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(54) **CREATING AN ABSTRACT CONCEPT MULTI-DISCIPLINED LEARNING TOOL**

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(73) Assignee: **Enduvo, Inc.**, Peoria, IL (US)

(21) Appl. No.: **17/096,754**

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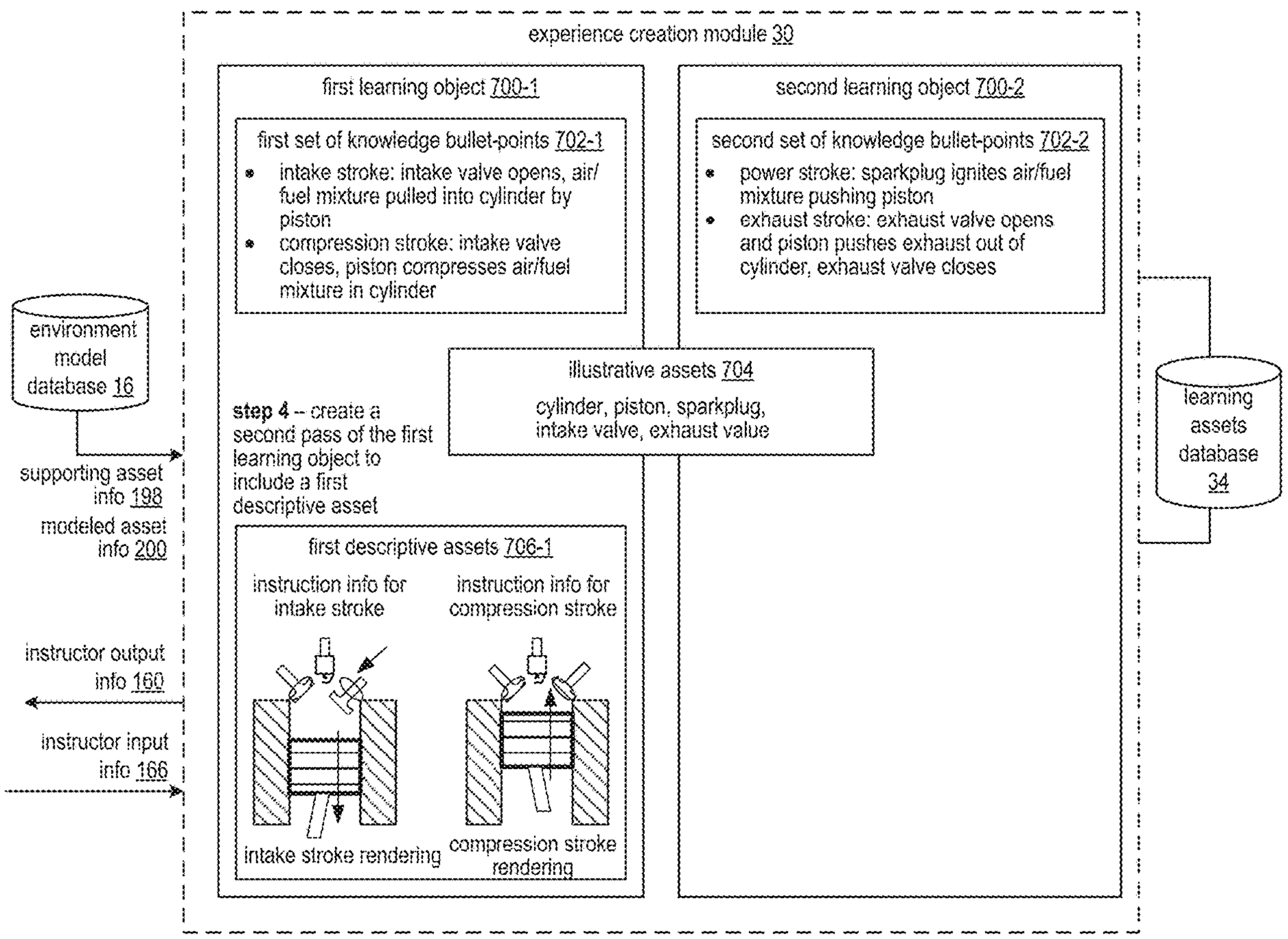
| ***G06F 16/22*** | (2006.01) |

(52) **U.S. Cl.**

CPC ..... ***G06F 40/166*** (2020.01); *G09B 7/00* (2013.01); ***G06F 16/2272*** (2019.01)

(57) **ABSTRACT**

A method for execution by a computing entity to create a multi-disciplined learning tool regarding an abstract environment topic includes creating first-passes of a first and second learning objects for first and second pieces of information regarding the abstract environment topic to include first and second sets of knowledge bullet-points regarding the first and second pieces of information. The method further includes obtaining a synthetic asset based on the first and second set of knowledge bullet-points. The method further includes creating second-passes of the first and second learning objects to further include first and second descriptive assets regarding the first and second pieces of information based on the first and second sets of knowledge bullet-points and the synthetic asset. The method further includes linking the second-passes of the first and second learning objects together to form at least a portion of the multi-disciplined learning tool.



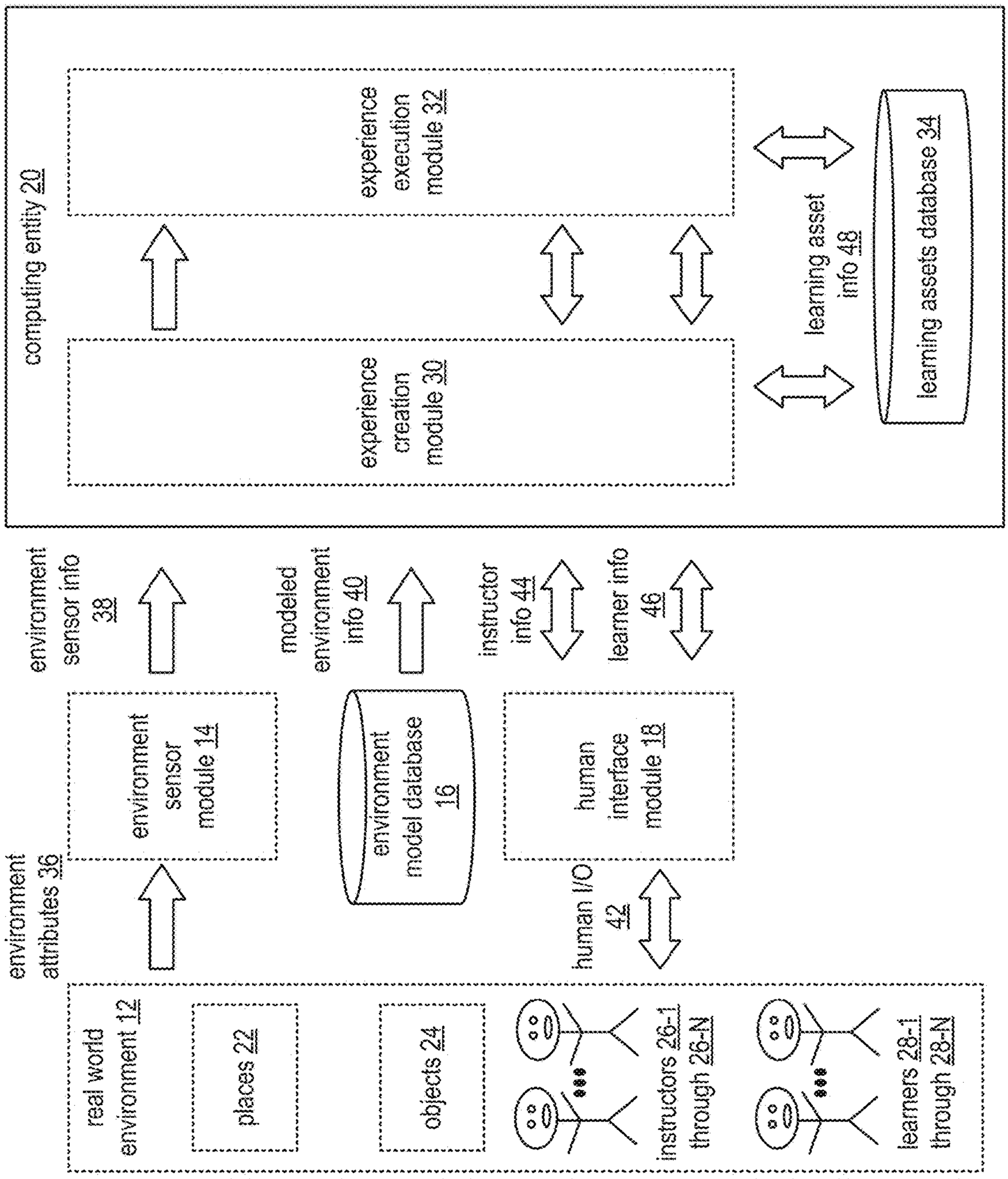

computing entity 20
experience execution module 32
experience creation module 30
learning assets data base 34
learning asset info 48
computing system 10
environment sensor info 38
modeled environment info 40
instructor info 44
learner info 46
environment sensor module 14
environment model database 16
human interface module 18
human I/O 42
environment attributes 36
real world environment 12
places 22
objects 24
instructors 26-1 through 26-N
learners 28-1 through 28-N

FIG. 1

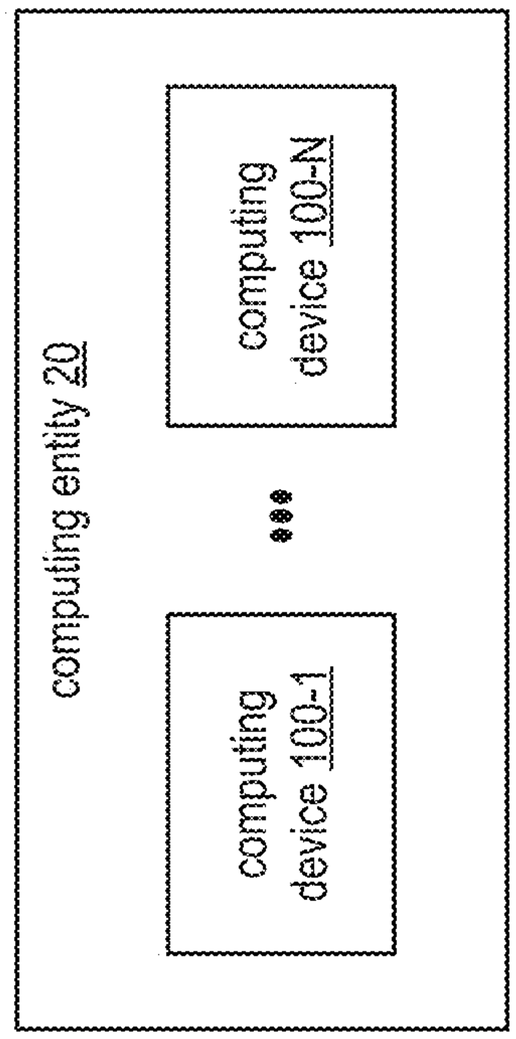

computing entity 20
computing device 100-1
computing device 100-N

FIG. 2A

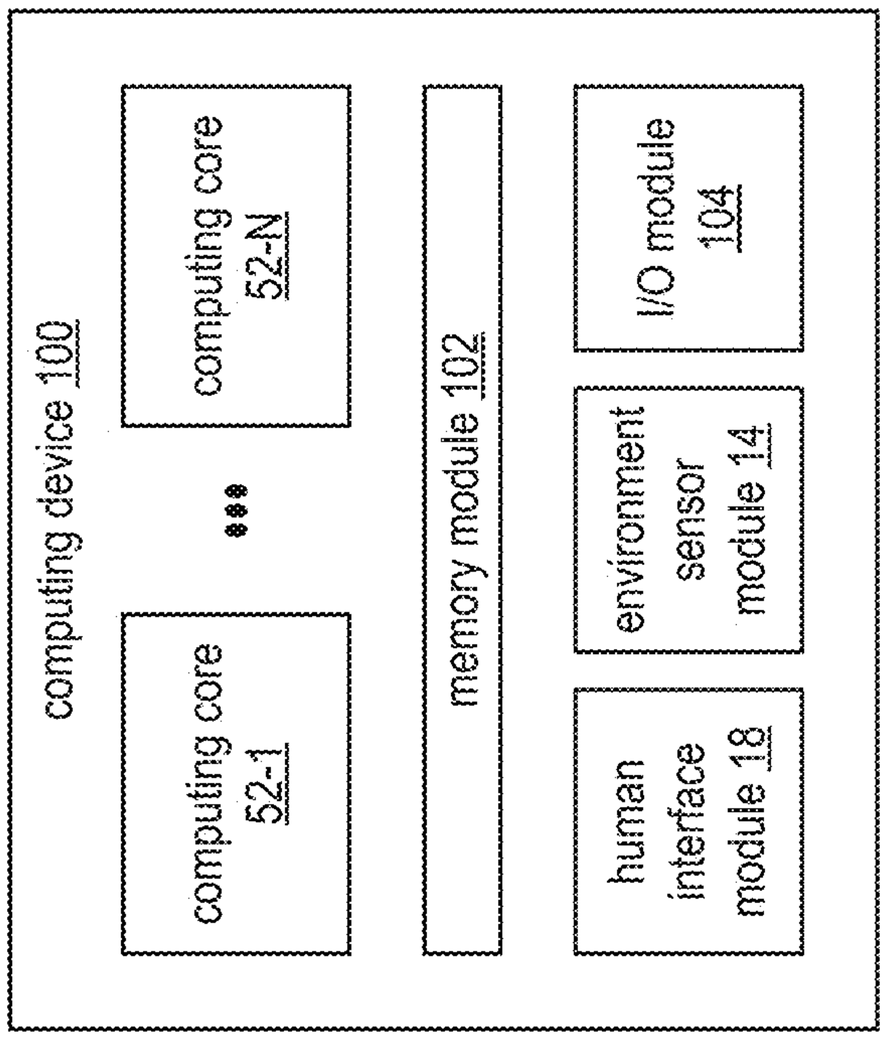

computing device 100
computing core 52-1
computing core 52-N
memory module 102
human interface module 18
environment sensor module 14
I/O module 104

FIG. 2B

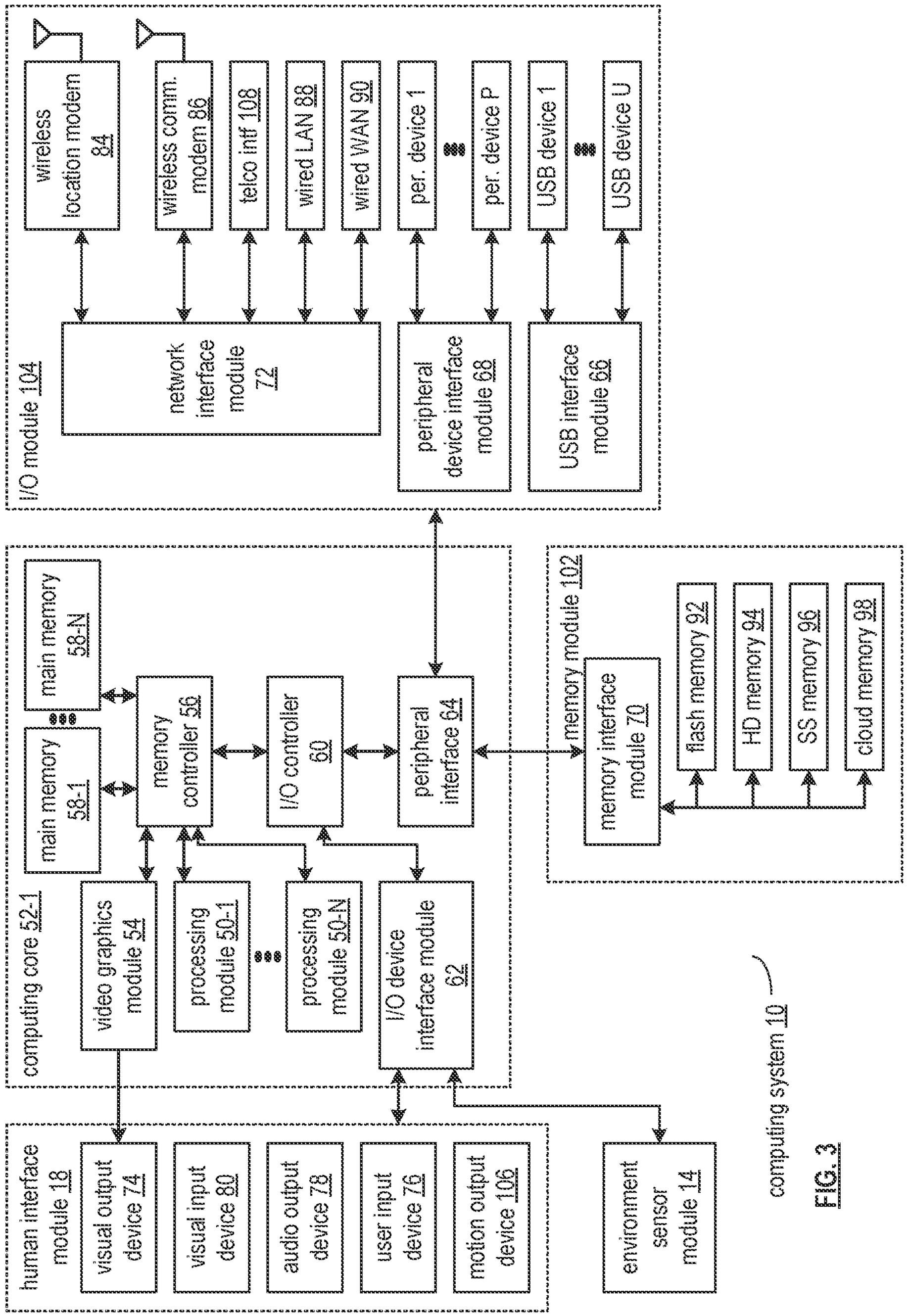

computing system 10
computing core 52-1
main memory 58-1
main memory 58-N
memory controller 56
I/O controller 60
peripheral interface 64
video graphics module 54
processing module 50-1
processing module 50-N
I/O device interface module 62
I/O module 104
wireless location modem 84
wireless comm. modem 86
telco intf 108
wired LAN 88
wired WAN 90
per. device 1
per. device P
USB device 1
USB device U
network interface module 72
peripheral device interface module 68
USB interface module 66
memory module 102
memory interface module 70
flash memory 92
HD memory 94
SS memory 96
cloud memory 98
human interface module 18
visual output device 74
visual input device 80
audio output device 78
user input device 76
motion output device 106
environment sensor module 14

FIG. 3

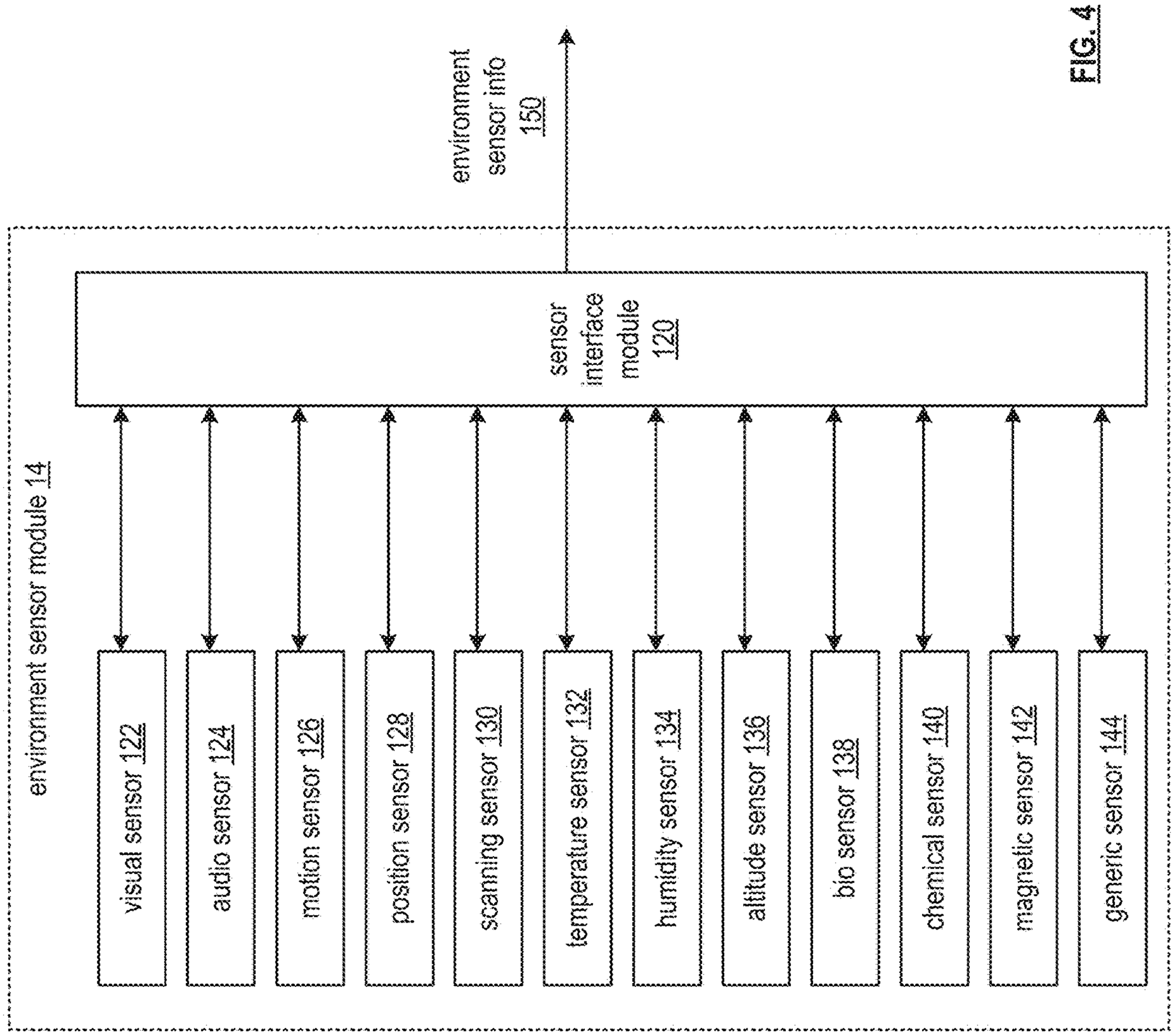

environment sensor info 150
environment sensor module 14
sensor interface module 120
visual sensor 122
audio sensor 124
motion sensor 126
position sensor 128
scanning sensor 130
temperature sensor 132
humidity sensor 134
altitude sensor 136
bio sensor 138
chemical sensor 140
magnetic sensor 142
generic sensor 144

FIG. 4

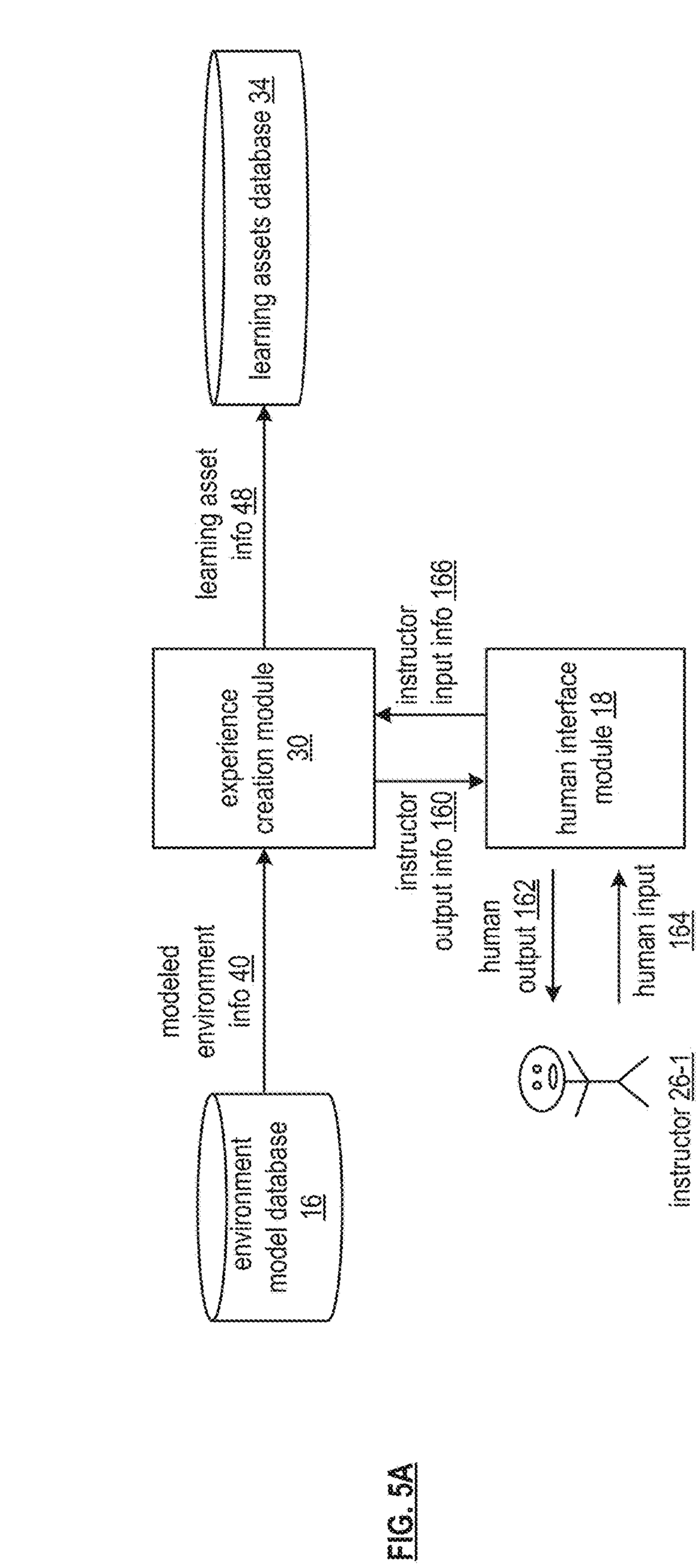

learning assets database 34
learning asset info 48
modeled environment info 40
experience creation module 30
instructor input info 166
instructor output info 160
human interface module 18
human output 162
human input 164
environment model database 16
instructor 26-1

FIG. 5A

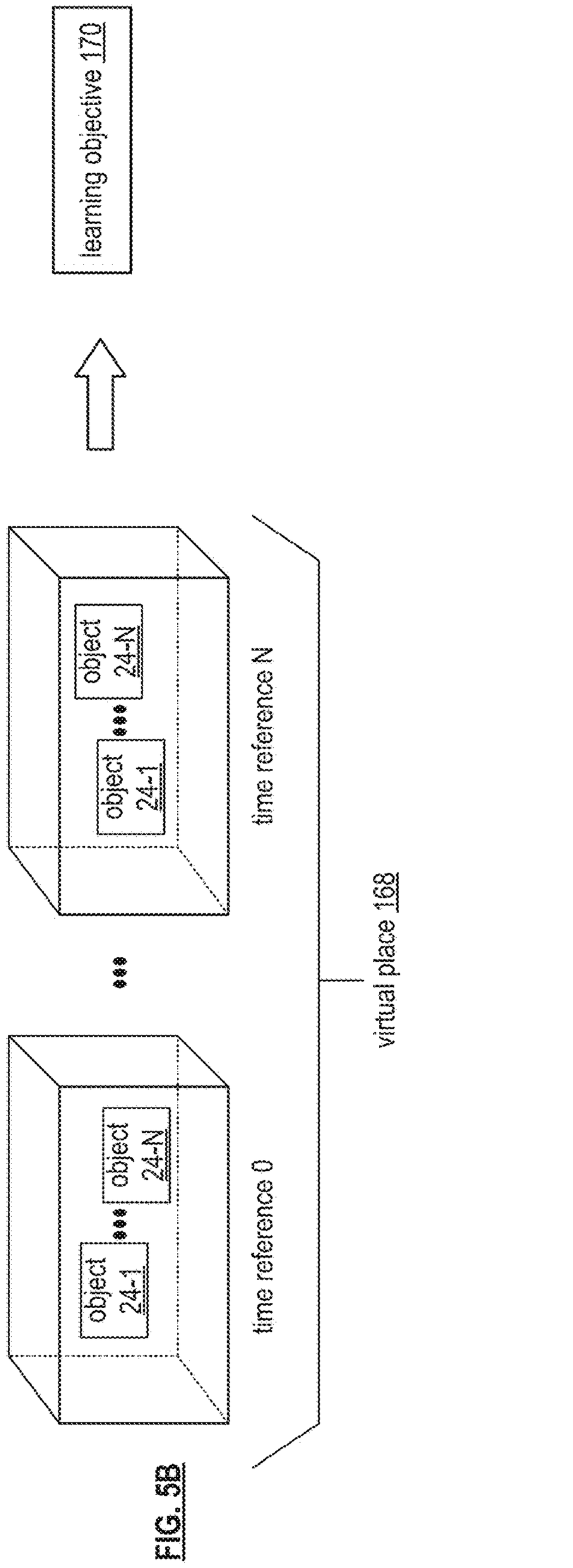

learning objective 170
object 24-N
object 24-1
time reference N
virtual place 168
object 24-1
object 24-N
time reference 0

FIG. 5B

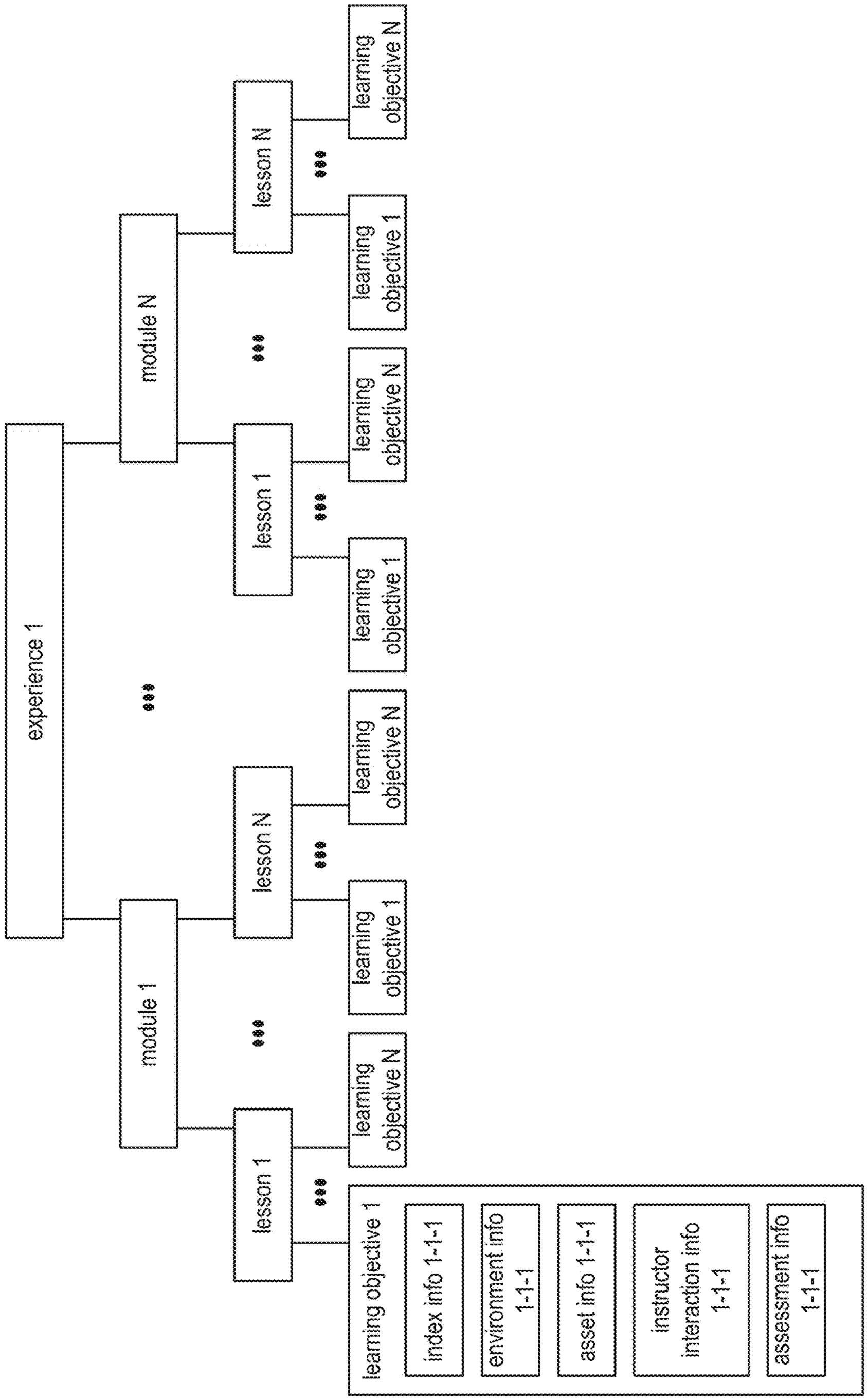

experience 1
module 1
lesson 1
learning objective 1
learning objective N
lesson N
learning objective 1
learning objective N
module N
lesson 1
learning objective 1
learning objective N
lesson N
learning objective 1
learning objective N
learning objective 1
index info 1-1-1
environment info 1-1-1
asset info 1-1-1
instructor interaction info 1-1-1
assessment info 1-1-1

FIG. 6

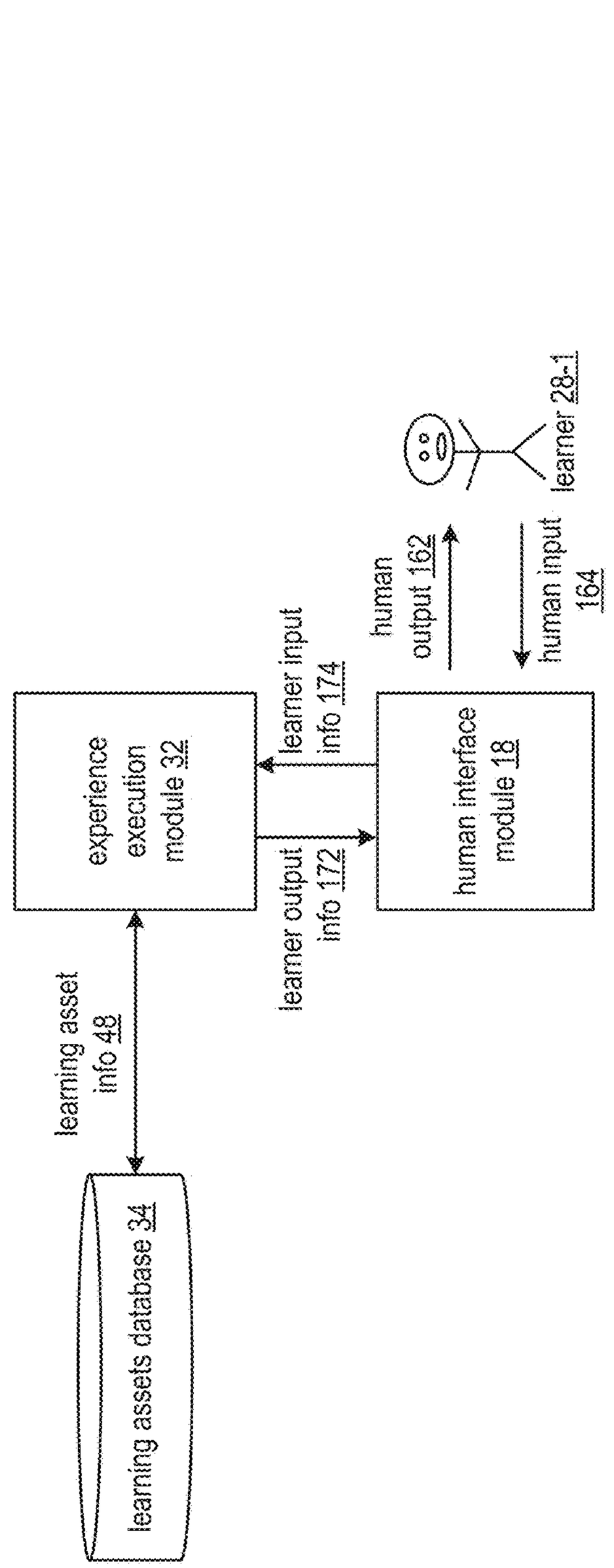

learner 28-1
learning asset info 48
learning assets database 34
experience execution module 32
learner output info 172
learner input info 174
human interface module 18
human output 162
human input 164

FIG. 7A

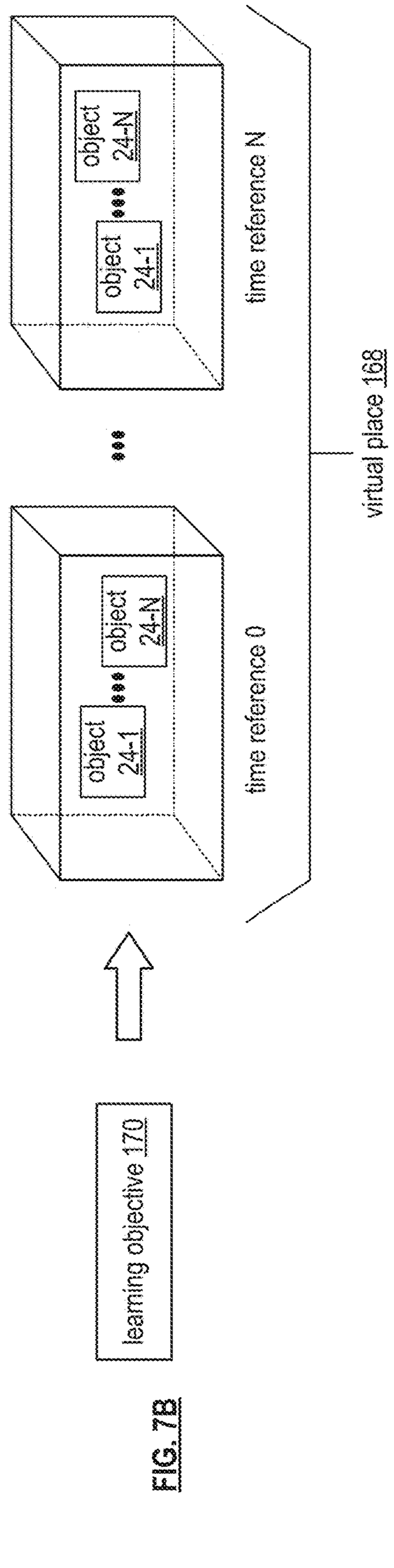

object 24-N
object 24-1
time reference N
virtual place 168
time reference 0
learning objective 170

FIG. 7B

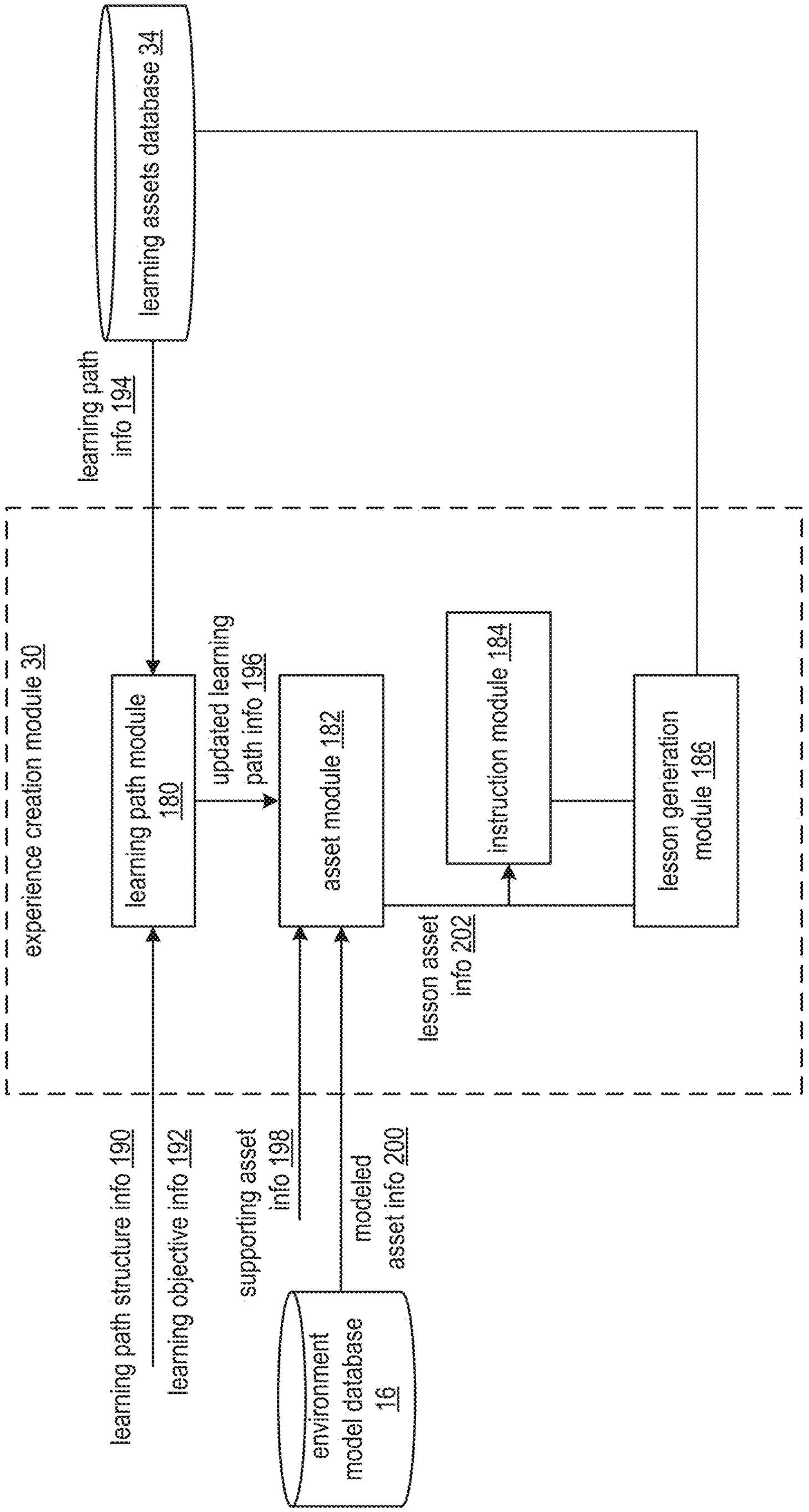

learning assets database 34
learning path info 194
experience creation module 30
learning path module 180
updated learning path info 196
asset module 182
instruction module 184
lesson generation module 186
lesson asset info 202
learning path structure info 190
learning objective info 192
supporting asset info 198
environment model database 16
modeled asset info 200

FIG. 8A

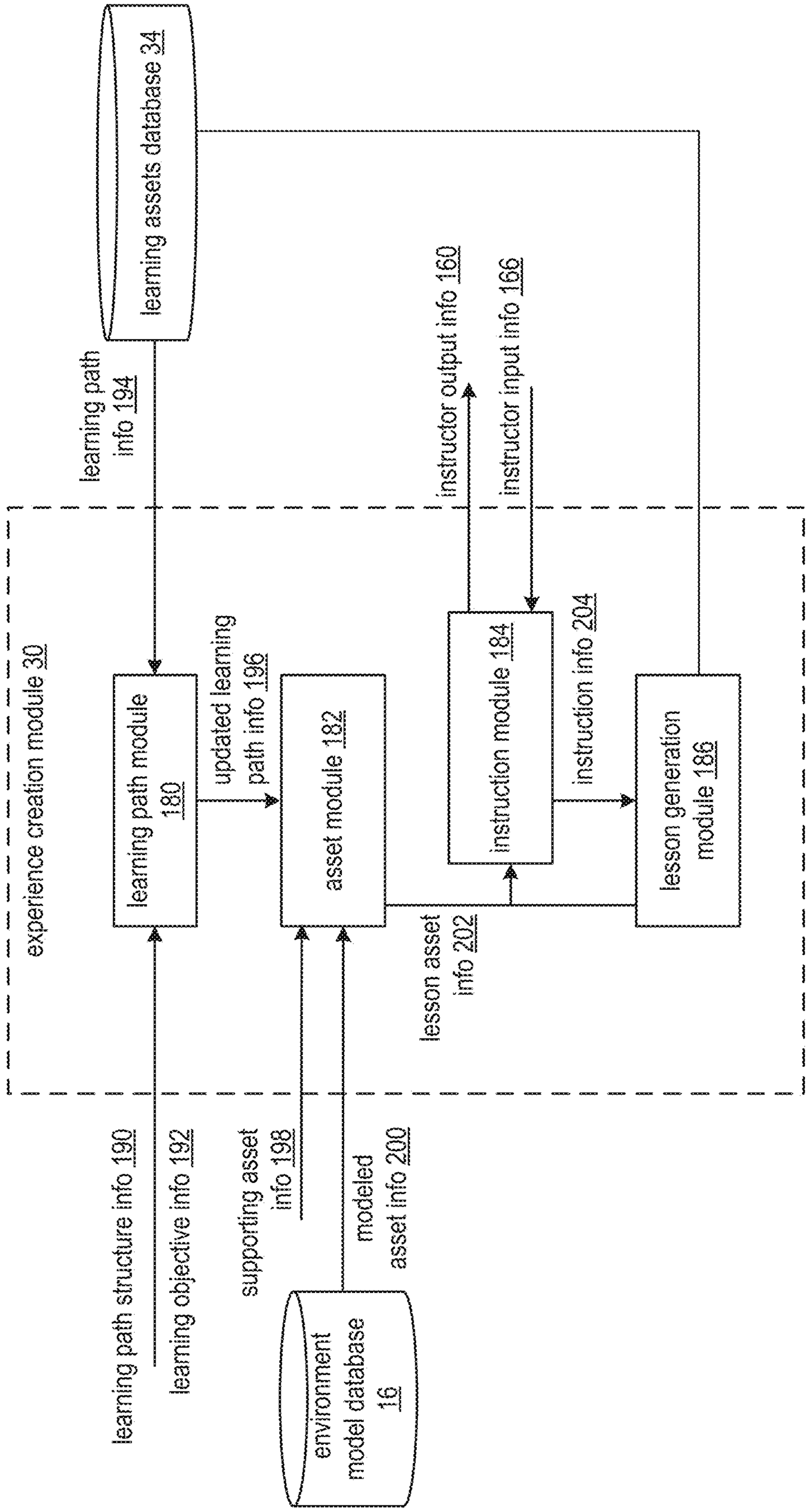

learning assets database 34
learning path info 194
learning path module 180
updated learning path info 196
asset module 182
lesson asset info 202
instructor output info 160
instructor input info 166
instruction module 184
instruction info 204
lesson generation module 186
experience creation module 30
learning path structure info 190
learning objective info 192
supporting asset info 198
environment model database 16
modeled asset info 200

FIG. 8B

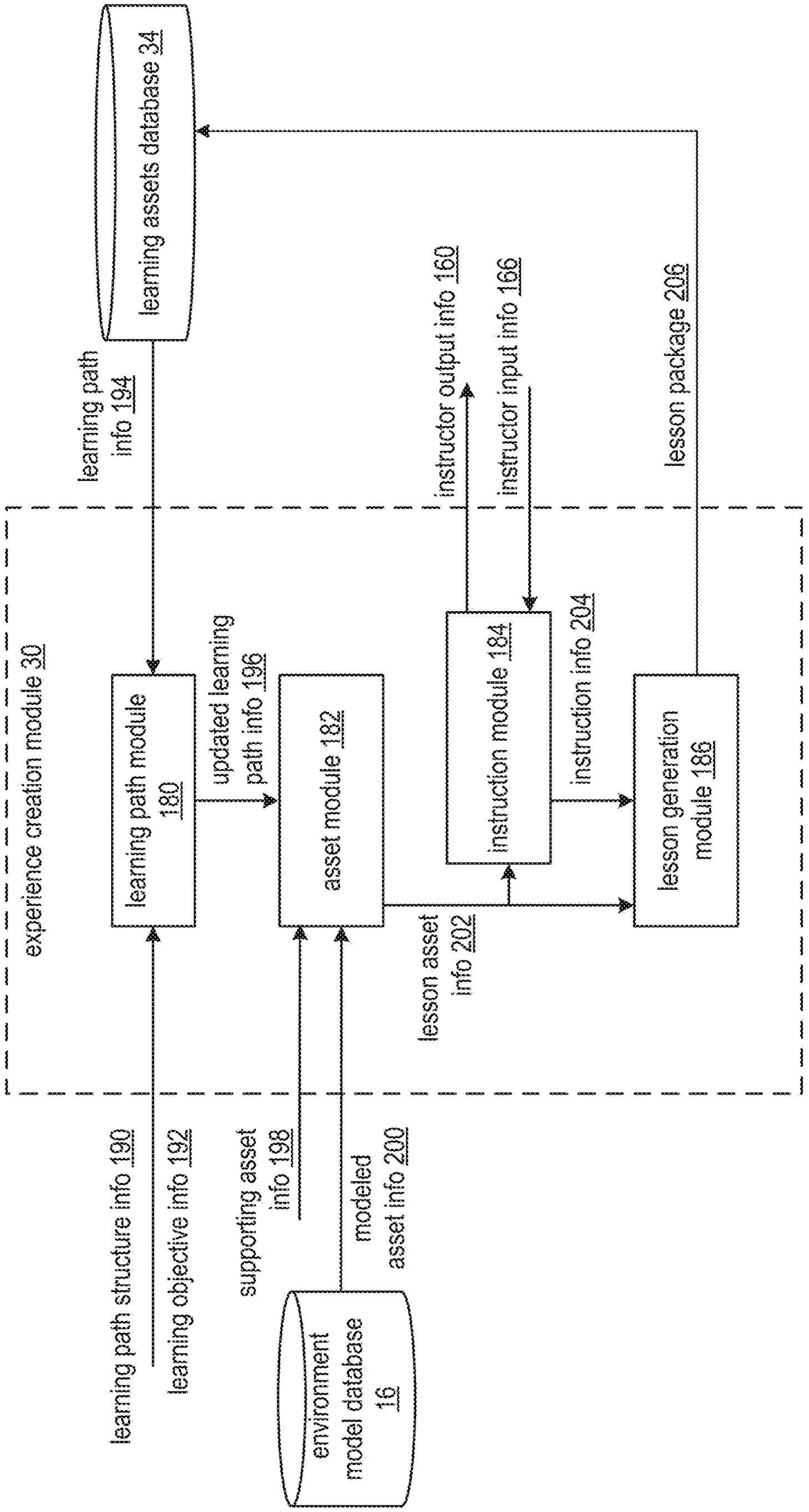

learning assets database 34
learning path info 194
learning path module 180
updated learning path info 196
asset module 182
lesson asset info 202
instruction module 184
instruction info 204
lesson generation module 186
instructor output info 160
instructor input info 166
lesson package 206
experience creation module 30
learning path structure info 190
learning objective info 192
supporting asset info 198
environment model database 16
modeled asset info 200

FIG. 8C

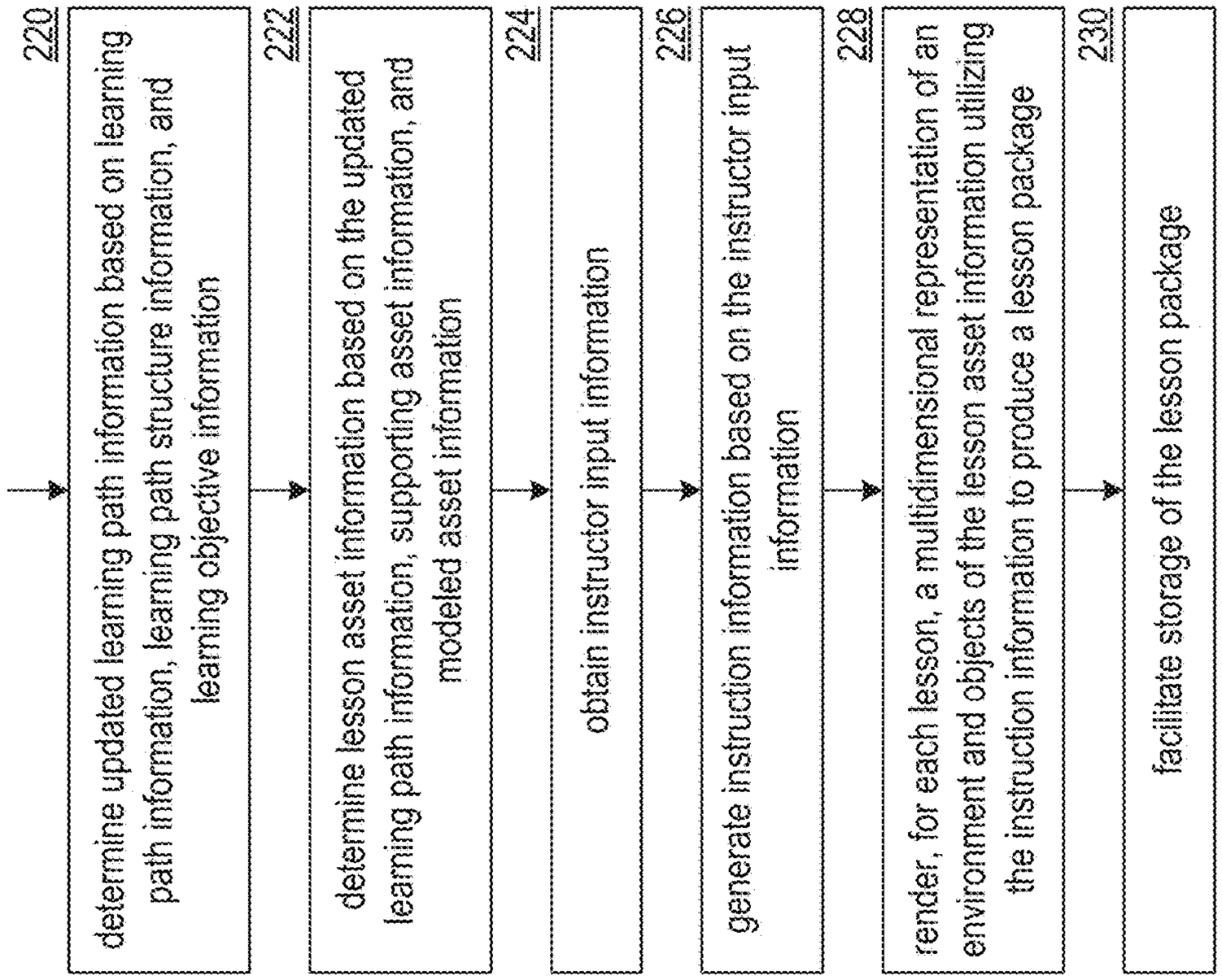

220
determine updated learning path information based on learning path information, learning path structure information, and learning objective information
222
determine lesson asset information based on the updated learning path information, supporting asset information, and modeled asset information
224
obtain instructor input information
226
generate instruction information based on the instructor input information
228
render, for each lesson, a multidimensional representation of an environment and objects of the lesson asset information utilizing the instruction information to produce a lesson package
230
facilitate storage of the lesson package

FIG. 8D

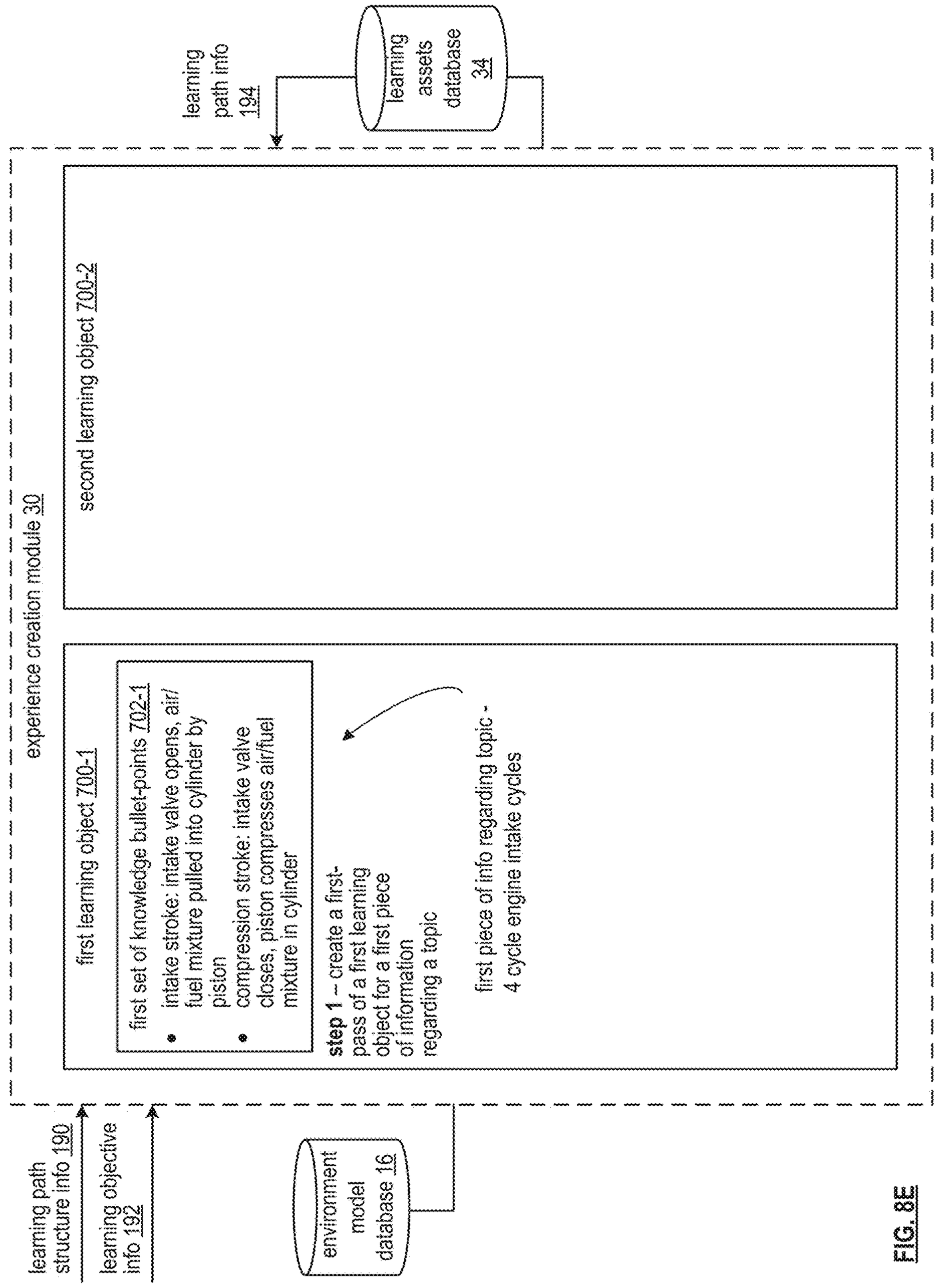

learning path info 194
learning assets database 34
experience creation module 30
second learning object 700-2
first learning object 700-1
first set of knowledge bullet-points 702-1
intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by pision
compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
step 1 – create a first-pass of a first learning object for a first piece of information regarding a topic
first piece of info regarding topic - 4 cycle engine intake cycles
learning path structure info 190
learning objective info 192
environment model database 16

FIG. 8E

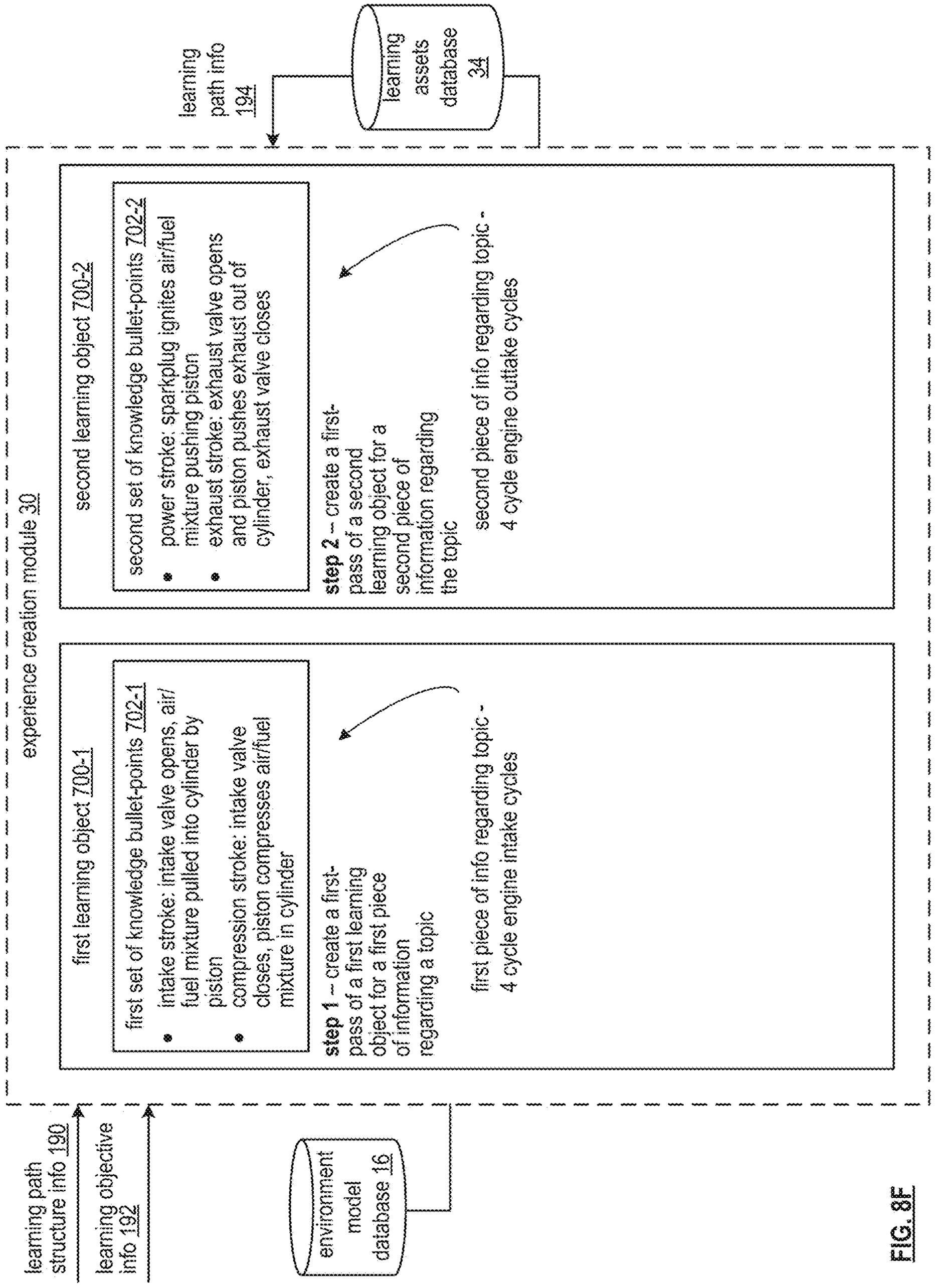

learning path info 194
learning assets database 34
experience creation module 30
second learning object 700-2
second set of knowledge bullet-points 702-2
power stroke: sparkplug ignites air/fuel mixture pushing piston
exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
step 2 – create a first-pass of a second learning object for a second piece of information regarding the topic
second piece of info regarding topic - 4 cycle engine outtake cycles
first learning object 700-1
first set of knowledge bullet-points 702-1
intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by pision
compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
step 1 – create a first-pass of a first learning object for a first piece of information regarding a topic
first piece of info regarding topic - 4 cycle engine intake cycles
learning path structure info 190
learning objective info 192
environment model database 16

FIG. 8F

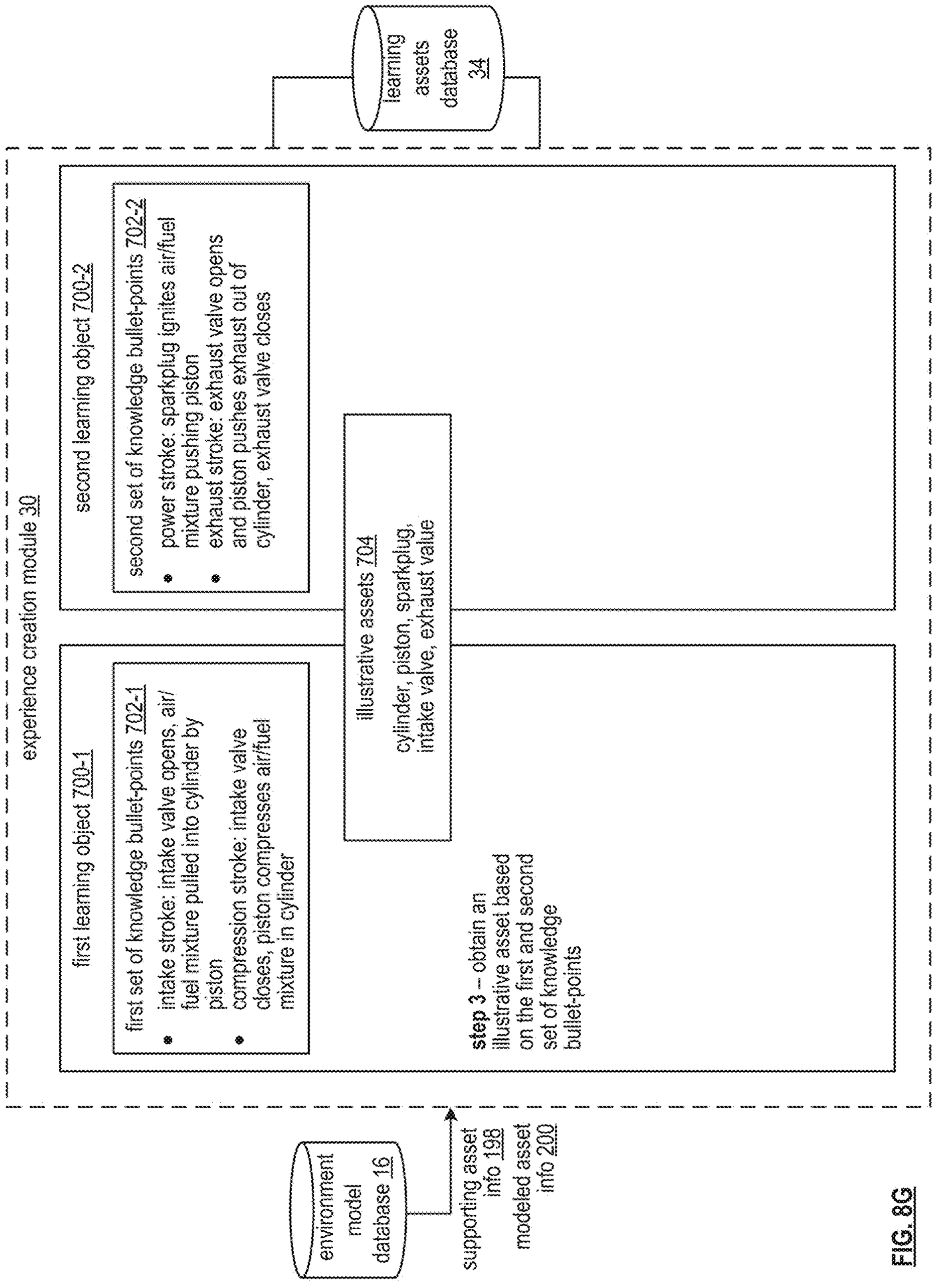

learning assets database 34
experience creation module 30
first learning object 700-1
first set of knowledge bullet-points 702-1
• intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by piston
• compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
second learning object 700-2
second set of knowledge bullet-points 702-2
• power stroke: sparkplug ignites air/fuel mixture pushing piston
• exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
illustrative assets 704
cylinder, piston, sparkplug, intake valve, exhaust value
step 3 – obtain an illustrative asset based on the first and second set of knowledge bullet-points
environment model database 16
supporting asset info 198
modeled asset info 200

FIG. 8G

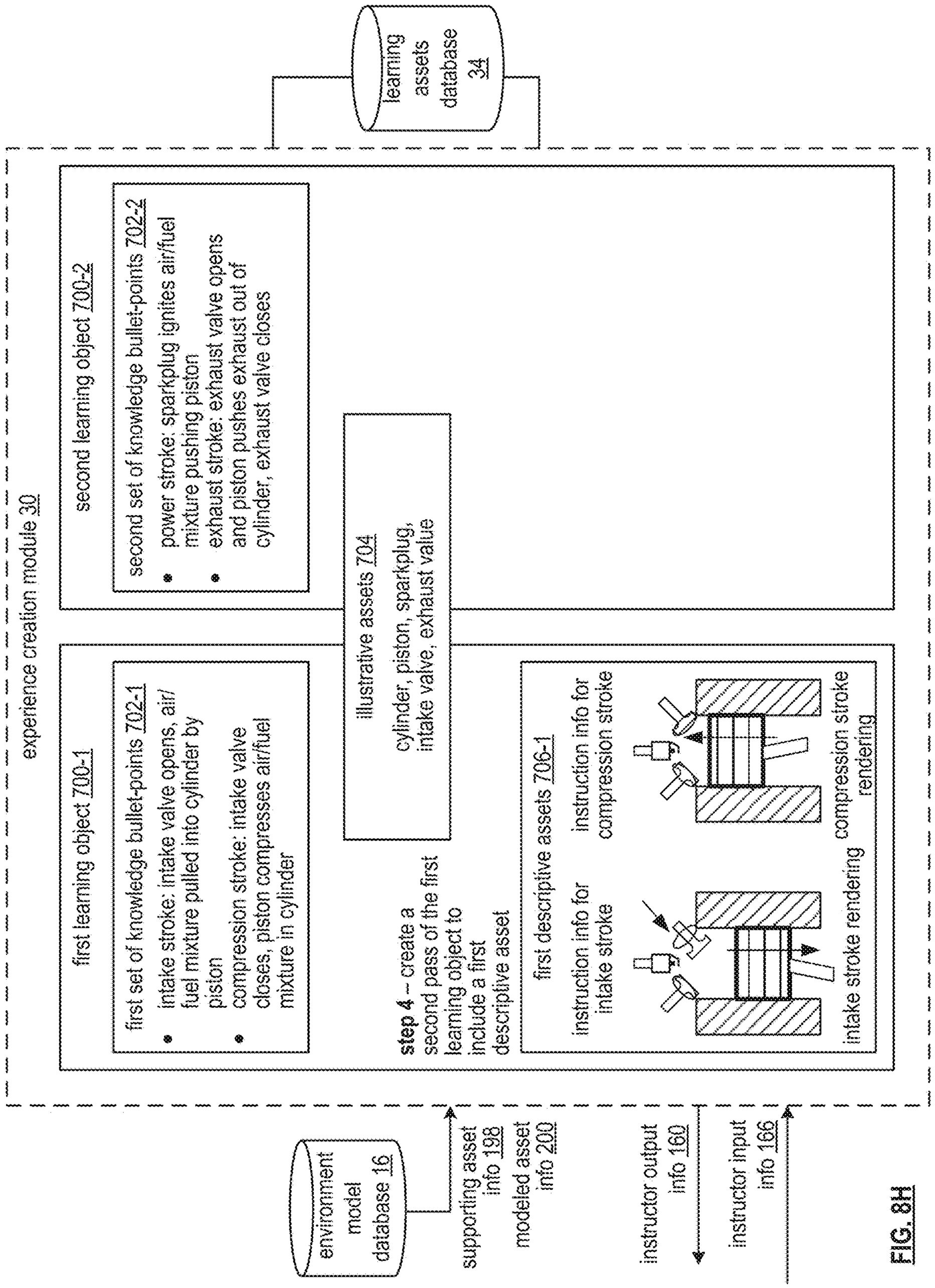

learning assets database 34
experience creation module 30
second learning object 700-2
second set of knowledge bullet-points 702-2
power stroke: sparkplug ignites air/fuel mixture pushing piston
exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
illustrative assets 704
cylinder, piston, sparkplug, intake valve, exhaust value
first learning object 700-1
first set of knowledge bullet-points 702-1
intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by pistion
compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
step 4 – create a second pass of the first learning object to include a first descriptive asset
first descriptive assets 706-1
instruction info for compression stroke
compression stroke rendering
instruction info for intake stroke
intake stroke rendering
environment model database 16
supporting asset info 198
modeled asset info 200
instructor output info 160
instructor input info 166

FIG. 8H

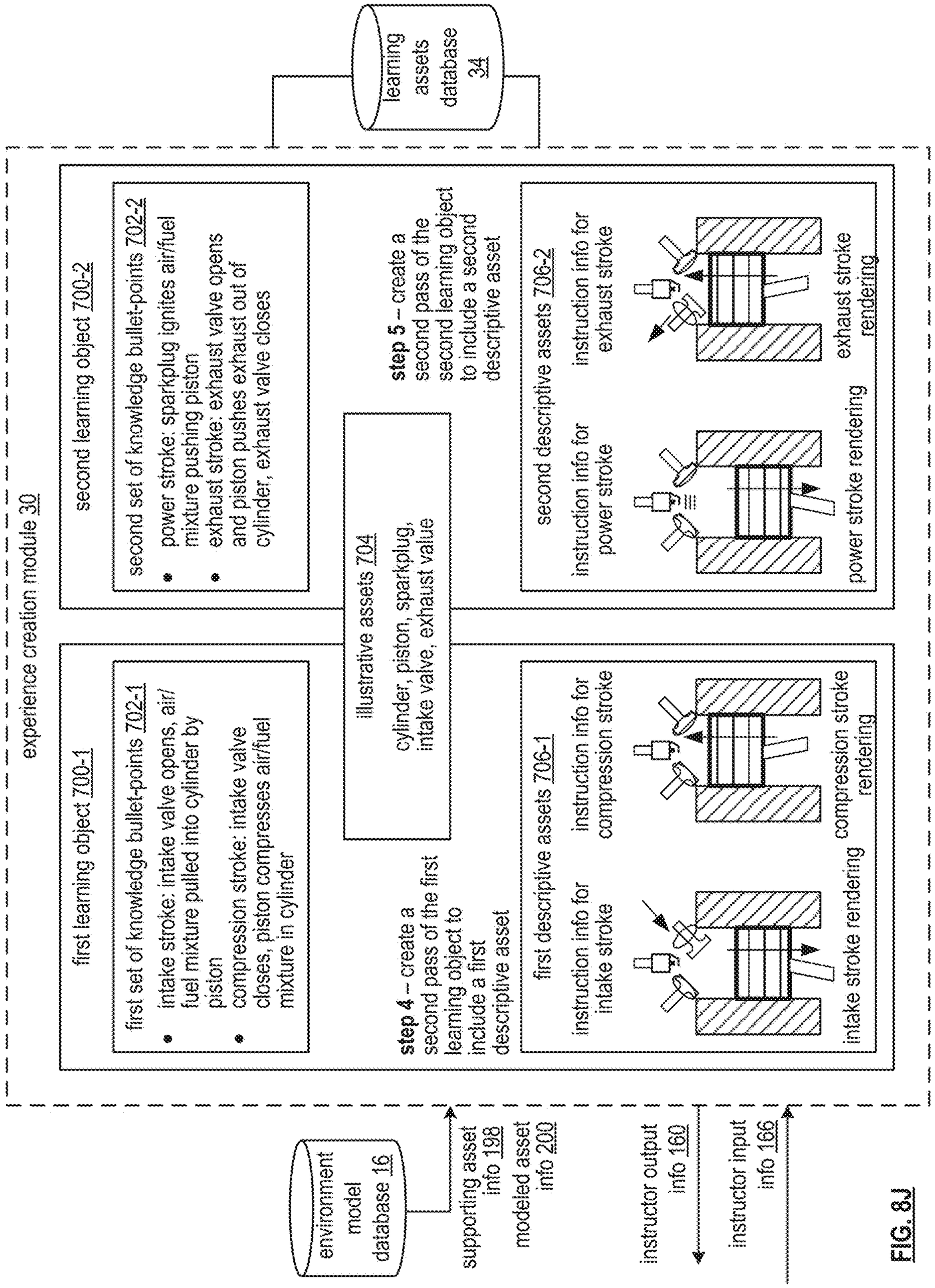

learning assets database 34
experience creation module 30
first learning object 700-1
first set of knowledge bullet-points 702-1
intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by pistion
compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
first descriptive assets 706-1
instruction info for intake stroke
intake stroke rendering
instruction info for compression stroke
compression stroke rendering
step 4 – create a second pass of the first learning object to include a first descriptive asset
illustrative assets 704
cylinder, piston, sparkplug, intake valve, exhaust value
step 5 – create a second pass of the second learning object to include a second descriptive asset
second learning object 700-2
second set of knowledge bullet-points 702-2
power stroke: sparkplug ignites air/fuel mixture pushing piston
exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
second descriptive assets 706-2
instruction info for power stroke
power stroke rendering
instruction info for exhaust stroke
exhaust stroke rendering
environment model database 16
supporting asset info 198
modeled asset info 200
instructor output info 160
instructor input info 166

FIG. 8J

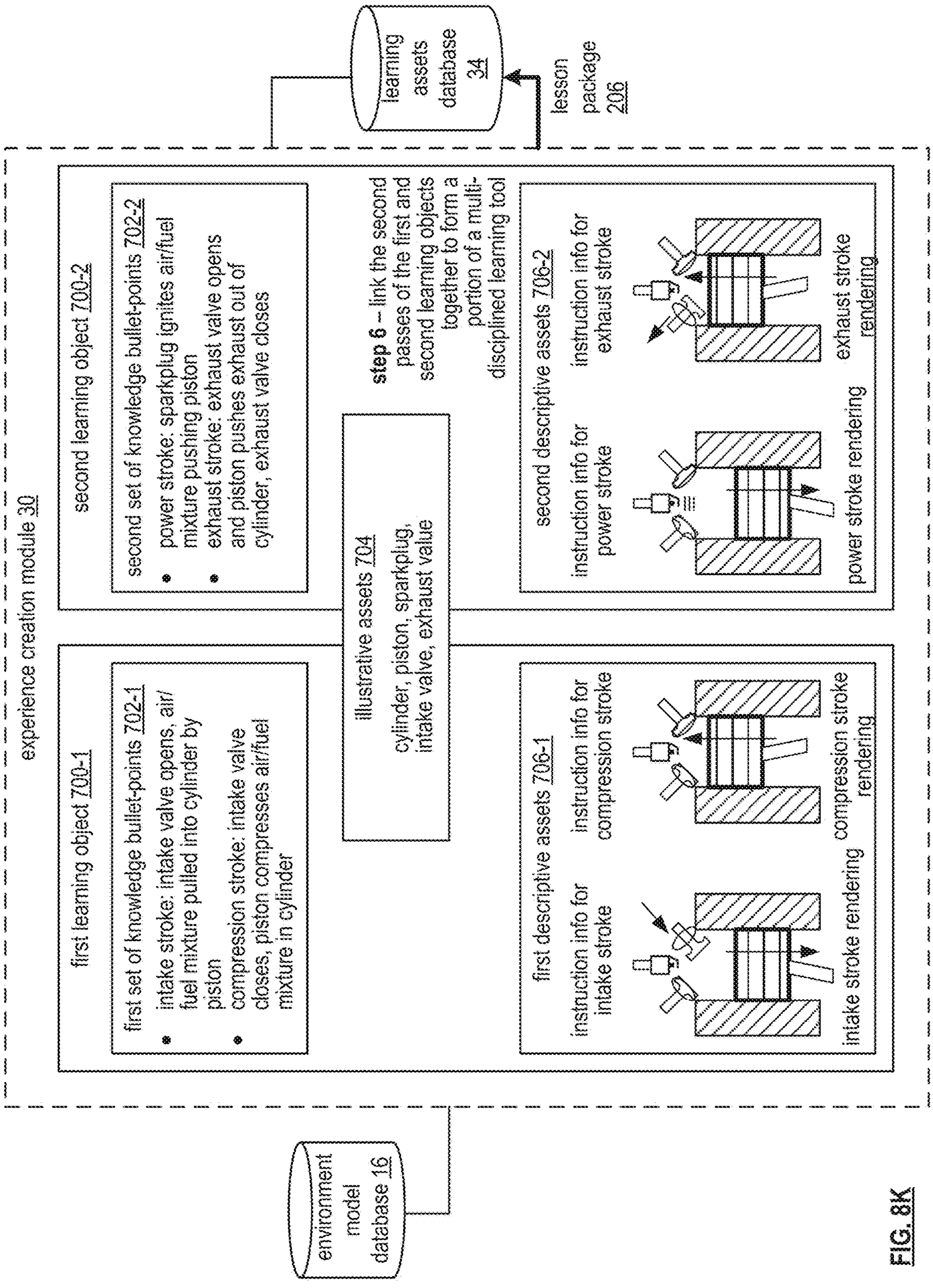

learning assets database 34
lesson package 206
experience creation module 30
second learning object 700-2
second set of knowledge bullet-points 702-2
power stroke: sparkplug ignites air/fuel mixture pushing piston
exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
step 6 – link the second passes of the first and second learning objects together to form a portion of a multi-disciplined learning tool
second descriptive assets 706-2
instruction info for exhaust stroke
exhaust stroke rendering
instruction info for power stroke
power stroke rendering
illustrative assets 704
cylinder, piston, sparkplug, intake valve, exhaust value
first learning object 700-1
first set of knowledge bullet-points 702-1
intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by piston
compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
first descriptive assets 706-1
instruction info for compression stroke
compression stroke rendering
instruction info for intake stroke
intake stroke rendering
environment model database 16

FIG. 8K

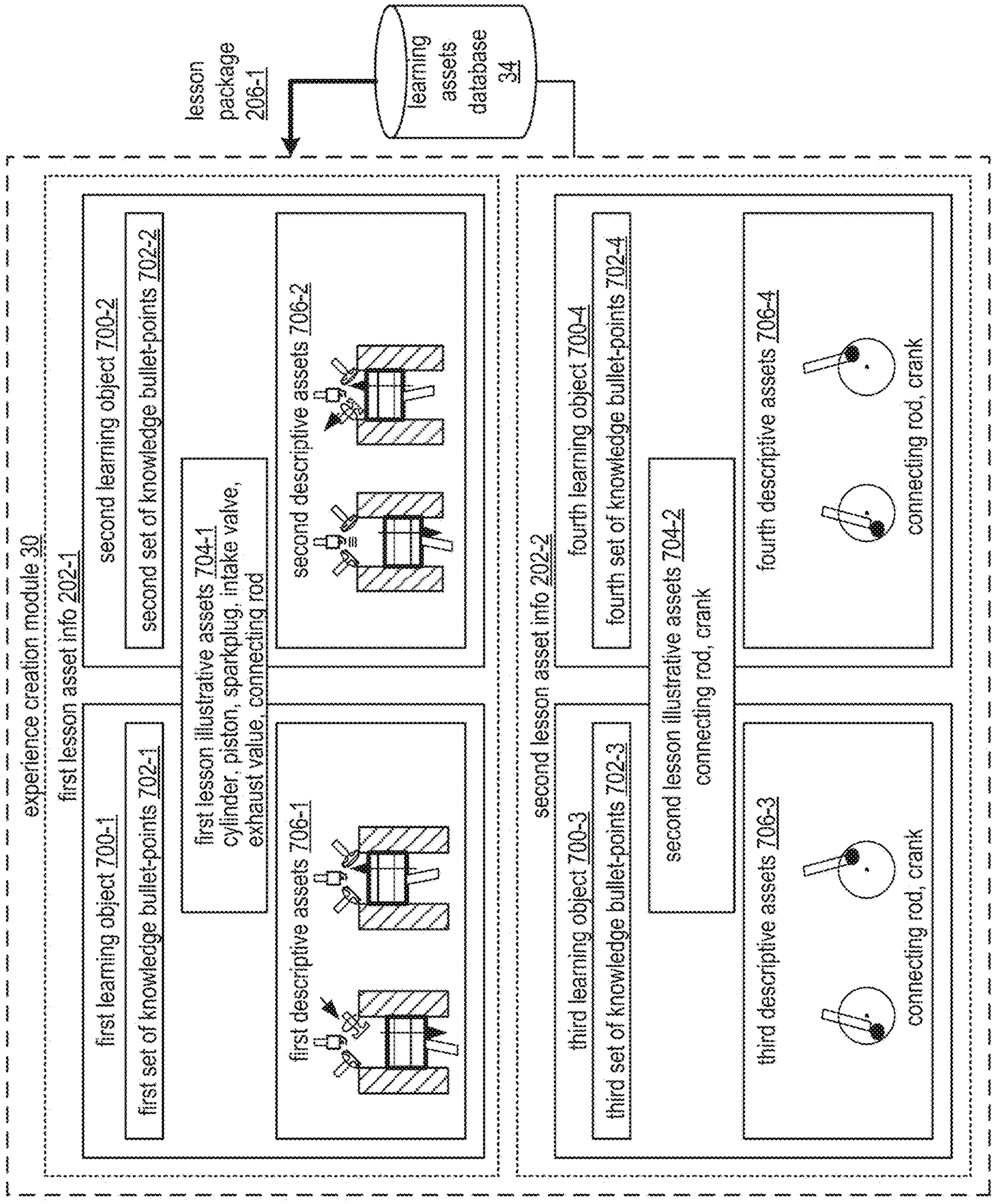

lesson package 206-1
learning assets database 34
experience creation module 30
first lesson asset info 202-1
first learning object 700-1
first set of knowledge bullet-points 702-1
first descriptive assets 706-1
first lesson illustrative assets 704-1
cylinder, piston, sparkplug, intake valve, exhaust value, connecting rod
second learning object 700-2
second set of knowledge bullet-points 702-2
second descriptive assets 706-2
second lesson asset info 202-2
third learning object 700-3
third set of knowledge bullet-points 702-3
third descriptive assets 706-3
second lesson illustrative assets 704-2
connecting rod, crank
fourth learning object 700-4
fourth set of knowledge bullet-points 702-4
fourth descriptive assets 706-4
connecting rod, crank
step 1 – obtain first lesson asset information regarding a first topic
step 2 – obtain second lesson asset information regarding a second topic

FIG. 9A

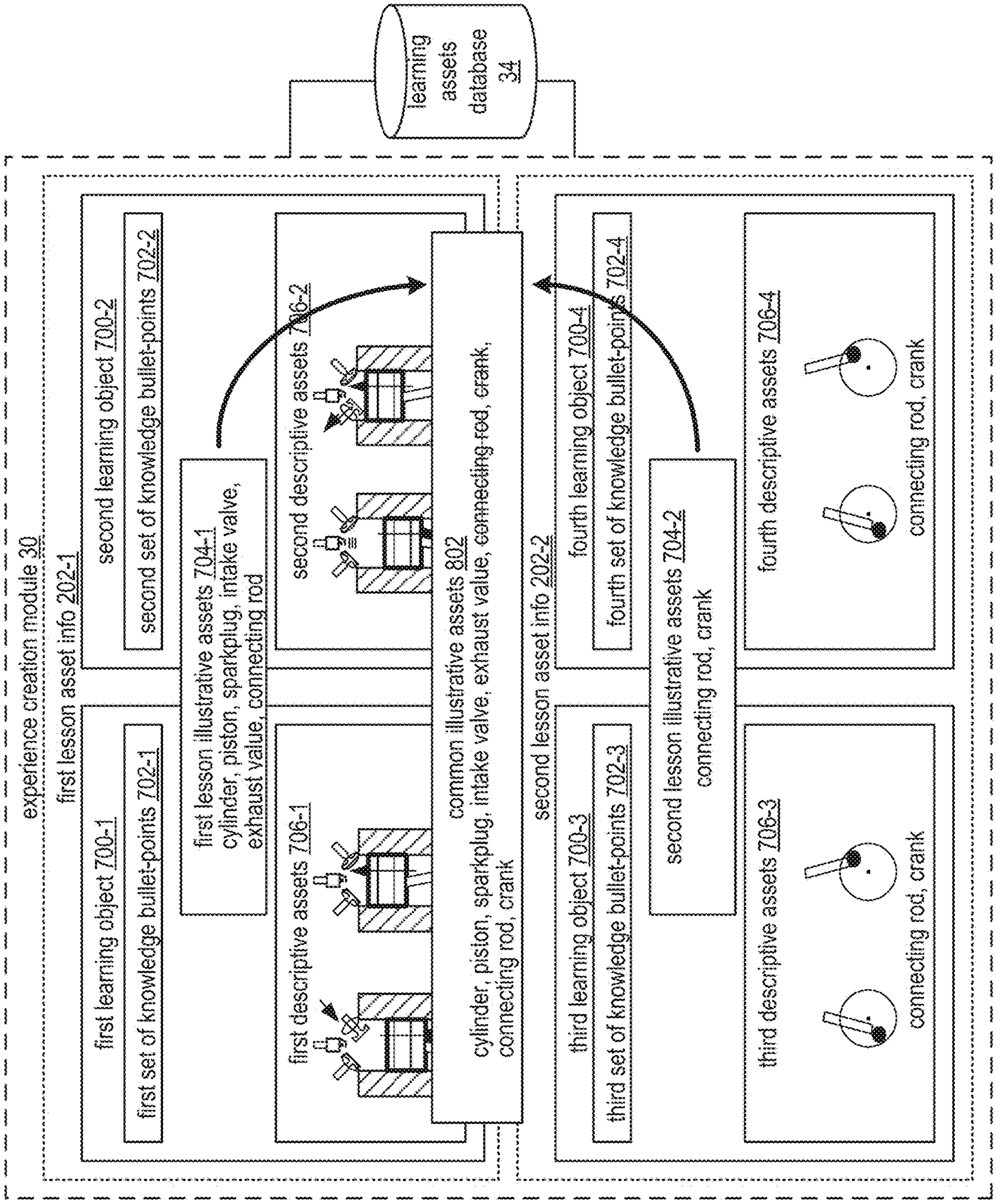

learning assets database 34
experience creation module 30
first lesson asset info 202-1
first learning object 700-1
first set of knowledge bullet-points 702-1
first lesson illustrative assets 704-1
cylinder, piston, sparkplug, intake valve, exhaust value, connecting rod
second learning object 700-2
second set of knowledge bullet-points 702-2
second descriptive assets 706-2
first descriptive assets 706-1
common illustrative assets 802
cylinder, pision, sparkplug, intake valve, exhaust value, connecting-rod, crank,
connecting rod, crank
second lesson asset info 202-2
third learning object 700-3
third set of knowledge bullet-points 702-3
second lesson illustrative assets 704-2
connecting rod, crank
fourth learning object 700-4
fourth set of knowledge bullet-points 702-4
fourth descriptive assets 706-4
third descriptive assets 706-3
connecting rod, crank
step 3 – generate a set of common lesson illustrative assets

FIG. 9B

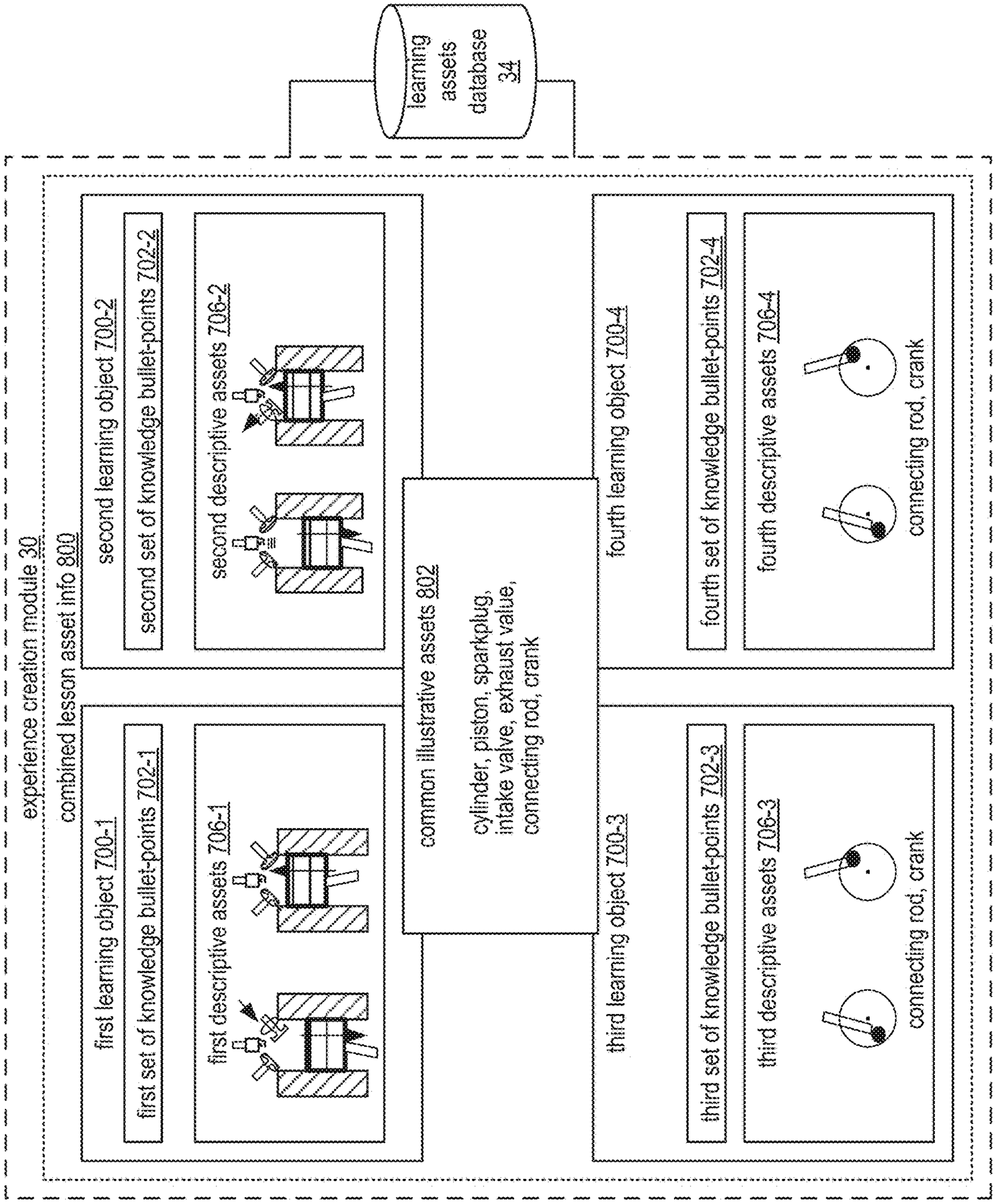

learning assets database 34
experience creation module 30
combined lesson asset info 800
first learning object 700-1
first set of knowledge bullet-points 702-1
first descriptive assets 706-1
second learning object 700-2
second set of knowledge bullet-points 702-2
second descriptive assets 706-2
common illustrative assets 802
cylinder, piston, sparkplug, intake valve, exhaust value, connecting rod, crank
third learning object 700-3
third set of knowledge bullet-points 702-3
third descriptive assets 706-3
connecting rod, crank
fourth learning object 700-4
fourth set of knowledge bullet-points 702-4
fourth descriptive assets 706-4
connecting rod, crank
step 4 – generate combined lesson asset information

FIG. 9C

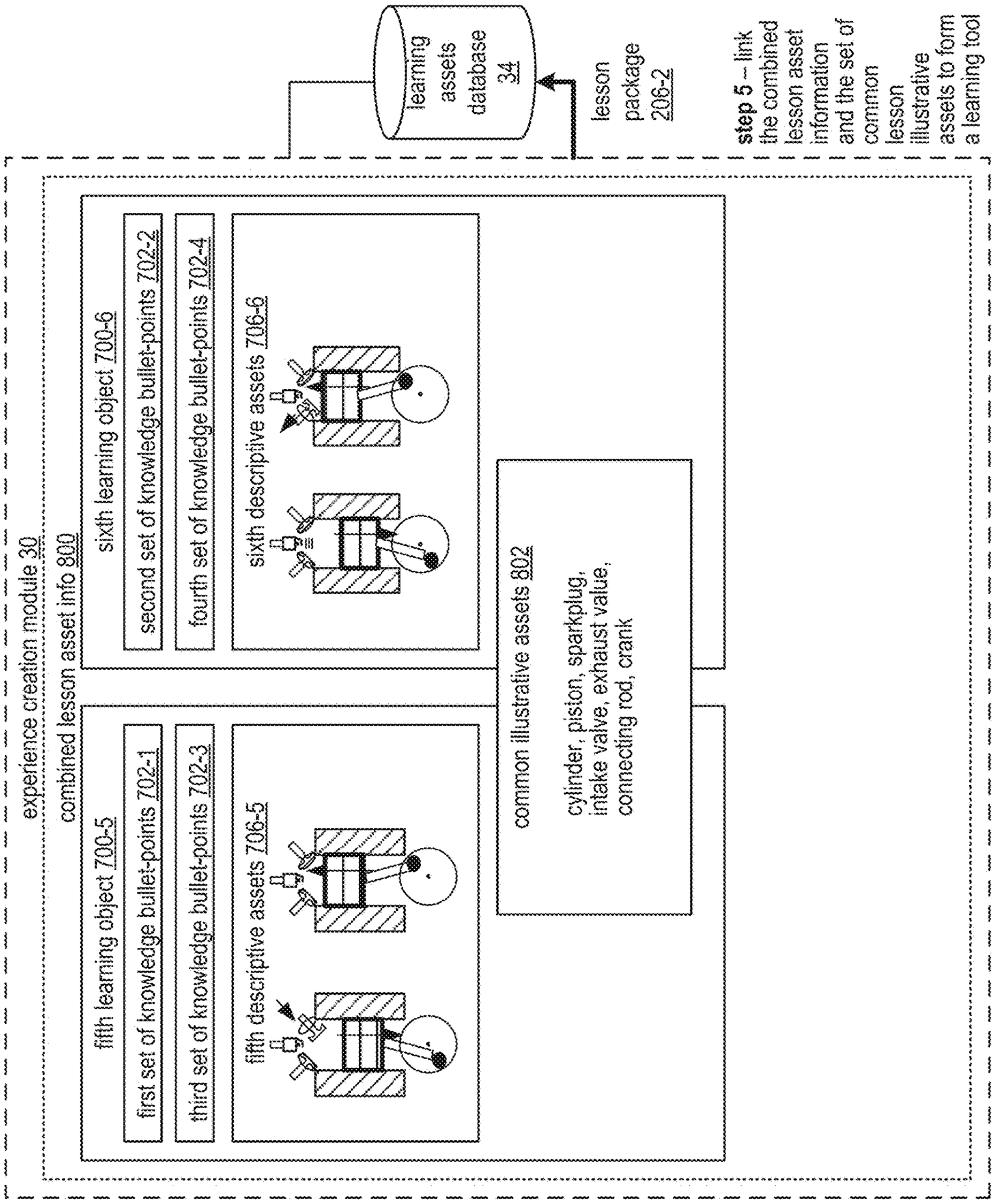

learning assets database 34
lesson package 206-2
step 5 – link the combined lesson asset information and the set of common lesson illustrative assets to form a learning tool
experience creation module 30
combined lesson asset info 800
sixth learning object 700-6
second set of knowledge bullet-points 702-2
fourth set of knowledge bullet-points 702-4
sixth descriptive assets 706-6
fifth learning object 700-5
first set of knowledge bullet-points 702-1
third set of knowledge bullet-points 702-3
fifth descriptive assets 706-5
common illustrative assets 802
cylinder, pision, sparkplug, intake valve, exhaust value, connecting rod, crank
step 4 – generate combined lesson asset information

FIG. 9D

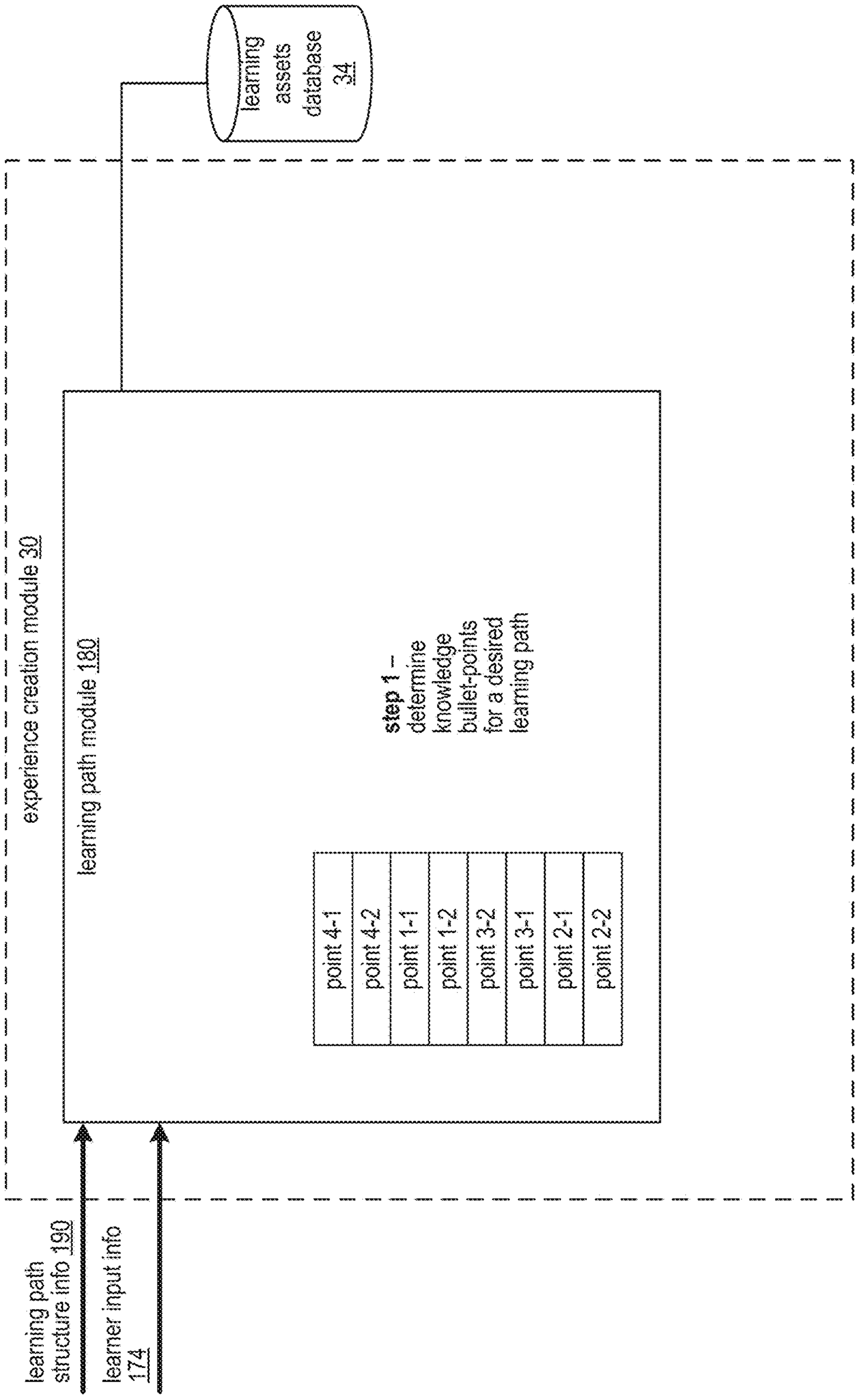

learning assets database 34
experience creation module 30
learning path module 180
step 1 – determine knowledge bullet-points for a desired learning path
point 4-1
point 4-2
point 1-1
point 1-2
point 3-2
point 3-1
point 2-1
point 2-2
learning path structure info 190
learner input info 174

FIG. 10A

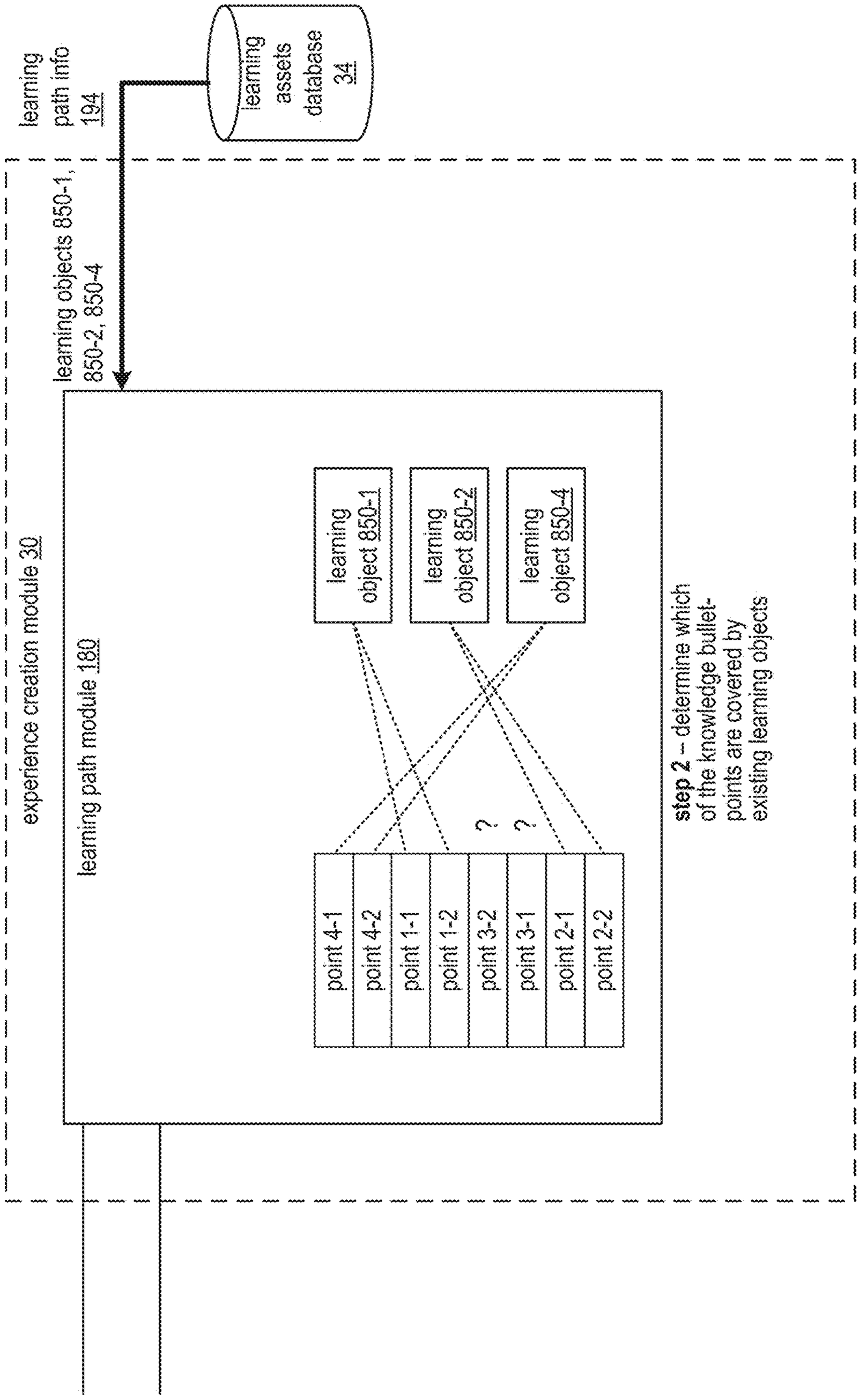

learning path info 194
learning assets database 34
learning objects 850-1, 850-2, 850-4
experience creation module 30
learning path module 180
learning object 850-1
learning object 850-2
learning object 850-4
point 4-1
point 4-2
point 1-1
point 1-2
point 3-2
point 3-1
point 2-1
point 2-2
? ?
step 2 – determine which of the knowledge bullet-points are covered by existing learning objects

FIG. 10B

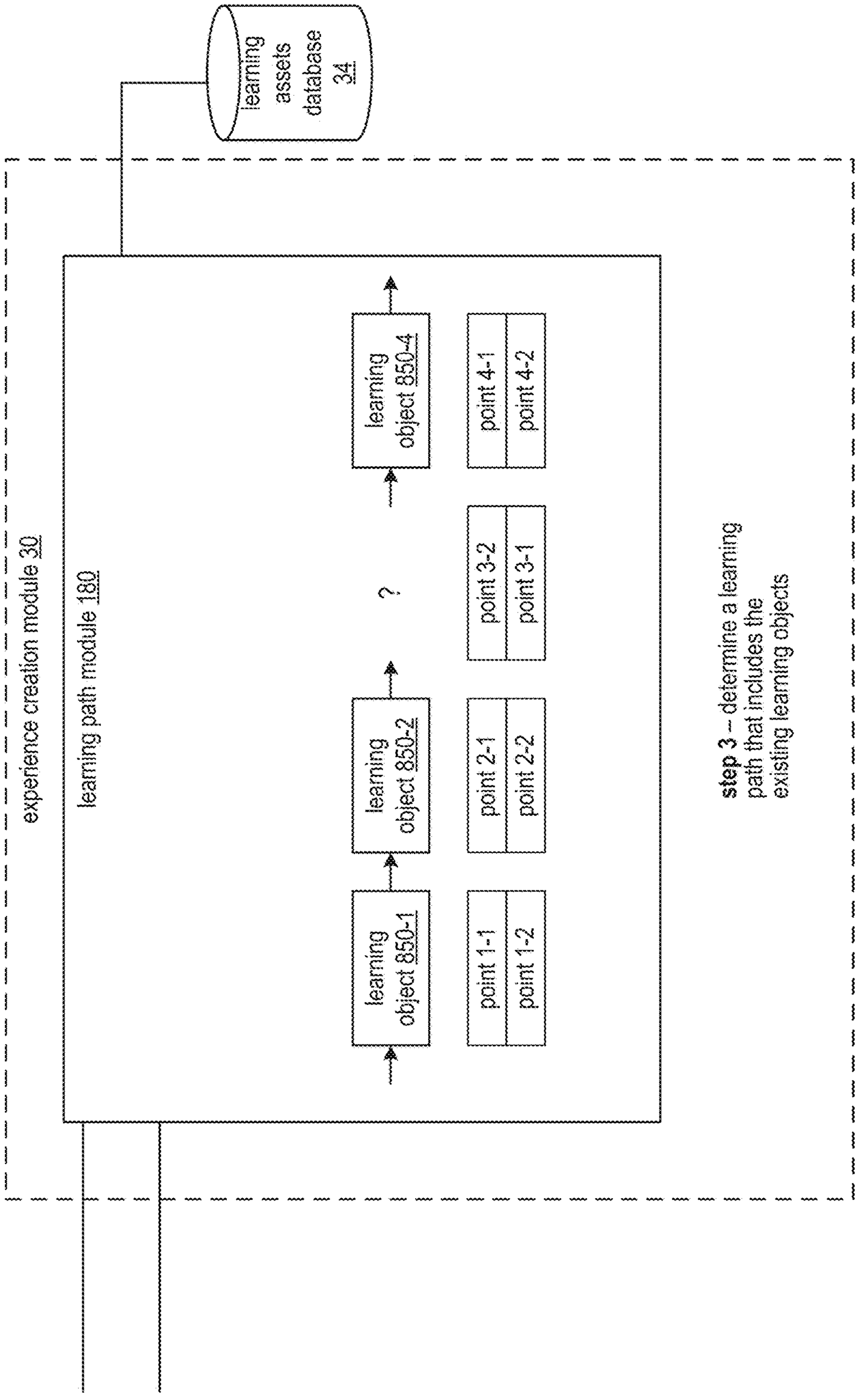

learning assets database 34
experience creation module 30
learning path module 180
learning object 850-1
learning object 850-2
?
learning object 850-4
point 1-1
point 1-2
point 2-1
point 2-2
point 3-1
point 3-2
point 4-1
point 4-2
step 3 – determine a learning path that includes the existing learning objects

FIG. 10C

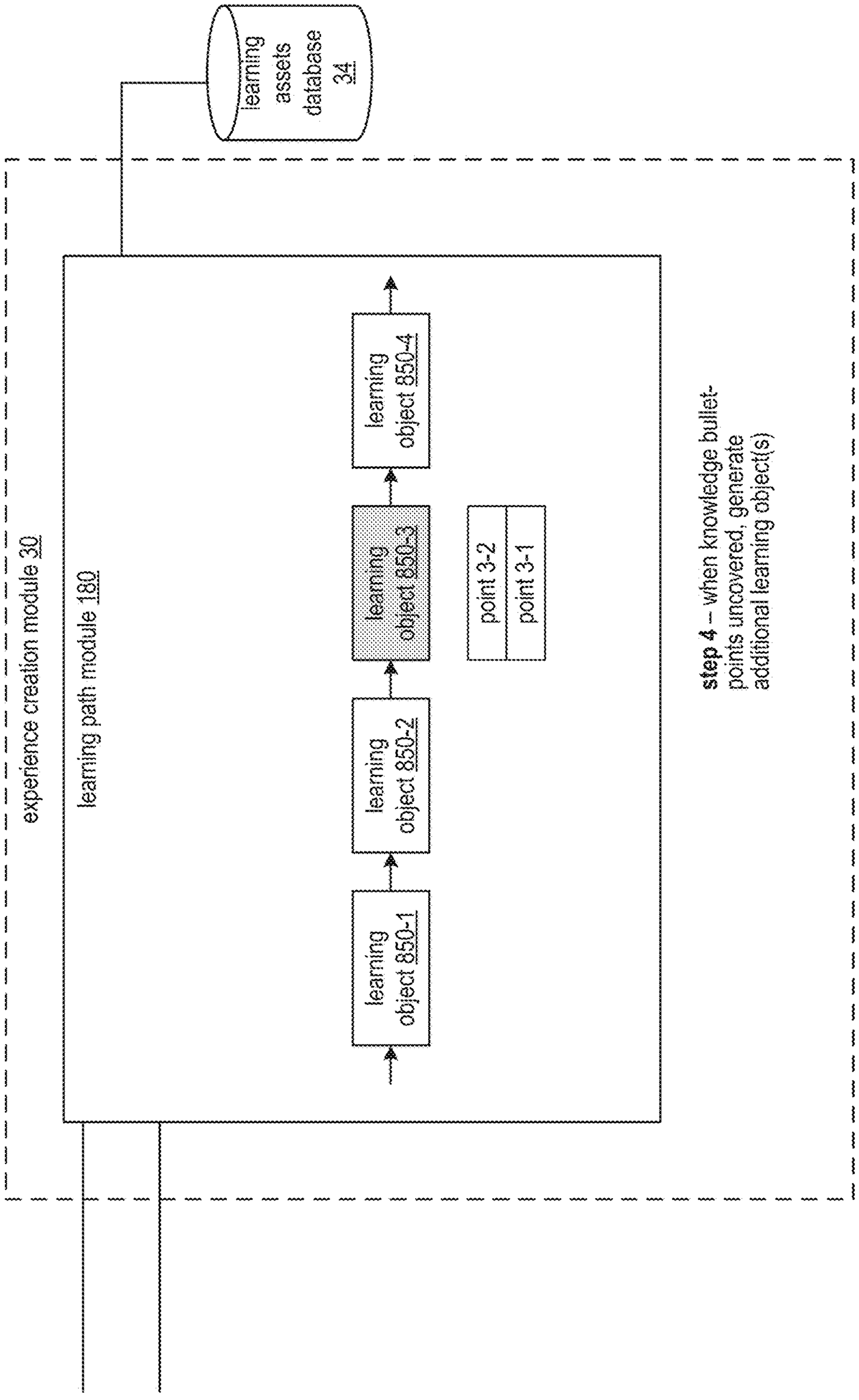

learning assets database 34
experience creation module 30
learning path module 180
learning object 850-1
learning object 850-2
learning object 850-3
learning object 850-4
point 3-1
point 3-2
step 4 – when knowledge bullet-points uncovered, generate additional learning object(s)

FIG. 10D

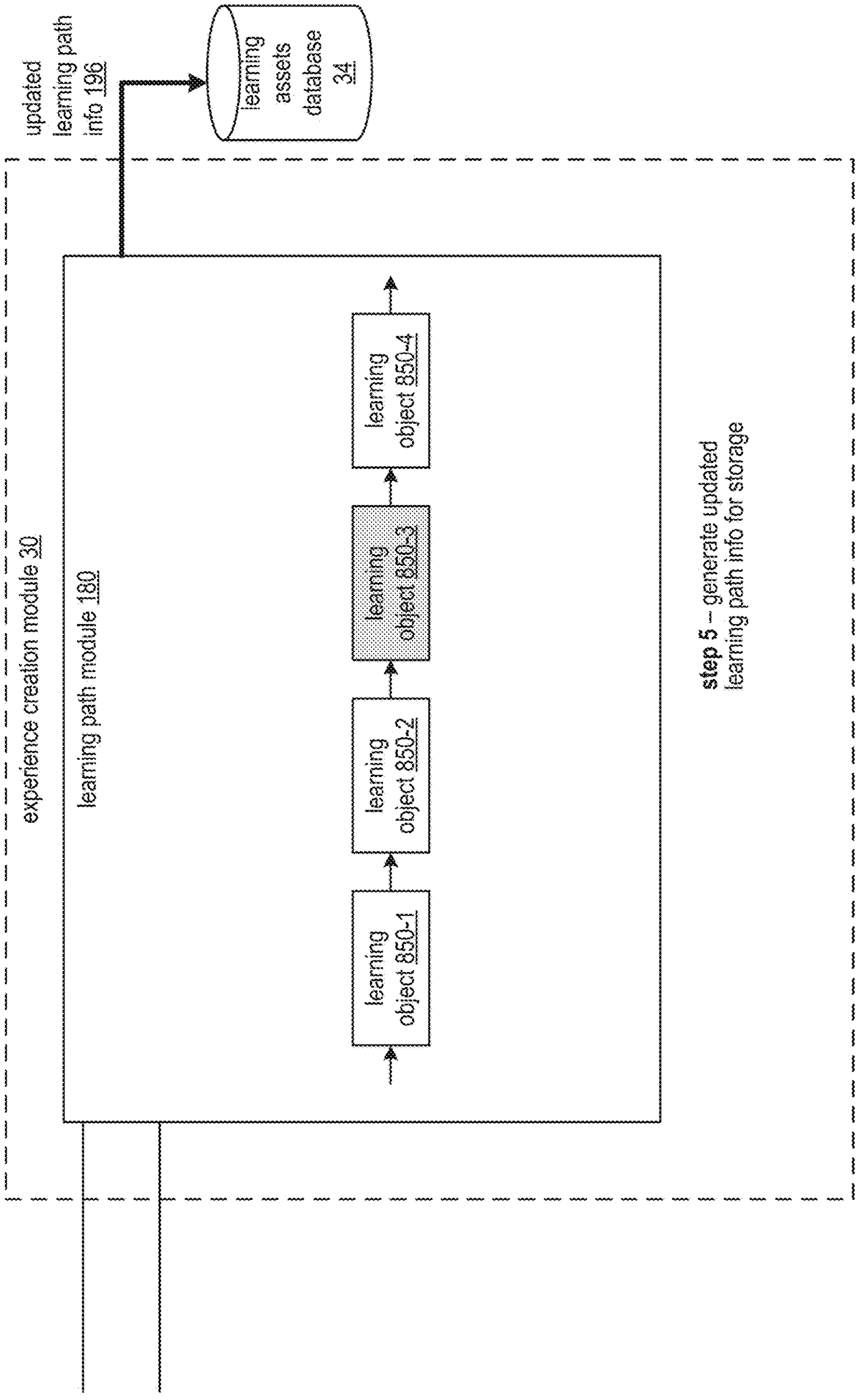

updated learning path info 196
learning assets database 34
experience creation module 30
learning path module 180
learning object 850-1
learning object 850-2
learning object 850-3
learning object 850-4
step 5 – generate updated learning path info for storage

FIG. 10E

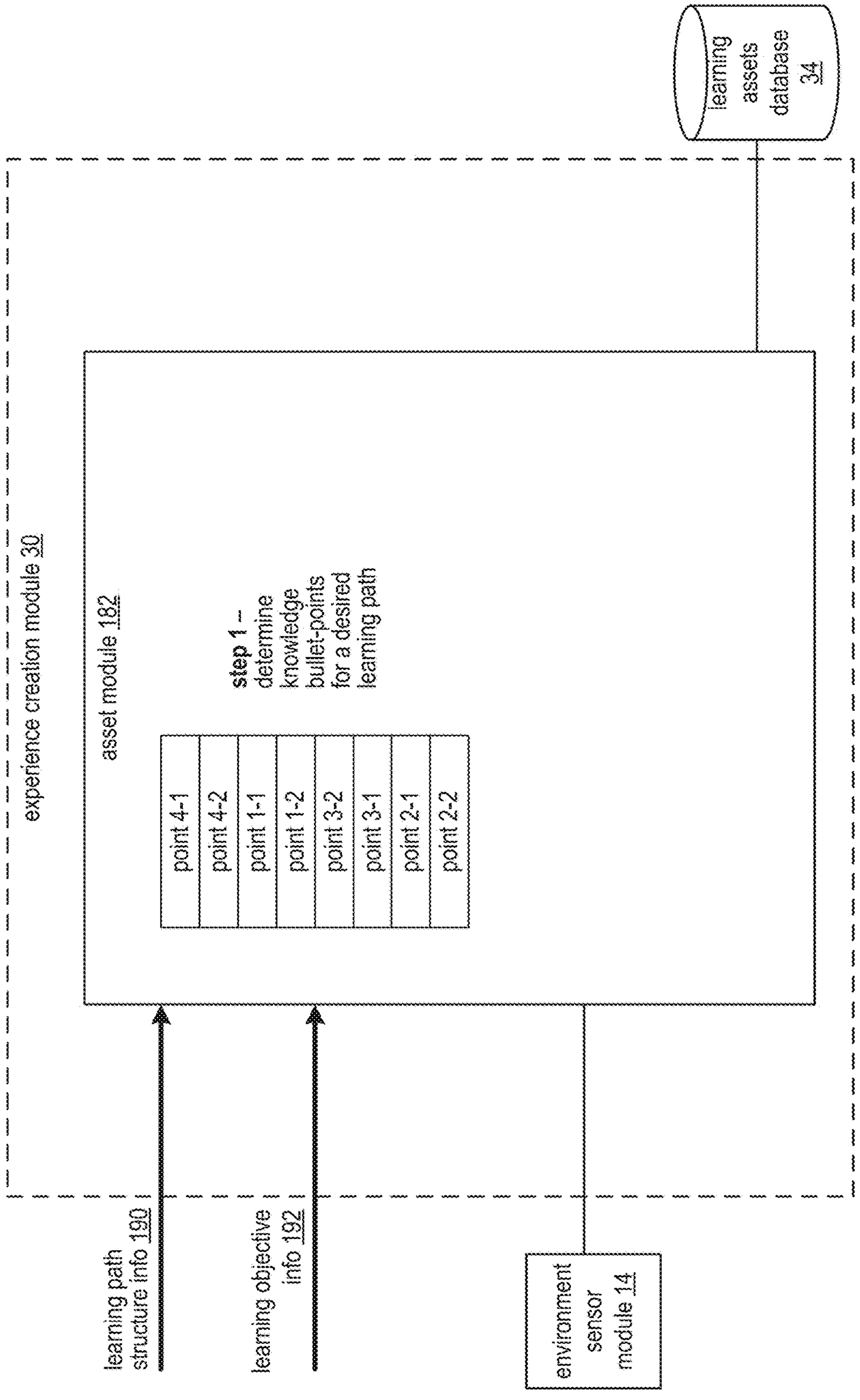

learning assets database 34
experience creation module 30
asset module 182
point 4-1
point 4-2
point 1-1
point 1-2
point 3-2
point 3-1
point 2-1
point 2-2
step 1 – determine knowledge bullet-points for a desired learning path
learning path structure info 190
learning objective info 192
environment sensor module 14

FIG. 11A

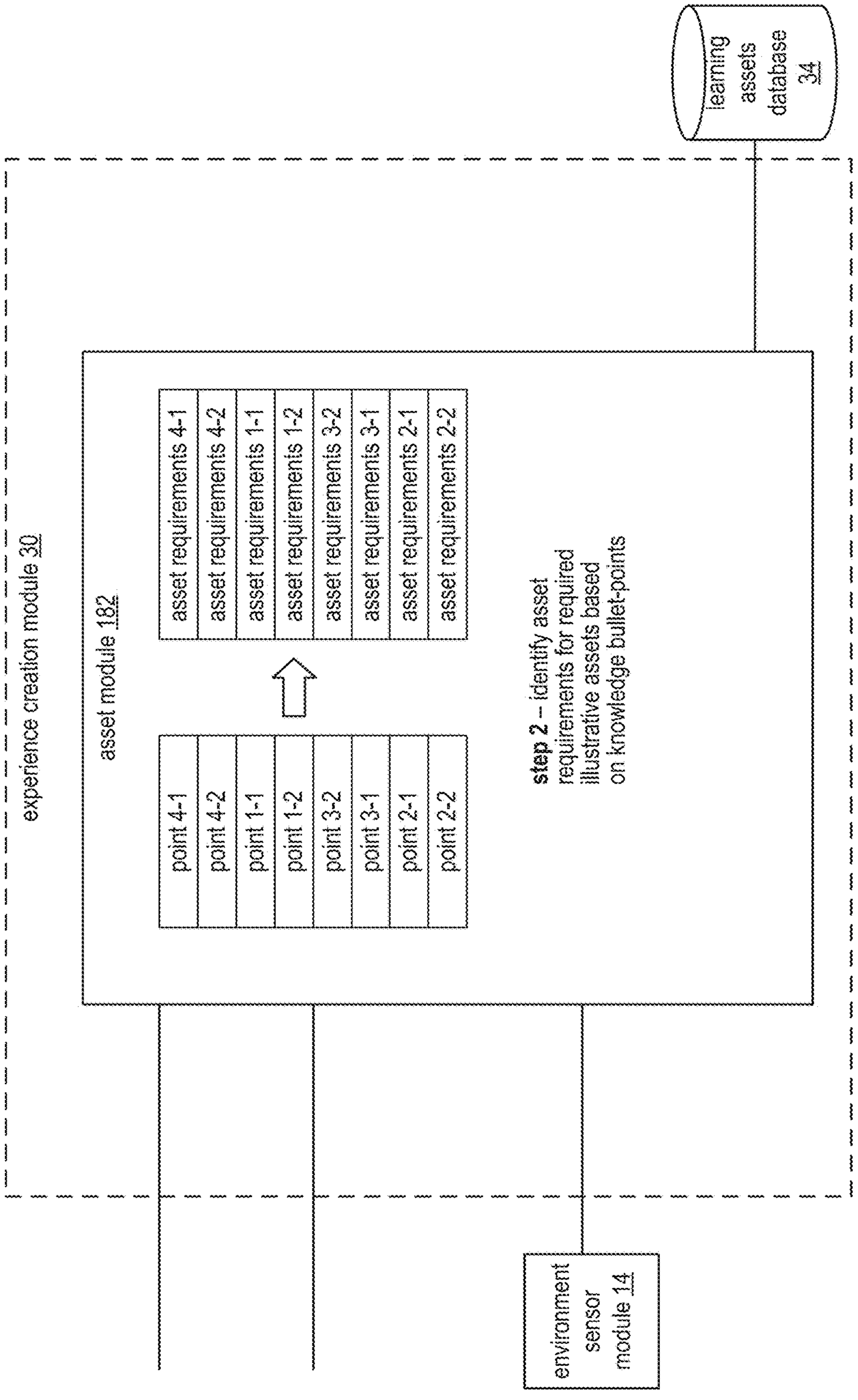

learning assets database 34
experience creation module 30
asset module 182
point 4-1
point 4-2
point 1-1
point 1-2
point 3-2
point 3-1
point 2-1
point 2-2
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
step 2 – identify asset requirements for required illustrative assets based on knowledge bullet-points
environment sensor module 14

FIG. 11B

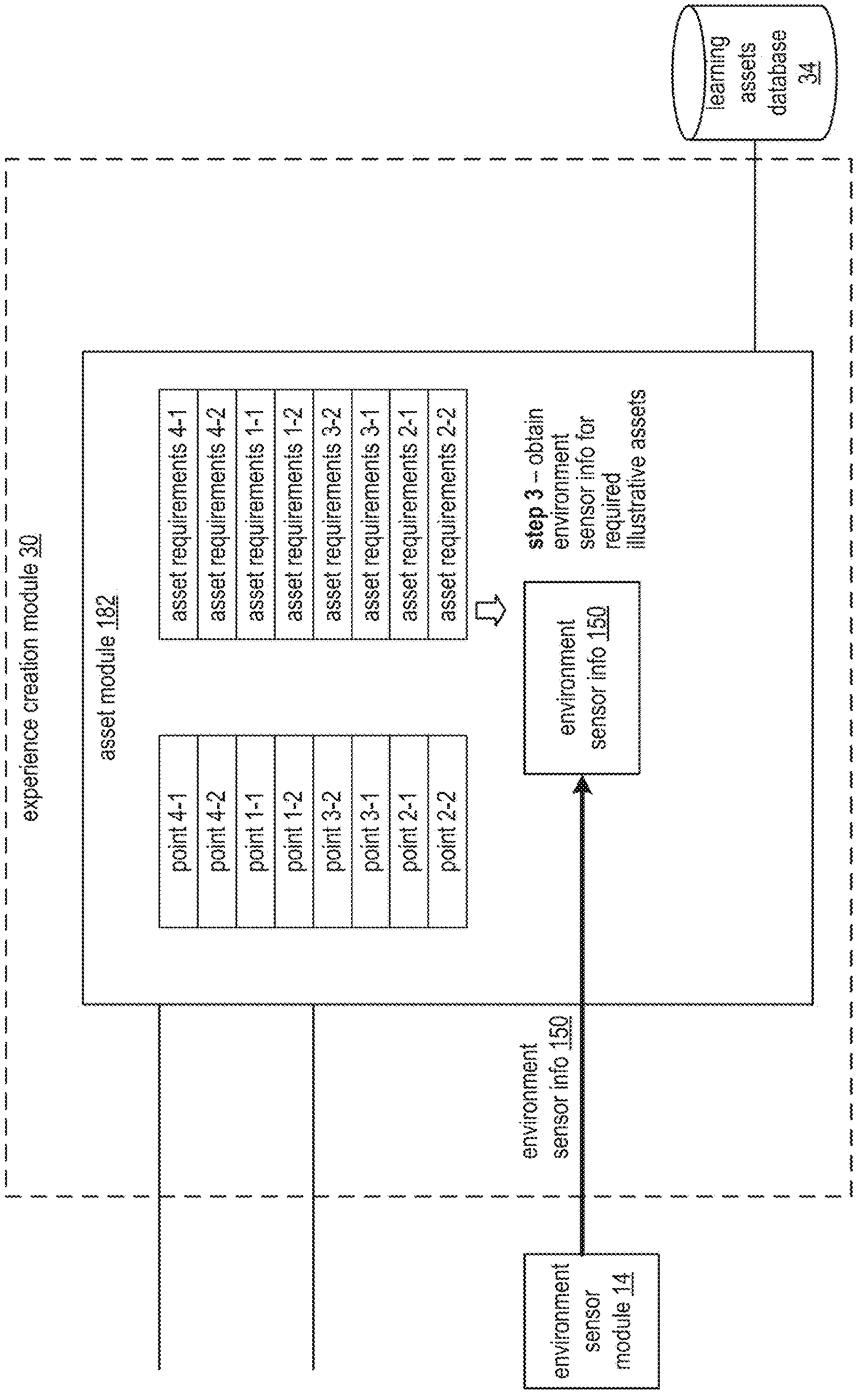

learning assets database 34
experience creation module 30
asset module 182
point 4-1
point 4-2
point 1-1
point 1-2
point 3-2
point 3-1
point 2-1
point 2-2
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
environment sensor info 150
step 3 – obtain enviroment sensor info for required illustrative assets
environment sensor info 150
environment sensor module 14

FIG. 11C

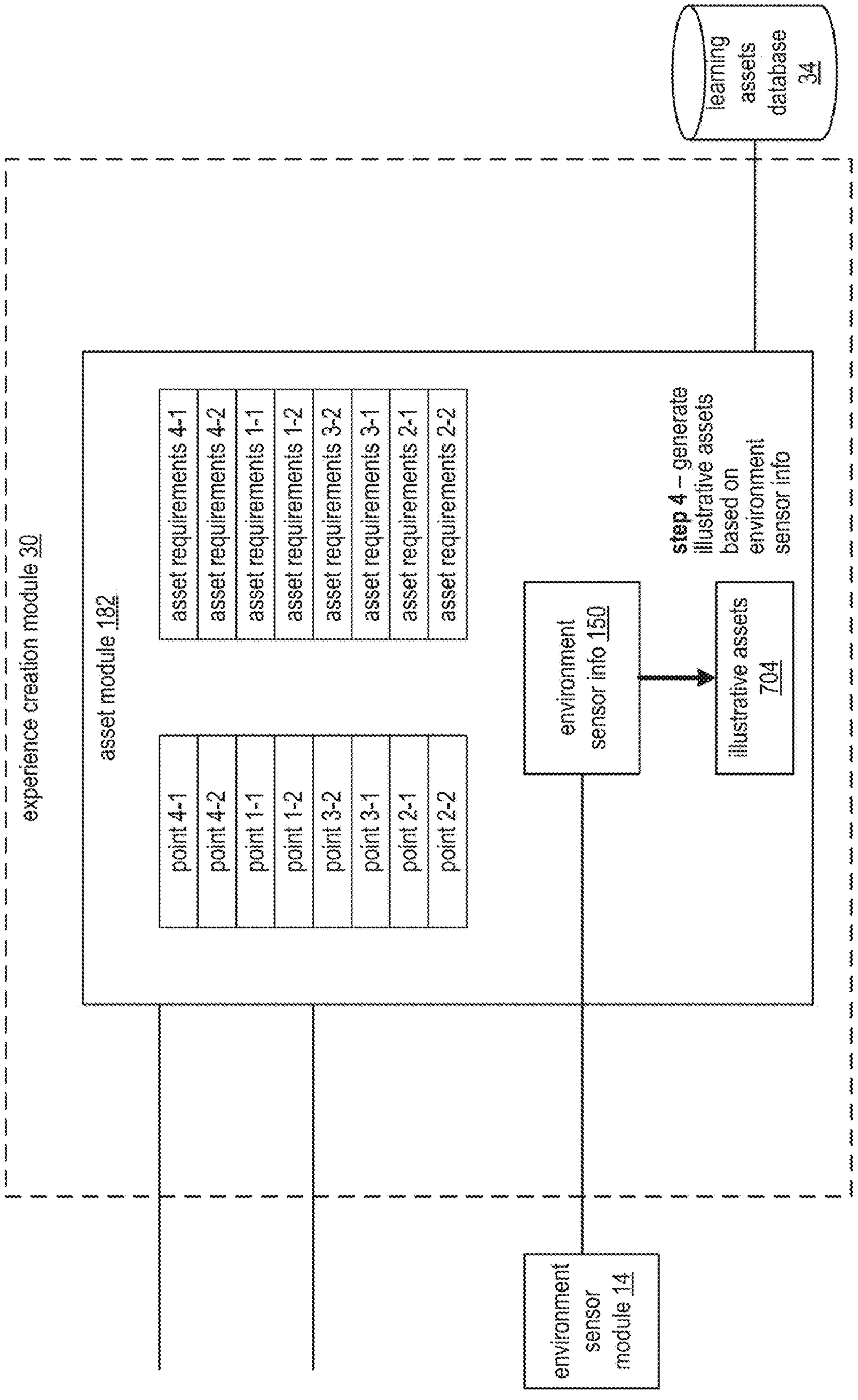

learning assets database 34
experience creation module 30
asset module 182
point 4-1
point 4-2
point 1-1
point 1-2
point 3-2
point 3-1
point 2-1
point 2-2
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
environment sensor info 150
step 4 – generate illustrative assets based on environment sensor info
illustrative assets 704
environment sensor module 14

FIG. 11D

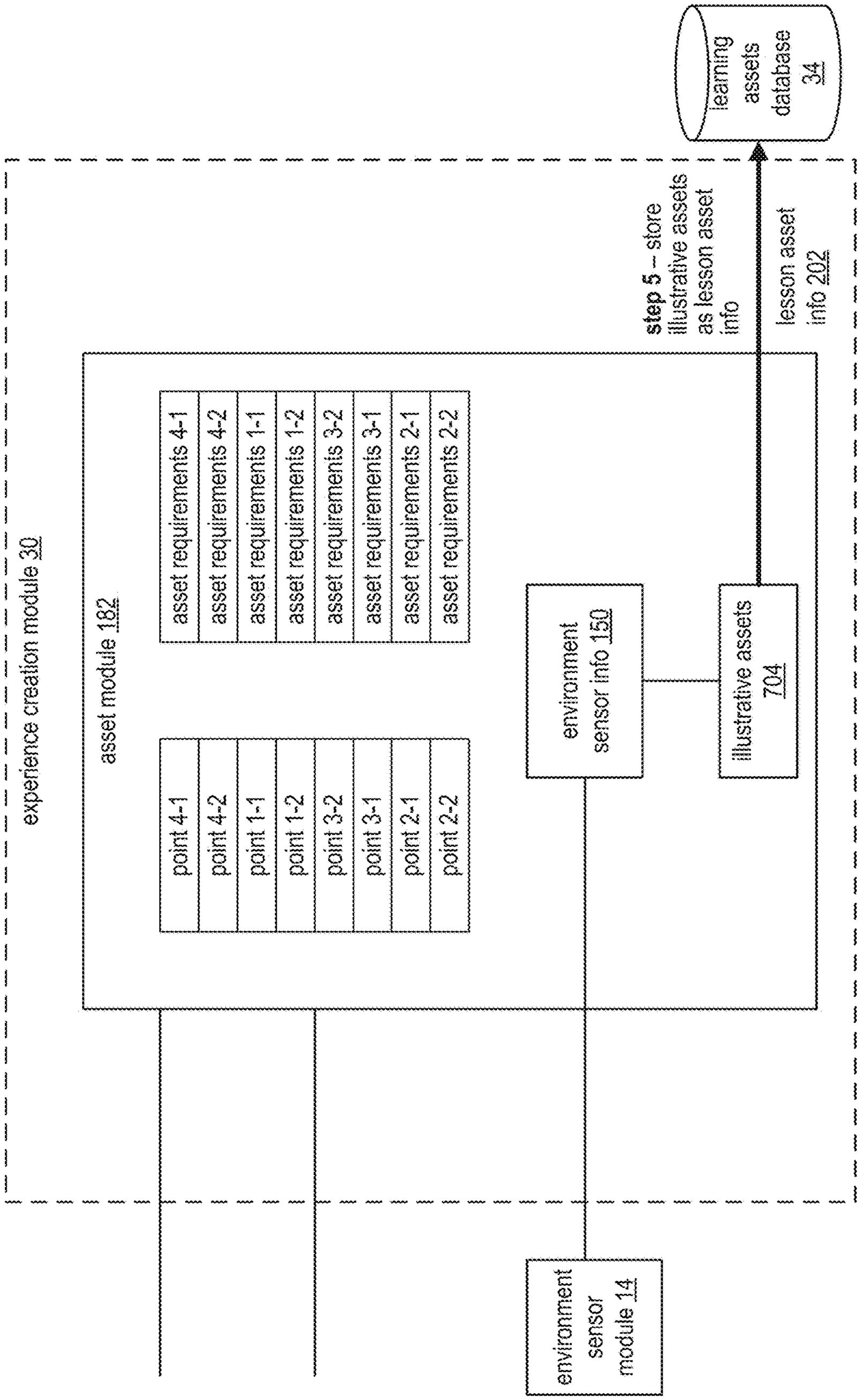

learning assets database 34
step 5 – store illustrative assets as lesson asset info
lesson asset info 202
experience creation module 30
asset module 182
point 4-1
point 4-2
point 1-1
point 1-2
point 3-2
point 3-1
point 2-1
point 2-2
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
environment sensor info 150
illustrative assets 704
environment sensor module 14

FIG. 11E

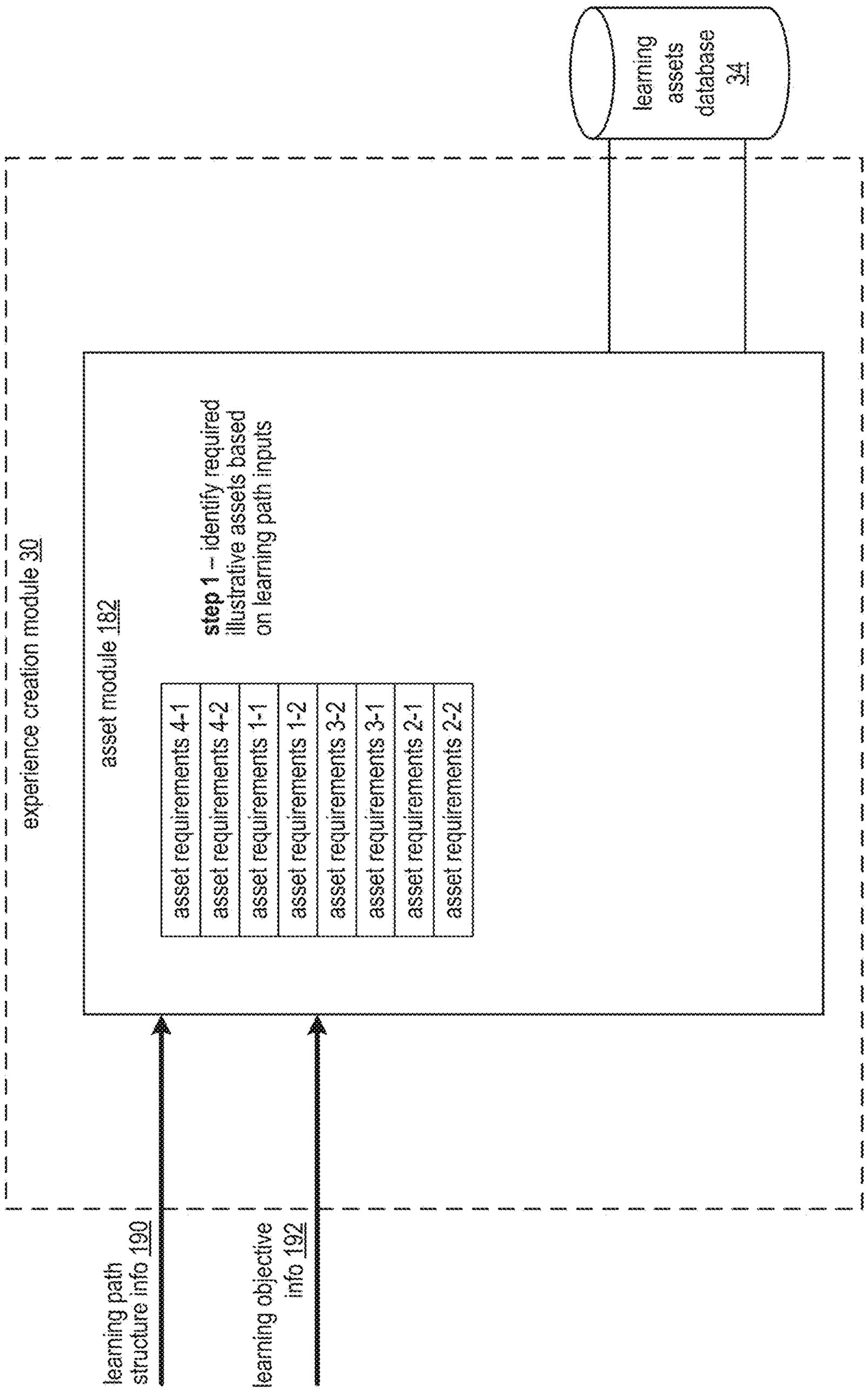

learning assets database 34
experience creation module 30
asset module 182
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
step 1 – identify required illustrative assets based on learning path inputs
learning path structure info 190
learning objective info 192

FIG. 12A

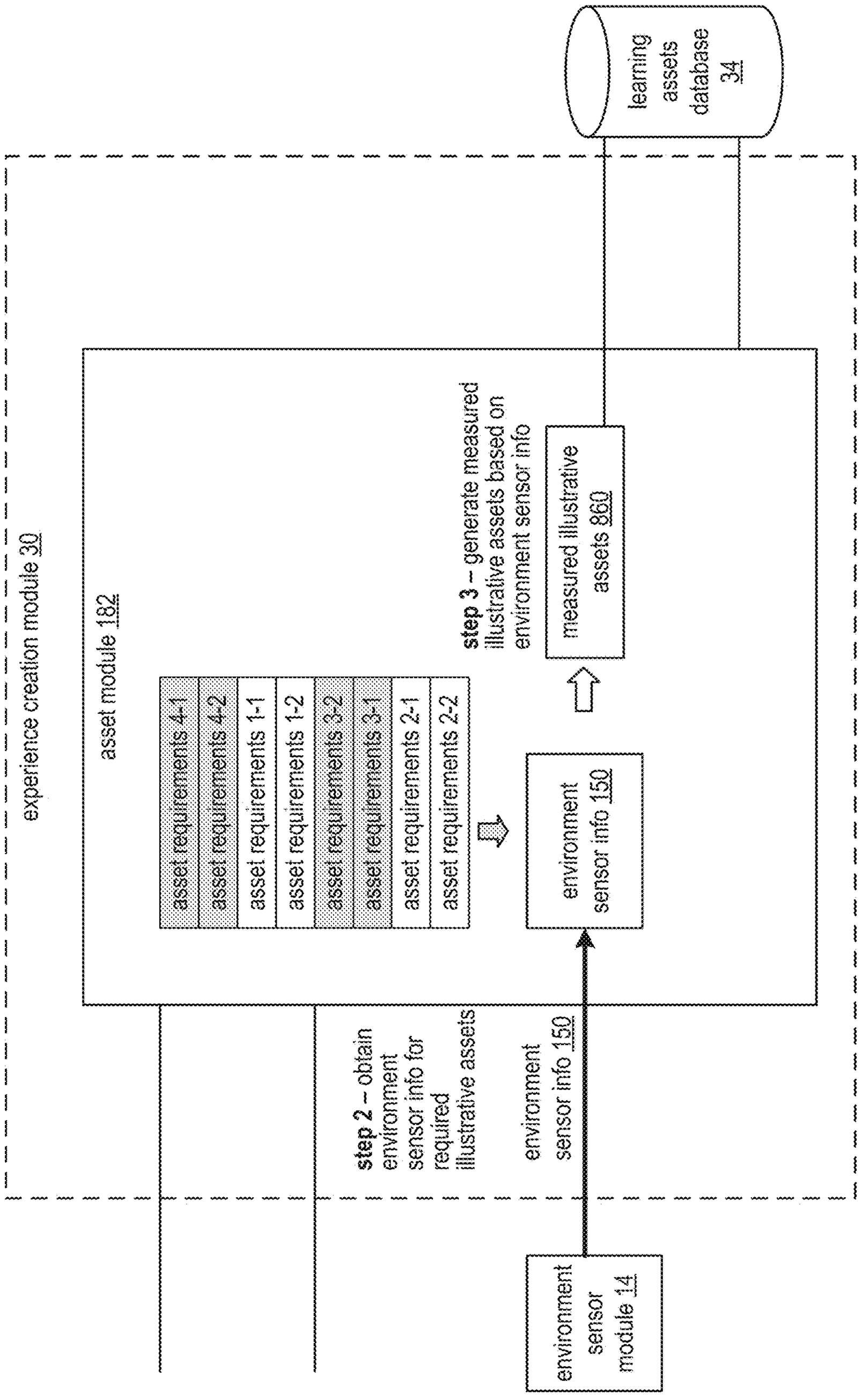

learning assets database 34
experience creation module 30
asset module 182
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
environment sensor info 150
step 3 – generate measured illustrative assets based on environment sensor info
measured illustrative assets 860
step 2 – obtain environment sensor info for required illustrative assets
environment sensor info 150
environment sensor module 14

FIG. 12B

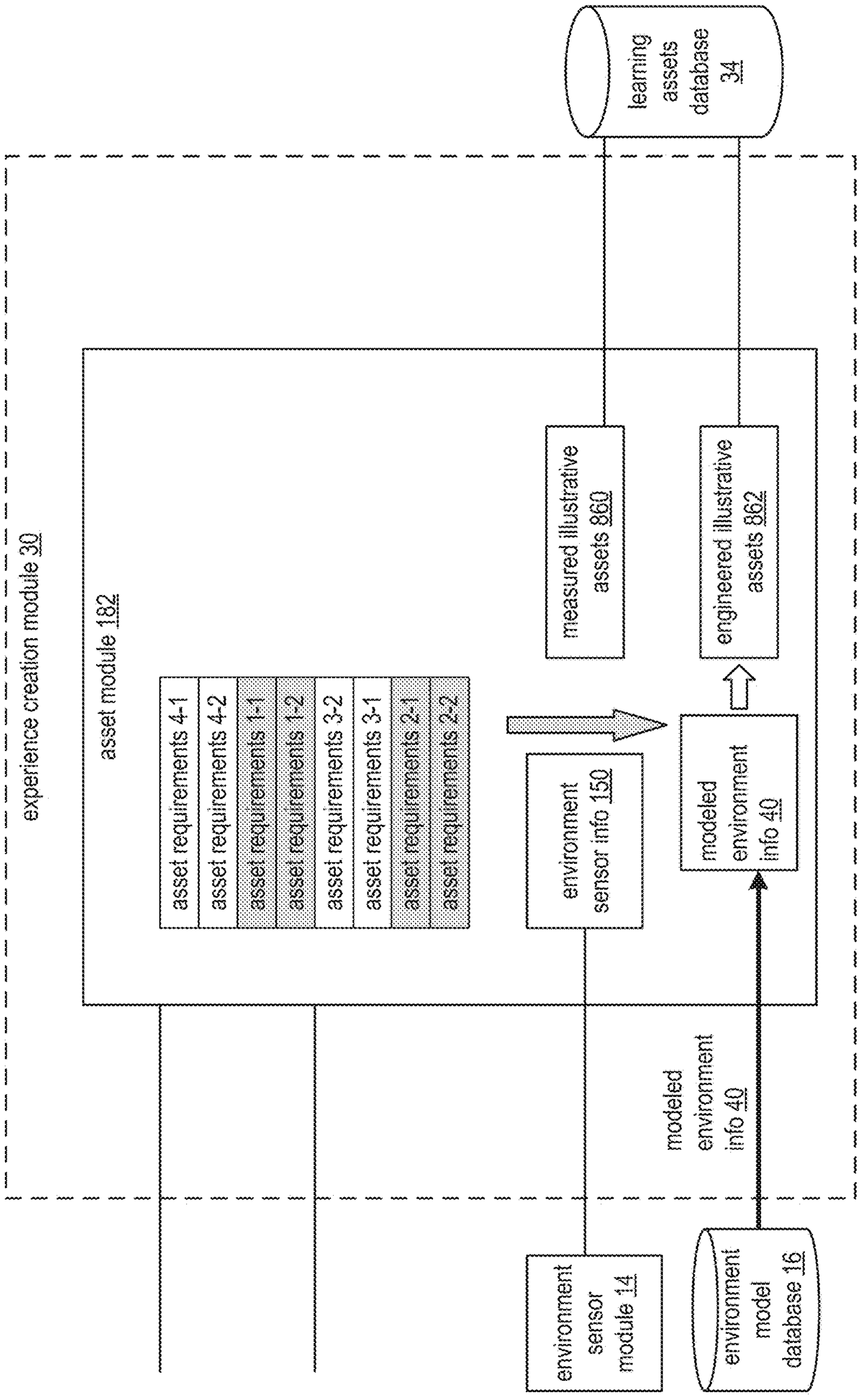

learning assets database 34
experience creation module 30
asset module 182
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
environment sensor info 150
measured illustrative assets 860
modeled environment info 40
engineered illustrative assets 862
modeled environment info 40
environment sensor module 14
environment model database 16
step 4 – when illustrative assets incomplete, obtain modeled environment info for remaining required illustrative assets
step 5 – generate engineered illustrative assets based on the modeled environment info

FIG. 12C

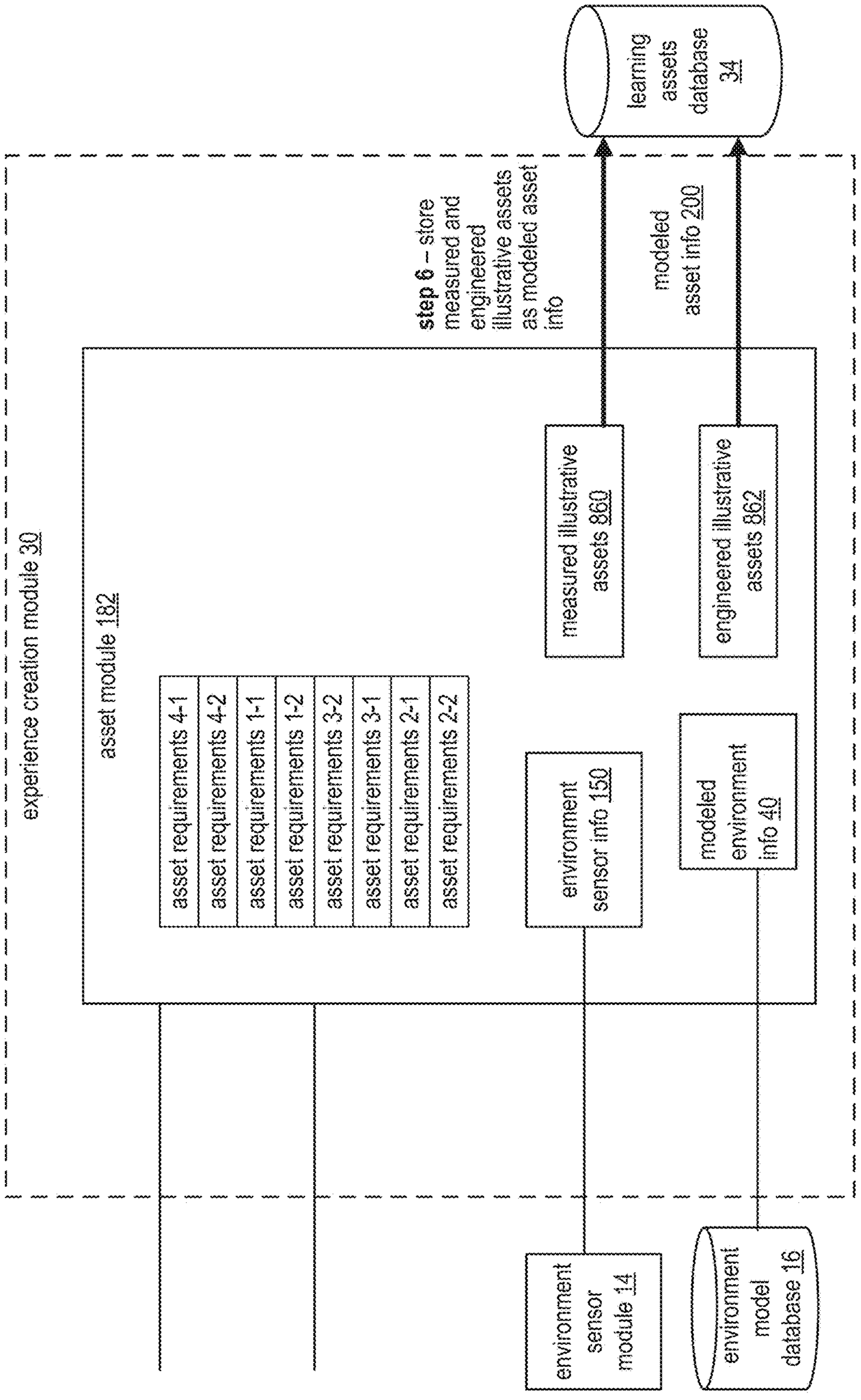

learning assets database 34
step 6 – store measured and engineered illustrative assets as modeled asset info
modeled asset info 200
experience creation module 30
asset module 182
asset requirements 4-1
asset requirements 4-2
asset requirements 1-1
asset requirements 1-2
asset requirements 3-2
asset requirements 3-1
asset requirements 2-1
asset requirements 2-2
measured illustrative assets 860
engineered illustrative assets 862
environment sensor info 150
modeled environment info 40
environment sensor module 14
environment model database 16

FIG. 12D

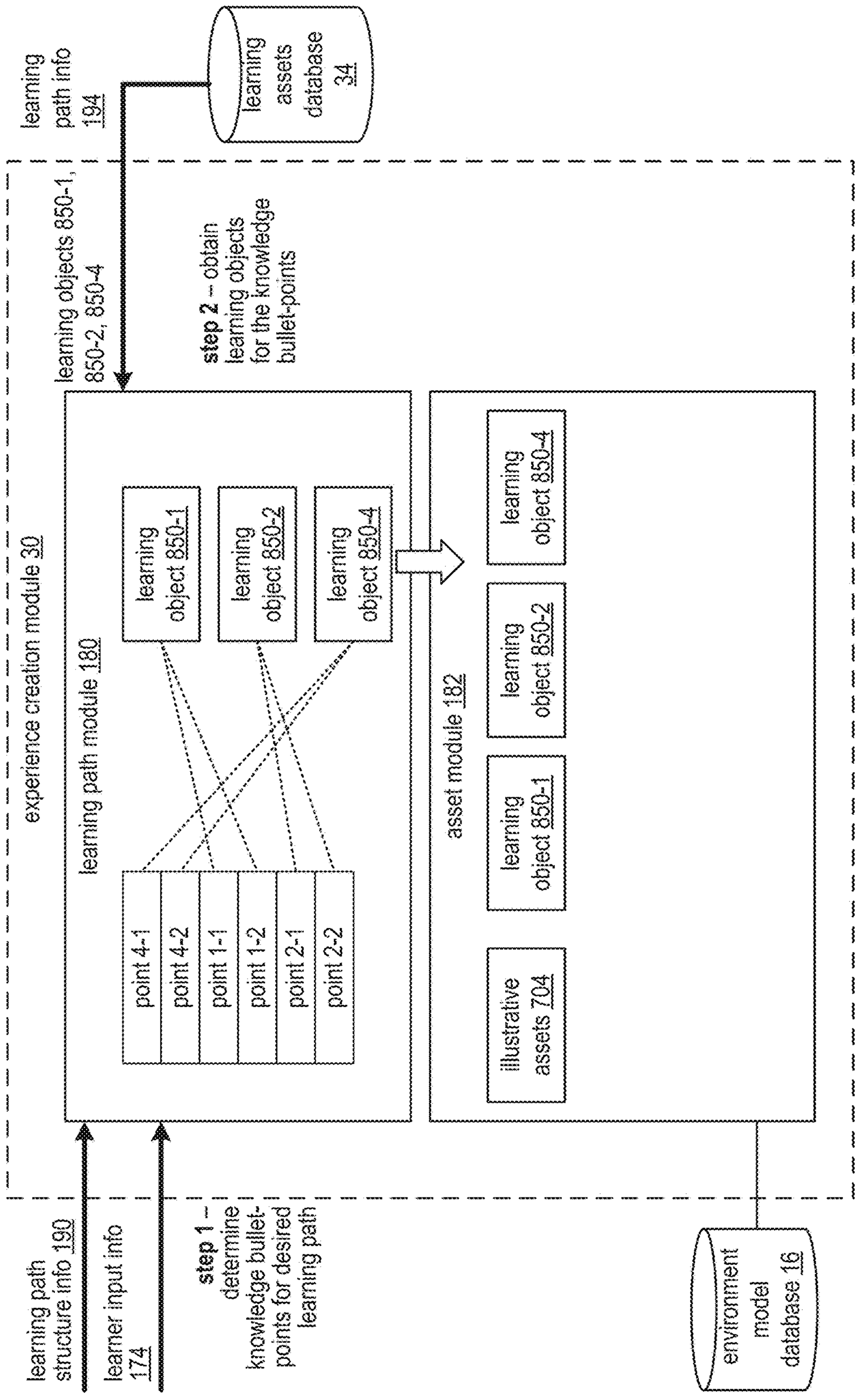

learning path structure info 190
learner input info 174
step 1 – determine knowledge bullet-points for desired learning path
experience creation module 30
learning path module 180
point 4-1
point 4-2
point 1-1
point 1-2
point 2-1
point 2-2
learning objects 850-1, 850-2, 850-4
learning path info 194
step 2 – obtain learning objects for the knowledge bullet-points
learning assets database 34
learning object 850-1
learning object 850-2
learning object 850-4
asset module 182
learning object 850-1
learning object 850-2
learning object 850-4
illustrative assets 704
environment model database 16

FIG. 13A

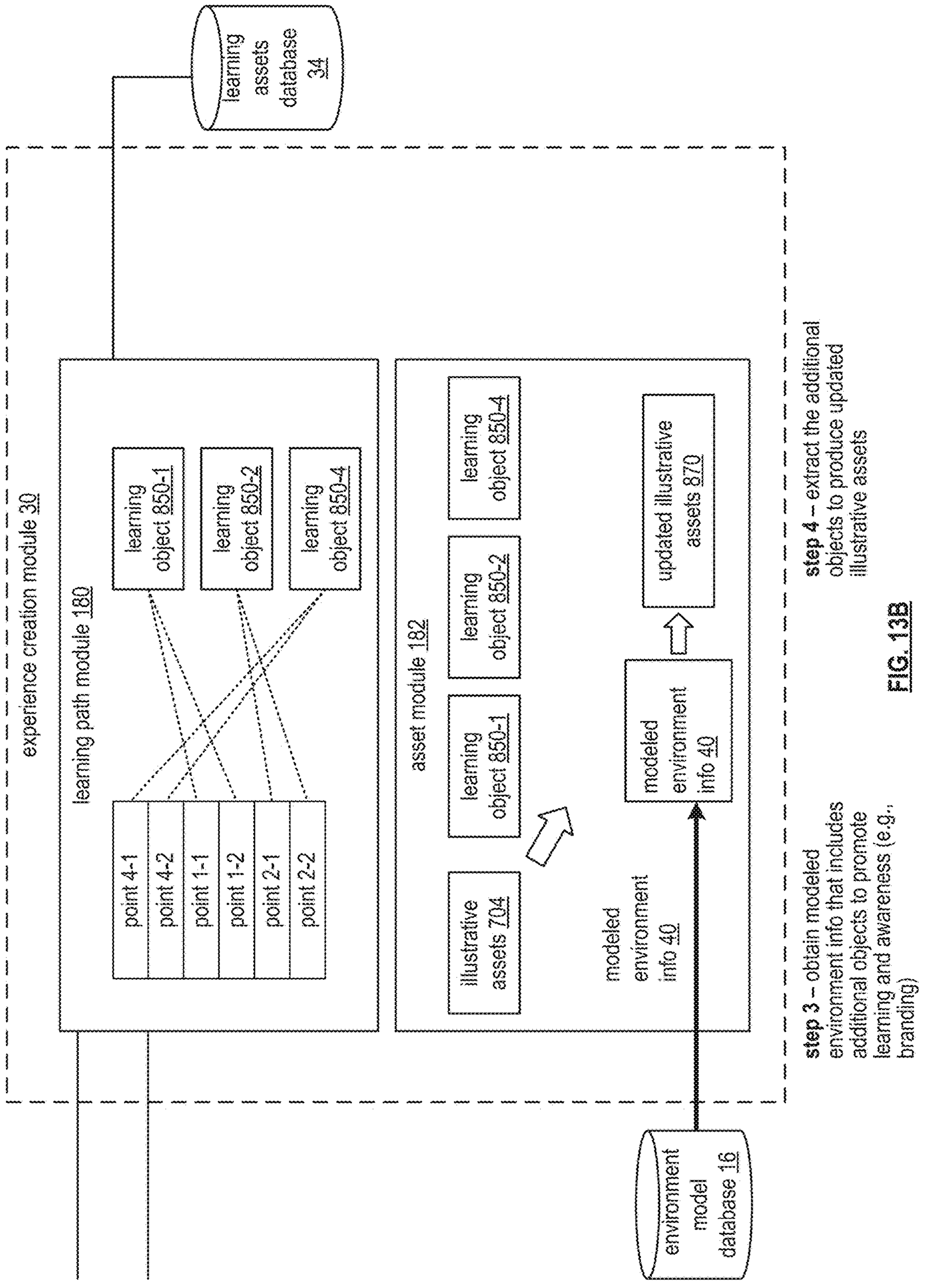

learning assets database 34
experience creation module 30
learning path module 180
learning object 850-1
learning object 850-2
learning object 850-4
point 4-1
point 4-2
point 1-1
point 1-2
point 2-1
point 2-2
asset module 182
learning object 850-1
learning object 850-2
learning object 850-4
updated illustrative assets 870
modeled environment info 40
illustrative assets 704
modeled environment info 40
environment model database 16
step 4 – extract the additional objects to produce updated illustrative assets
step 3 – obtain modeled environment info that includes additional objects to promote learning and awareness (e.g., branding)

FIG. 13B

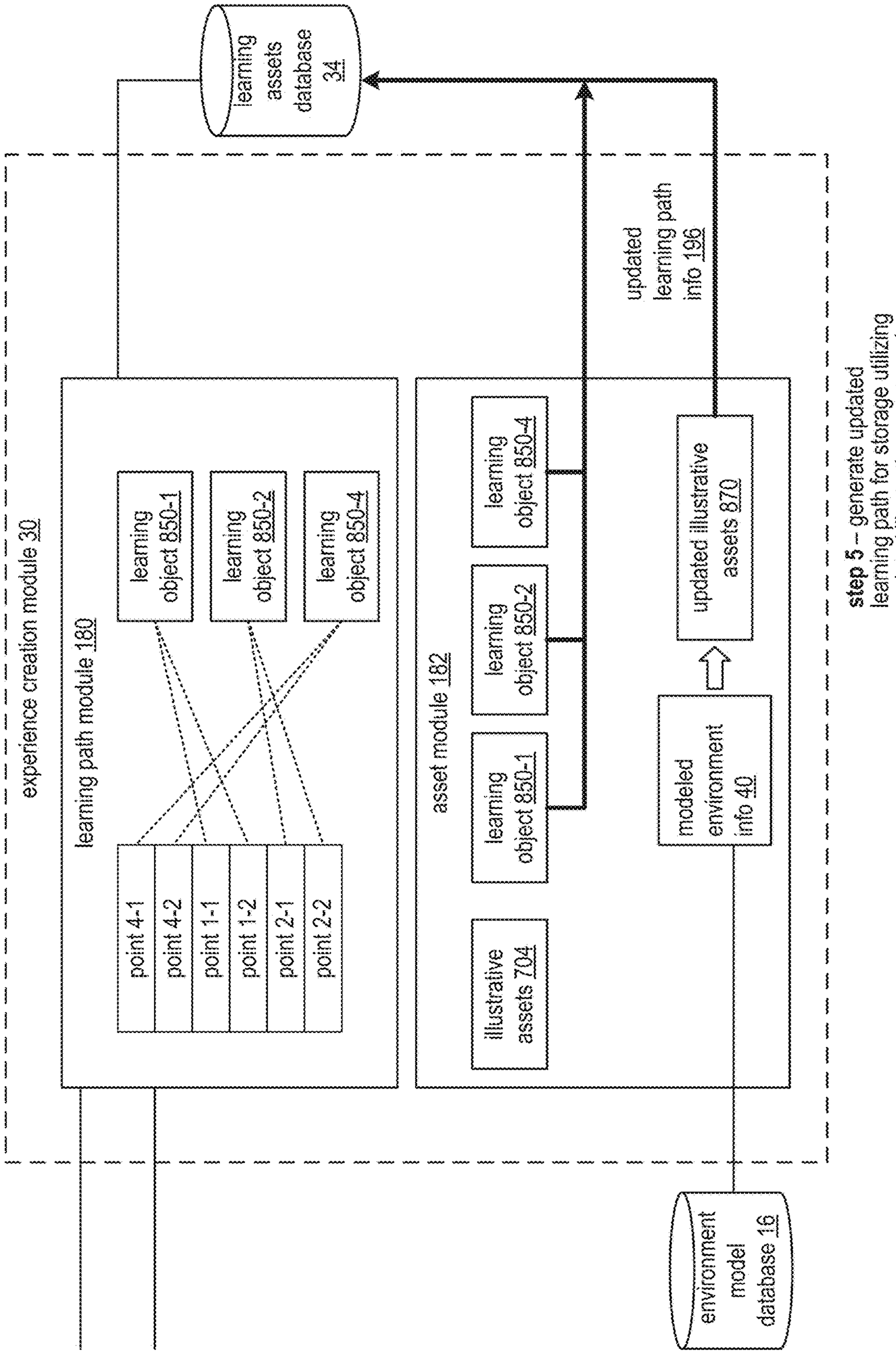

learning assets database 34
experience creation module 30
learning path module 180
learning object 850-1
learning object 850-2
learning object 850-4
point 4-1
point 4-2
point 1-1
point 1-2
point 2-1
point 2-2
asset module 182
learning object 850-1
learning object 850-2
learning object 850-4
illustrative assets 704
updated illustrative assets 870
modeled environment info 40
updated learning path info 196
step 5 – generate updated learning path for storage utilizing updated illustrative assets and learning objects
environment model database 16

FIG. 13C

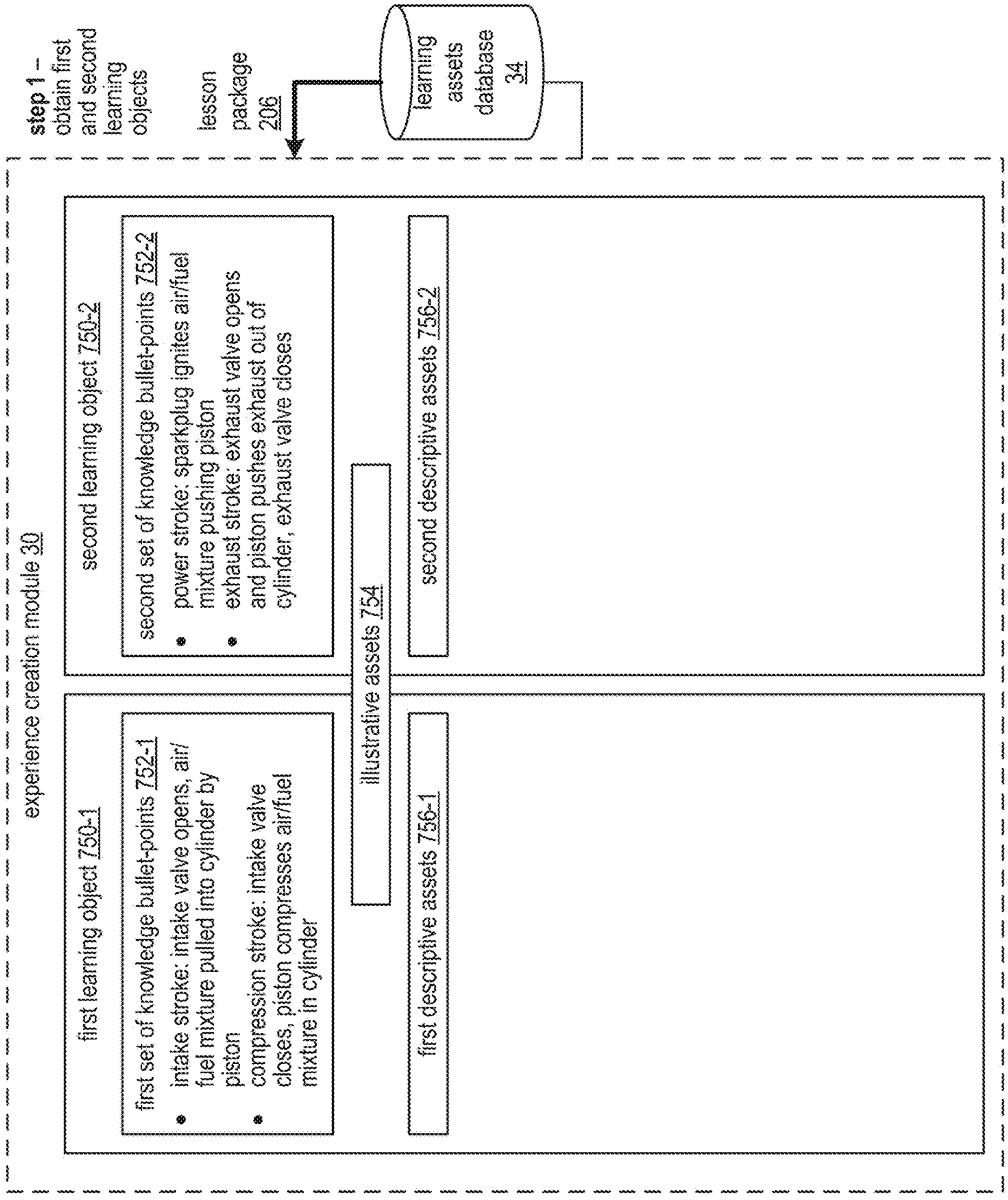

step 1 – obtain first and second learning objects
lesson package 206
learning assets database 34
experience creation module 30
second learning object 750-2
second set of knowledge bullet-points 752-2
power stroke: sparkplug ignites air/fuel mixture pushing piston
exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
illustrative assets 754
second descriptive assets 756-2
first learning object 750-1
first set of knowledge bullet-points 752-1
intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by piston
compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
first descriptive assets 756-1

FIG. 14A

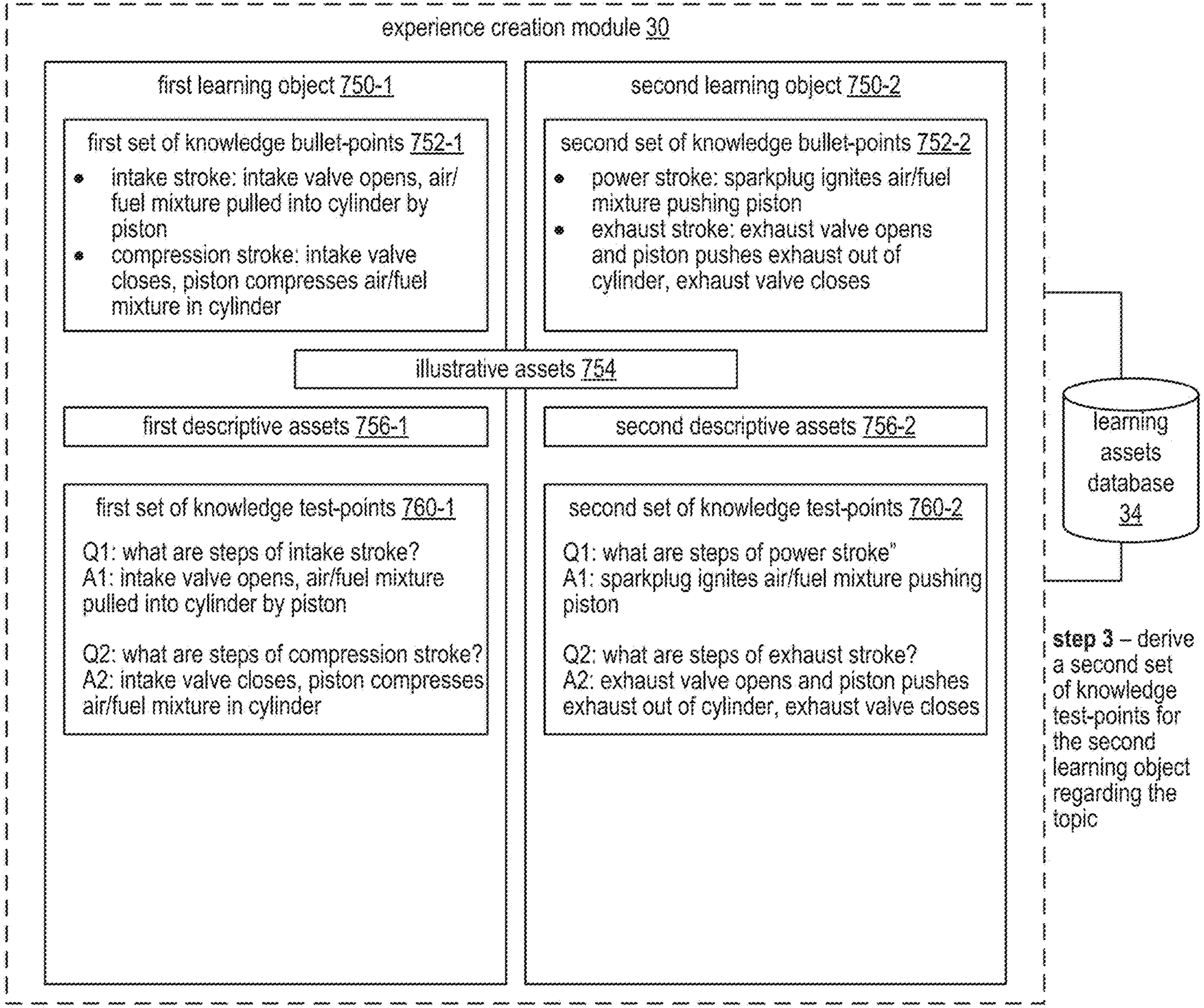

experience creation module 30
first learning object 750-1
first set of knowledge bullet-points 752-1
intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by piston
compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder
second learning object 750-2
second set of knowledge bullet-points 752-2
power stroke: sparkplug ignites air/fuel mixture pushing piston
exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
illustrative assets 754
first descriptive assets 756-1
second descriptive assets 756-2
first set of knowledge test-points 760-1
Q1: what are steps of intake stroke?
A1: intake valve opens, air/fuel mixture pulled into cylinder by piston
Q2: what are steps of compression stroke?
A2: intake valve closes, piston compresses air/fuel mixture in cylinder
second set of knowledge test-points 760-2
Q1: what are steps of power stroke"
A1: sparkplug ignites air/fuel mixture pushing piston
Q2: what are steps of exhaust stroke?
A2: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
learning assets database 34
step 2 – derive a first set of knowledge test-points for the first learning object regarding the topic
step 3 – derive a second set of knowledge test-points for the second learning object regarding the topic

FIG. 14B

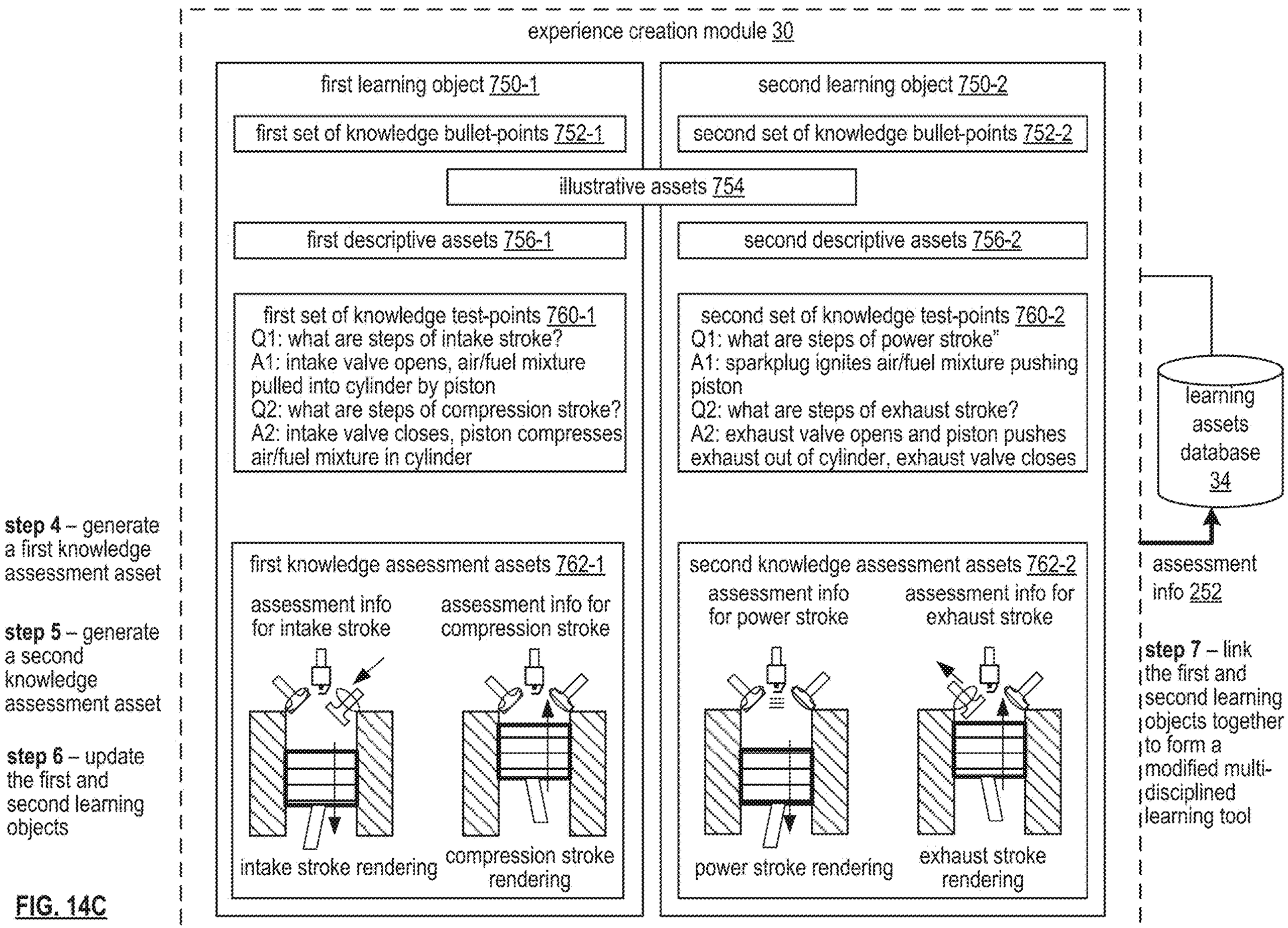

experience creation module 30
first learning object 750-1
second learning object 750-2
first set of knowledge bullet-points 752-1
second set of knowledge bullet-points 752-2
illustrative assets 754
first descriptive assets 756-1
second descriptive assets 756-2
first set of knowledge test-points 760-1
Q1: what are steps of intake stroke?
A1: intake valve opens, air/fuel mixture pulled into cylinder by piston
Q2: what are steps of compression stroke?
A2: intake valve closes, piston compresses air/fuel mixture in cylinder
second set of knowledge test-points 760-2
Q1: what are steps of power stroke"
A1: sparkplug ignites air/fuel mixture pushing piston
Q2: what are steps of exhaust stroke?
A2: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes
learning assets database 34
assessment info 252
step 4 – generate a first knowledge assessment asset
step 5 – generate a second knowledge assessment asset
step 6 – update the first and second learning objects
step 7 – link the first and second learning objects together to form a modified multi-disciplined learning tool
first knowledge assessment assets 762-1
assessment info for intake stroke
assessment info for compression stroke
intake stroke rendering
compression stroke rendering
second knowledge assessment assets 762-2
assessment info for power stroke
assessment info for exhaust stroke
power stroke rendering
exhaust stroke rendering

FIG. 14C

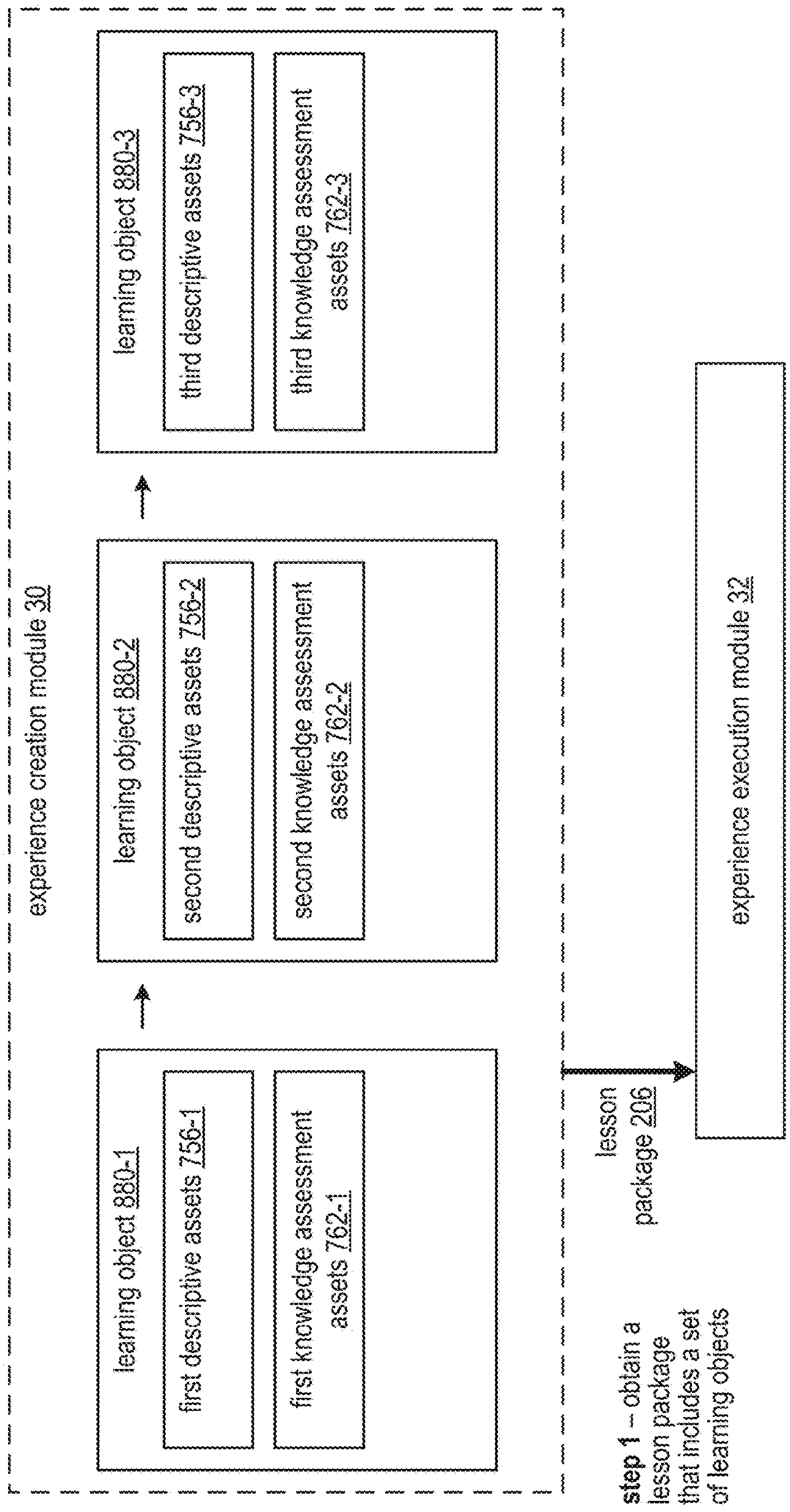

learning object 880-3
third descriptive assets 756-3
third knowledge assessment assets 762-3
experience creation module 30
learning object 880-2
second descriptive assets 756-2
second knowledge assessment assets 762-2
learning object 880-1
first descriptive assets 756-1
first knowledge assessment assets 762-1
experience execution module 32
step 1 – obtain a lesson package that includes a set of learning objects
lesson package 206

FIG. 15A

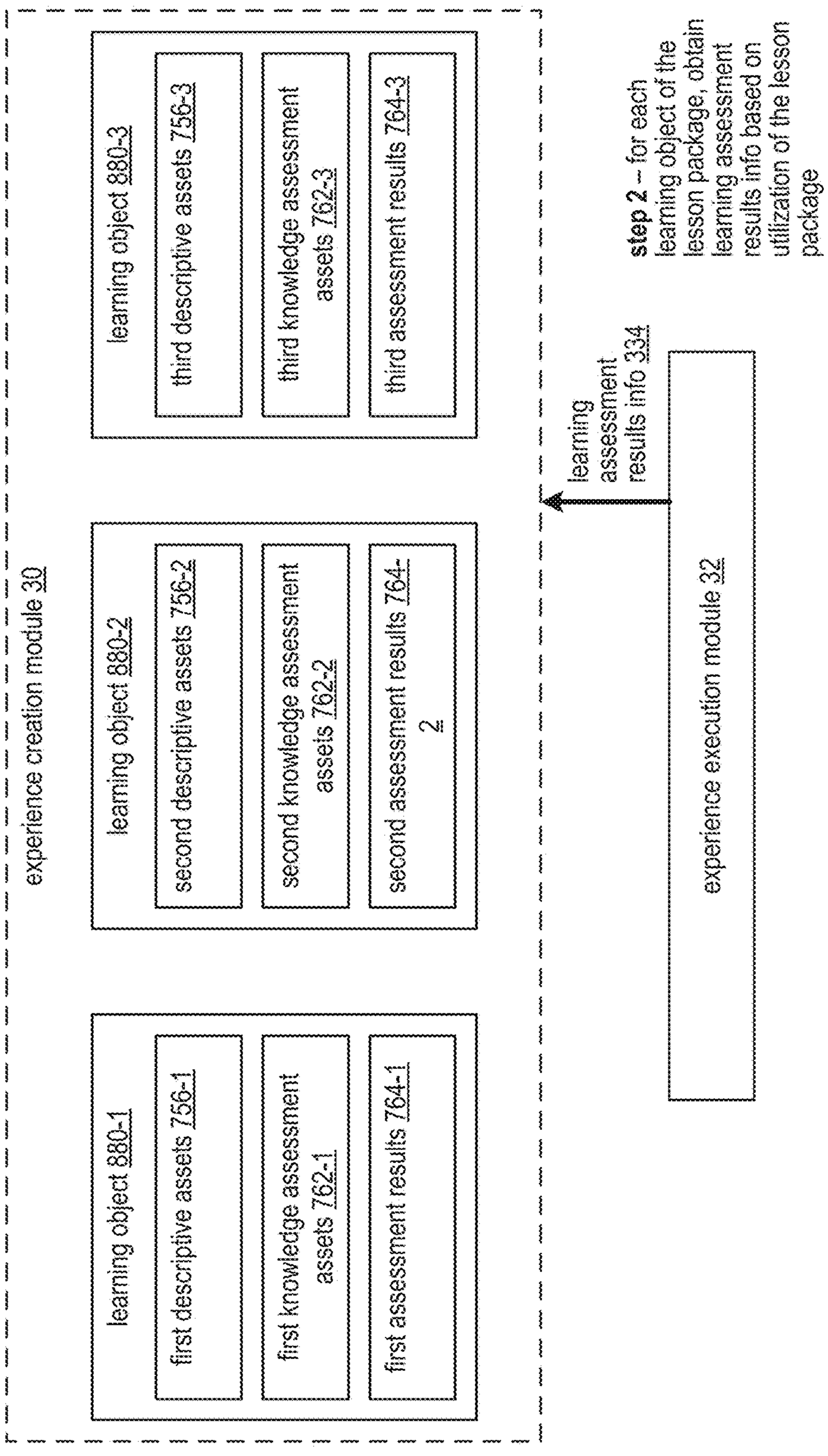

experience creation module 30
learning object 880-3
third descriptive assets 756-3
third knowledge assessment assets 762-3
third assessment results 764-3
learning object 880-2
second descriptive assets 756-2
second knowledge assessment assets 762-2
second assessment results 764-2
learning object 880-1
first descriptive assets 756-1
first knowledge assessment assets 762-1
first assessment results 764-1
learning assessment results info 334
step 2 – for each learning object of the lesson package, obtain learning assessment results info based on utilization of the lesson package
experience execution module 32

FIG. 15B

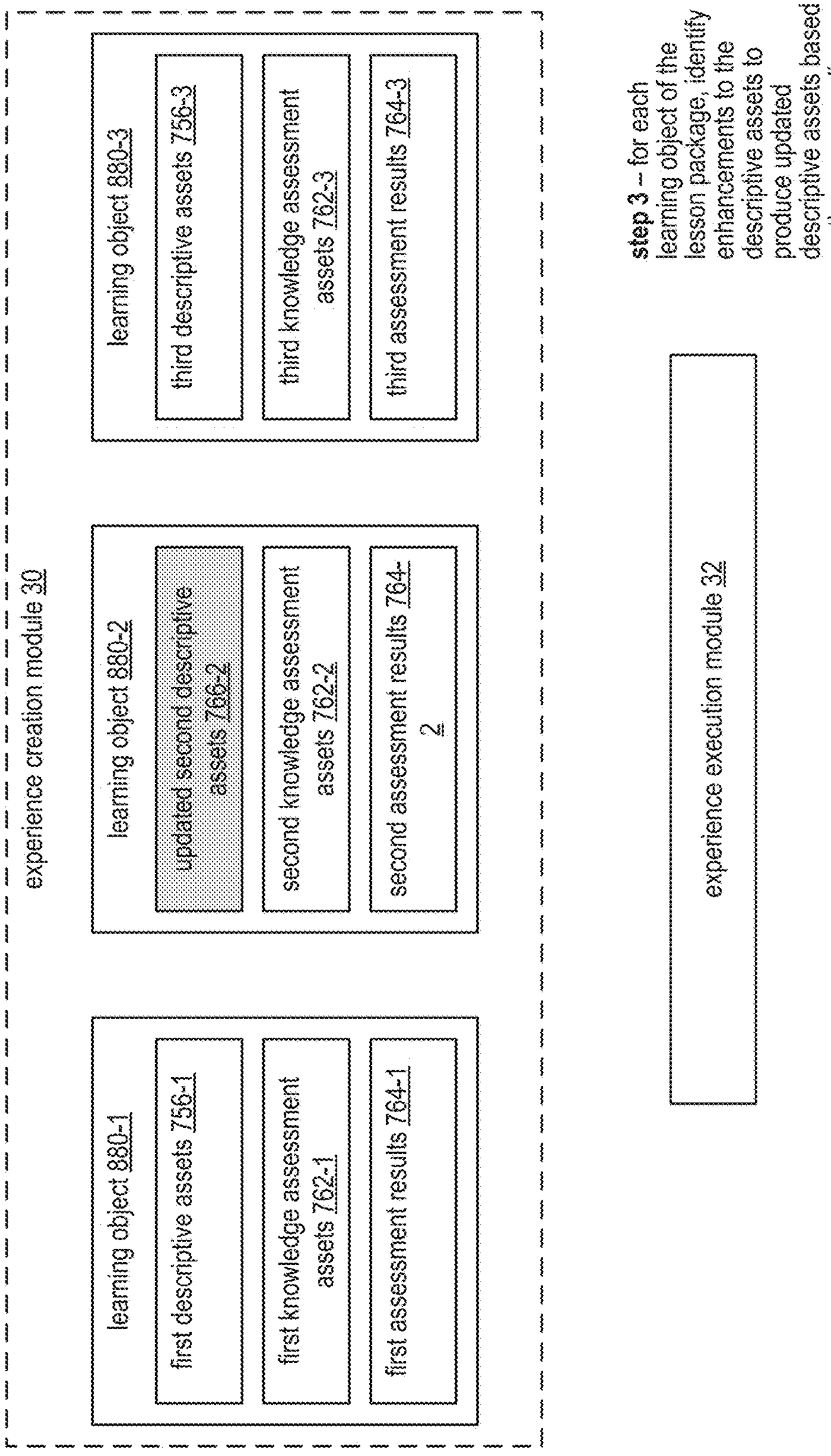

experience creation module 30
learning object 880-3
third descriptive assets 756-3
third knowledge assessment assets 762-3
third assessment results 764-3
learning object 880-2
updated second descriptive assets 766-2
second knowledge assessment assets 762-2
second assessment results 764-2
learning object 880-1
first descriptive assets 756-1
first knowledge assessment assets 762-1
first assessment results 764-1
step 3 – for each learning object of the lesson package, identify enhancements to the descriptive assets to produce updated descriptive assets based on the corresponding learning assessment results info
experience execution module 32

FIG. 15C

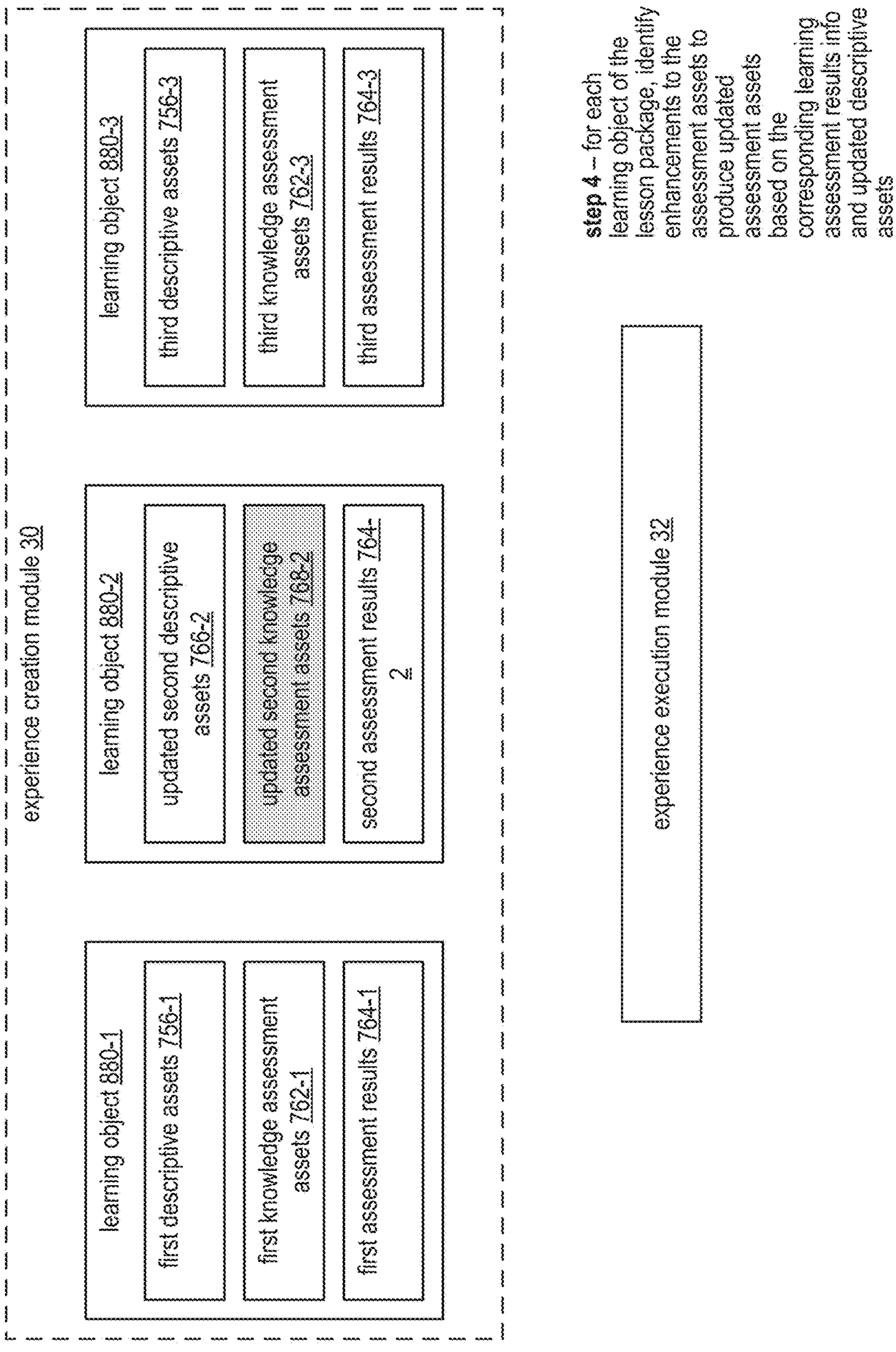

learning object 880-3
third descriptive assets 756-3
third knowledge assessment assets 762-3
third assessment results 764-3
experience creation module 30
learning object 880-2
updated second descriptive assets 766-2
updated second knowledge assessment assets 768-2
second assessment results 764-2
learning object 880-1
first descriptive assets 756-1
first knowledge assessment assets 762-1
first assessment results 764-1
step 4 – for each learning object of the lesson package, identify enhancements to the assessment assets to produce updated assessment assets based on the corresponding learning assessment results info and updated descriptive assets
experience execution module 32

FIG. 15D

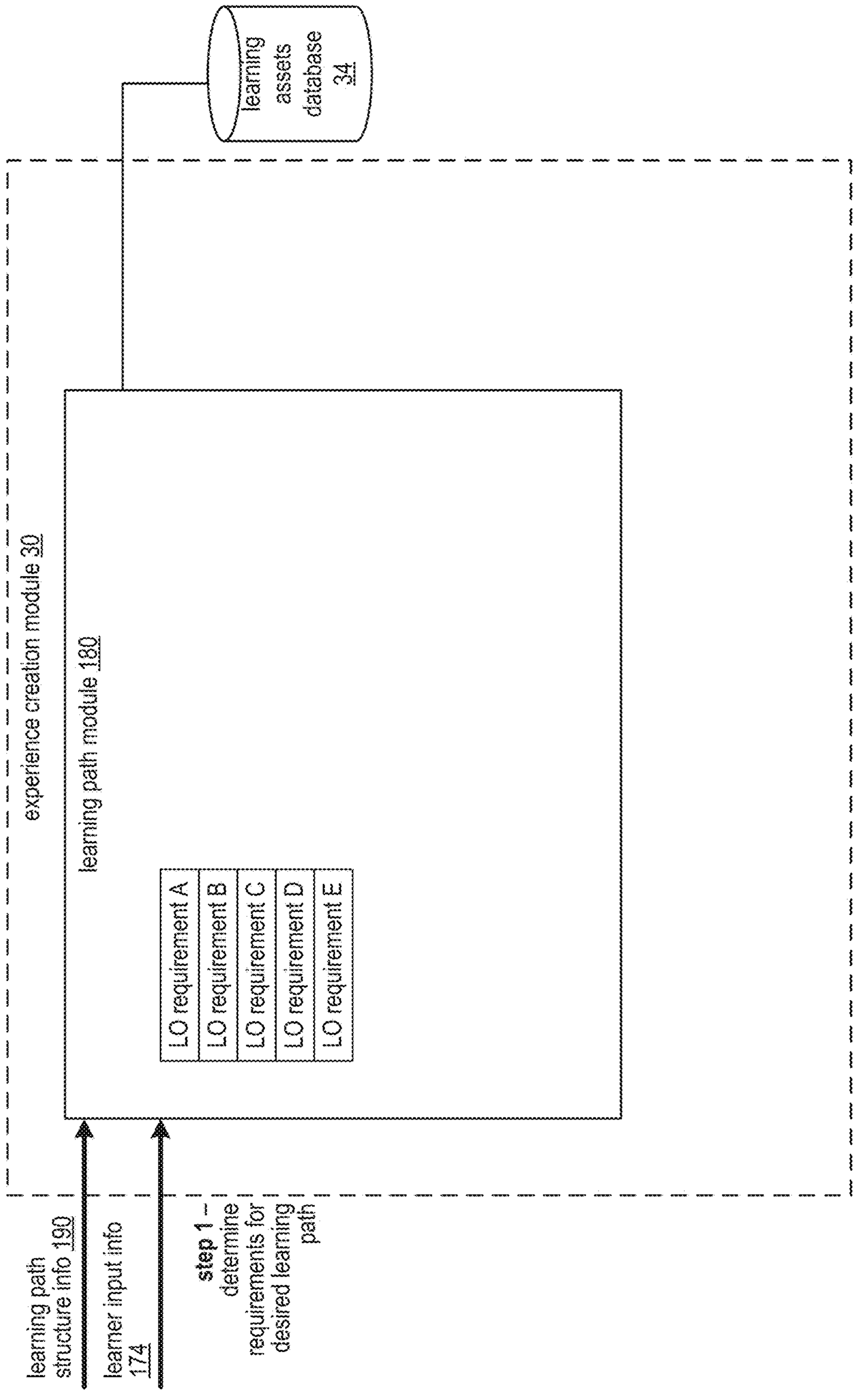

learning assets database 34
experience creation module 30
learning path module 180
LO requirement A
LO requirement B
LO requirement C
LO requirement D
LO requirement E
learning path structure info 190
learner input info 174
step 1 – determine requirements for desired learning path

FIG. 16A

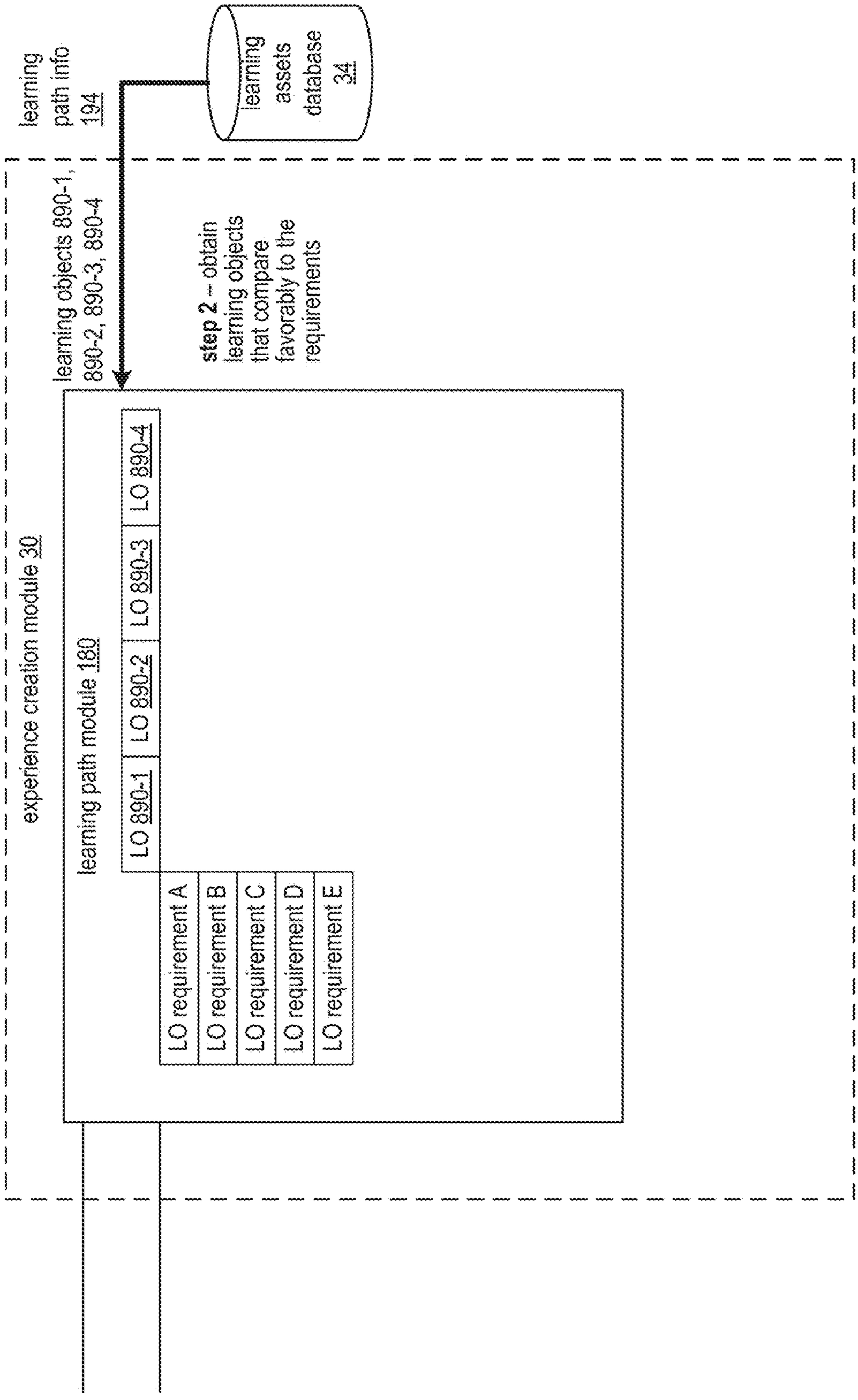

learning path info 194
learning assets database 34
learning objects 890-1, 890-2, 890-3, 890-4
step 2 – obtain learning objects that compare favorably to the requirements
experience creation module 30
learning path module 180
LO 890-1
LO 890-2
LO 890-3
LO 890-4
LO requirement A
LO requirement B
LO requirement C
LO requirement D
LO requirement E

FIG. 16B

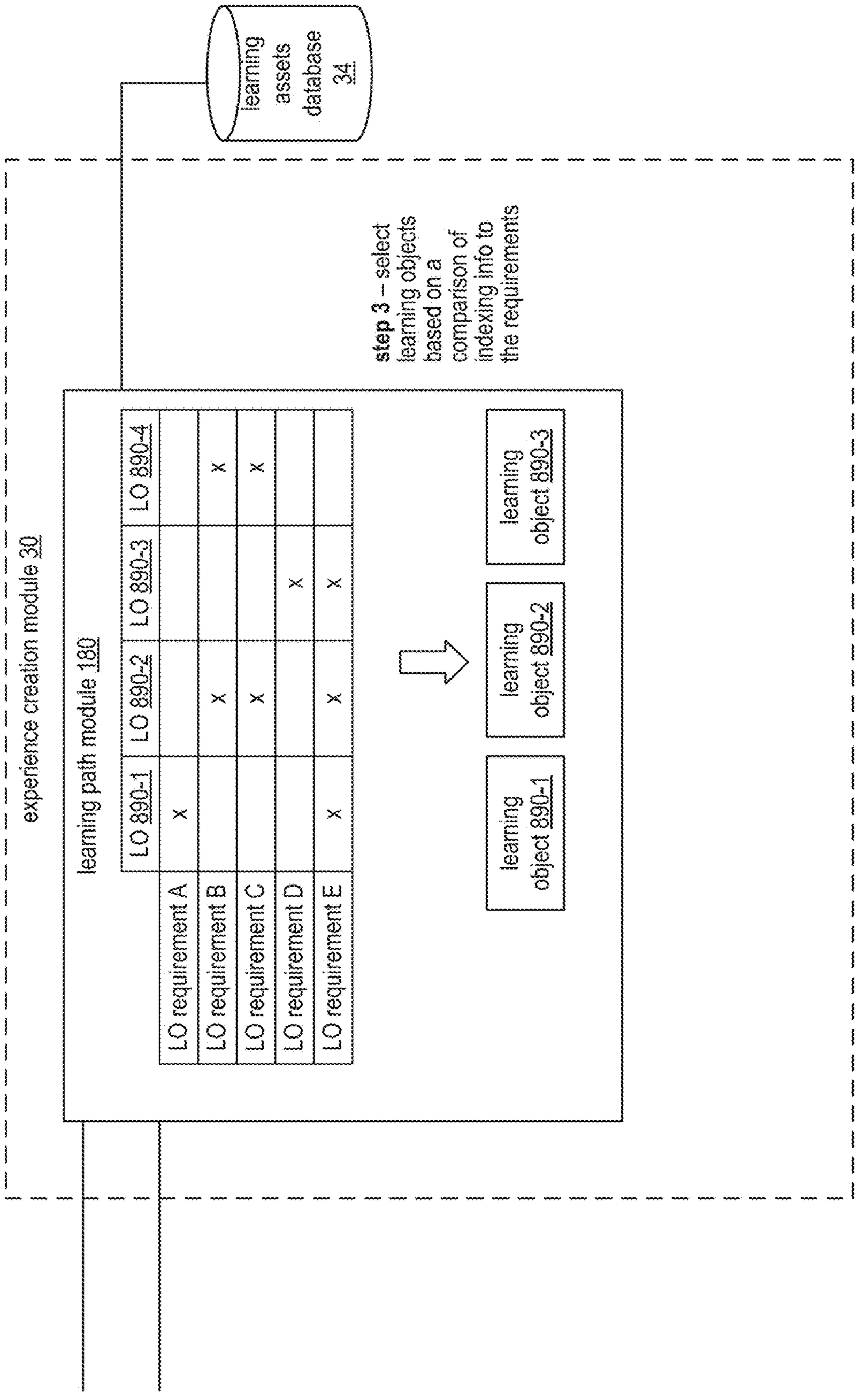

learning assets database 34
step 3 – select learning objects based on a comparison of indexing info to the requirements
experience creation module 30
learning path module 180
LO 890-1
LO 890-2
LO 890-3
LO 890-4
LO requirement A
LO requirement B
LO requirement C
LO requirement D
LO requirement E
learning object 890-1
learning object 890-2
learning object 890-3

FIG. 16C

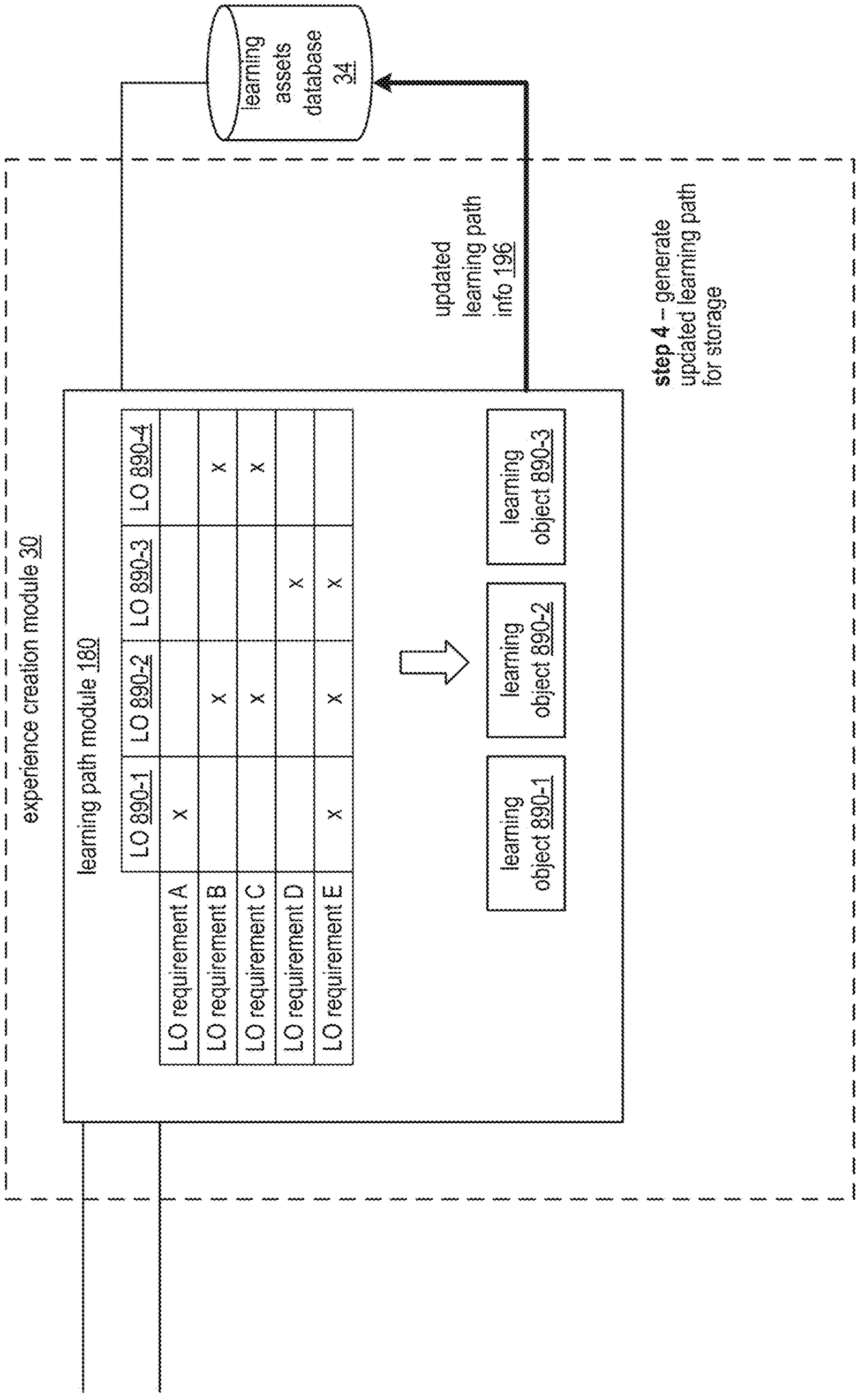

learning assets database 34
updated learning path info 196
step 4 – generate updated learning path for storage
experience creation module 30
learning path module 180
LO 890-1
LO 890-2
LO 890-3
LO 890-4
LO requirement A
LO requirement B
LO requirement C
LO requirement D
LO requirement E
learning object 890-1
learning object 890-2
learning object 890-3

FIG. 16D

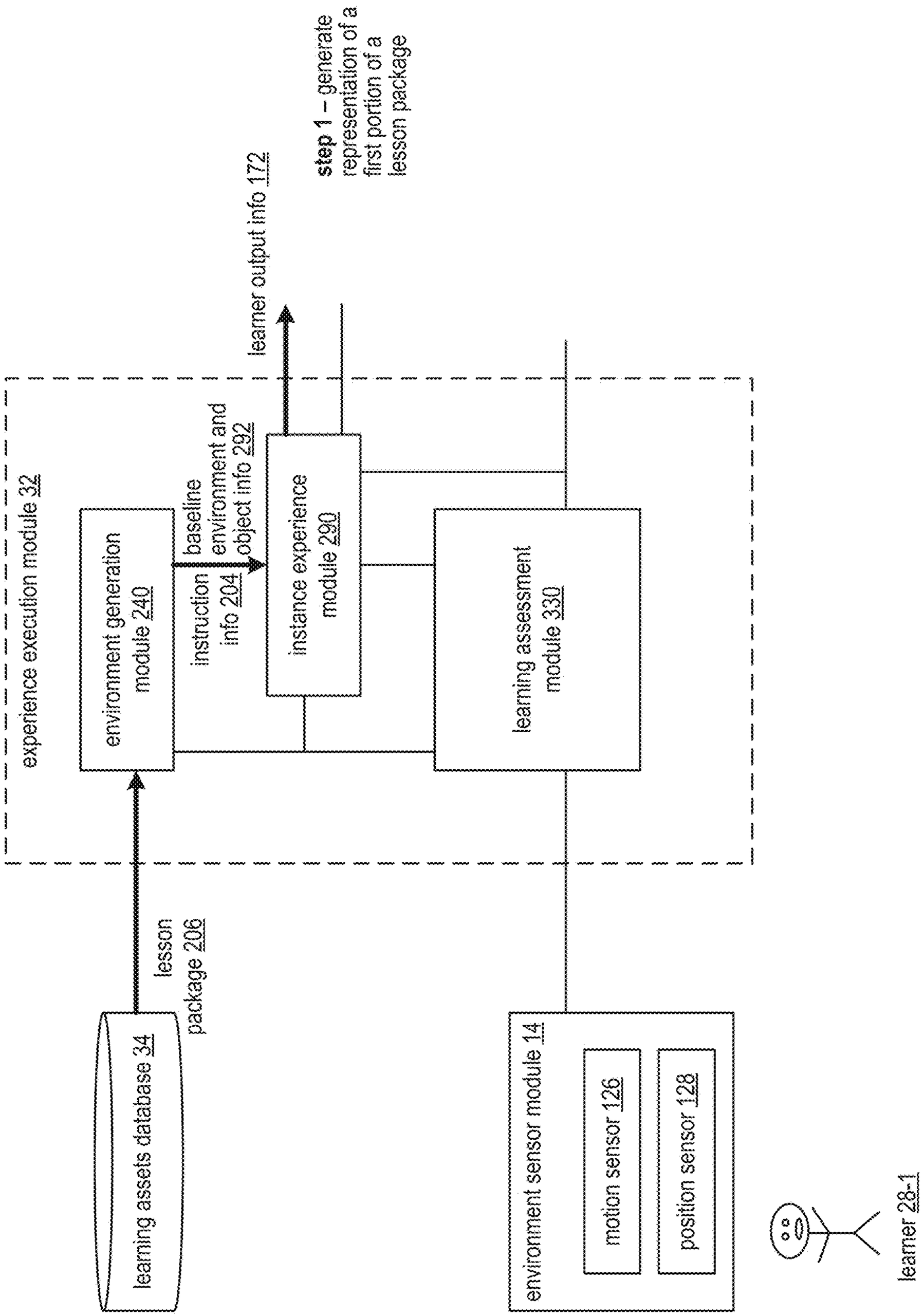

step 1 – generate represeniation of a first portion of a lesson package
r output info 172
experience execution module 32
environment generation module 240
instruction info 204
baseline environment and object info 292
instance experience module 290
learning assessment module 330
learning assets database 34
lesson package 206
environment sensor module 14
motion sensor 126
position sensor 128
learner 28-1

FIG. 17A

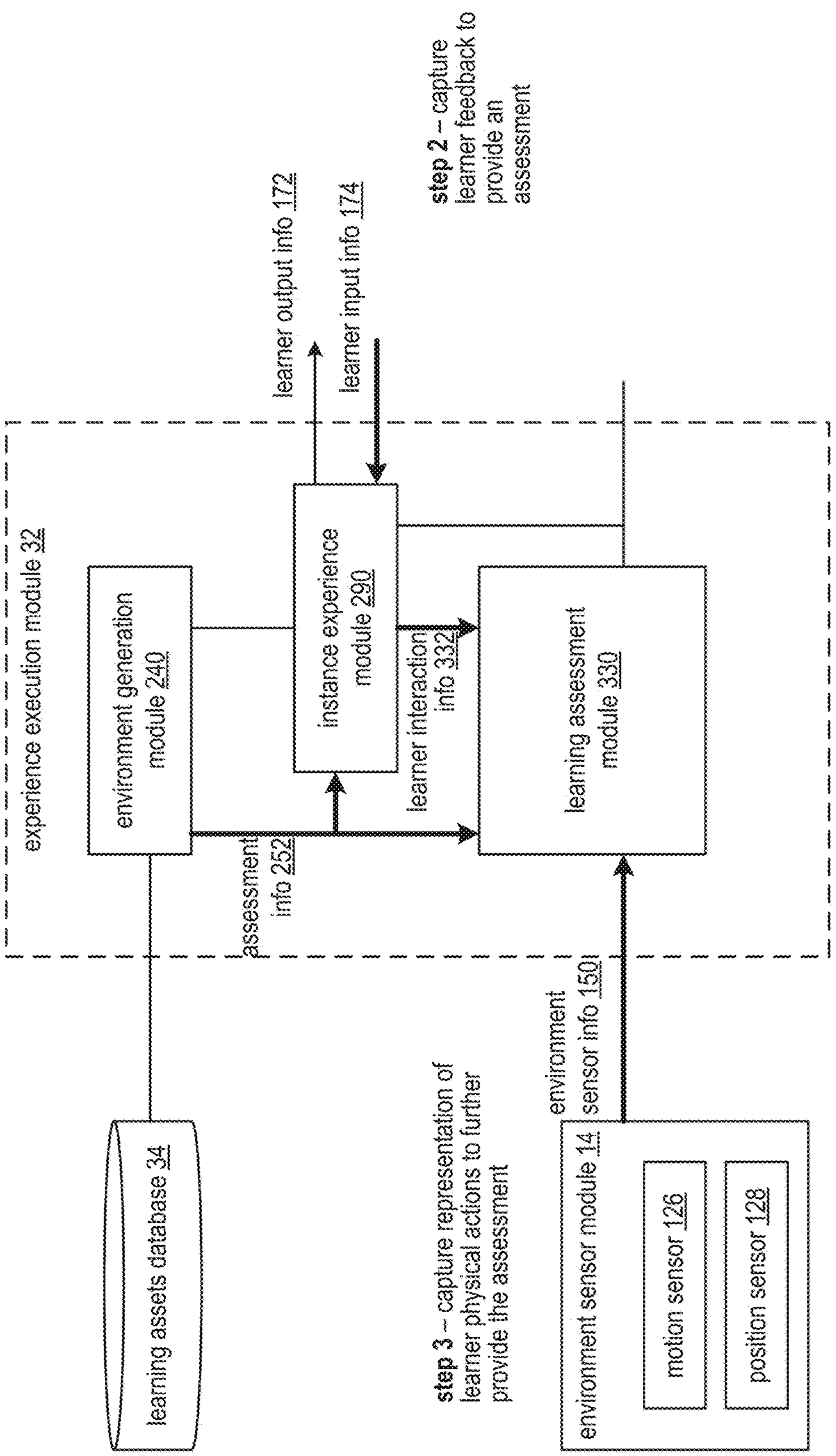

learning assets database 34
step 3 – capture representation of learner physical actions to further provide the assessment
environment sensor module 14
motion sensor 126
position sensor 128
environment sensor info 150
learner 28-1
experience execution module 32
environment generation module 240
assessment info 252
instance experience module 290
learner interaction info 332
learning assessment module 330
learner output info 172
learner input info 174
step 2 – capture learner feedback to provide an assessment

FIG. 17B

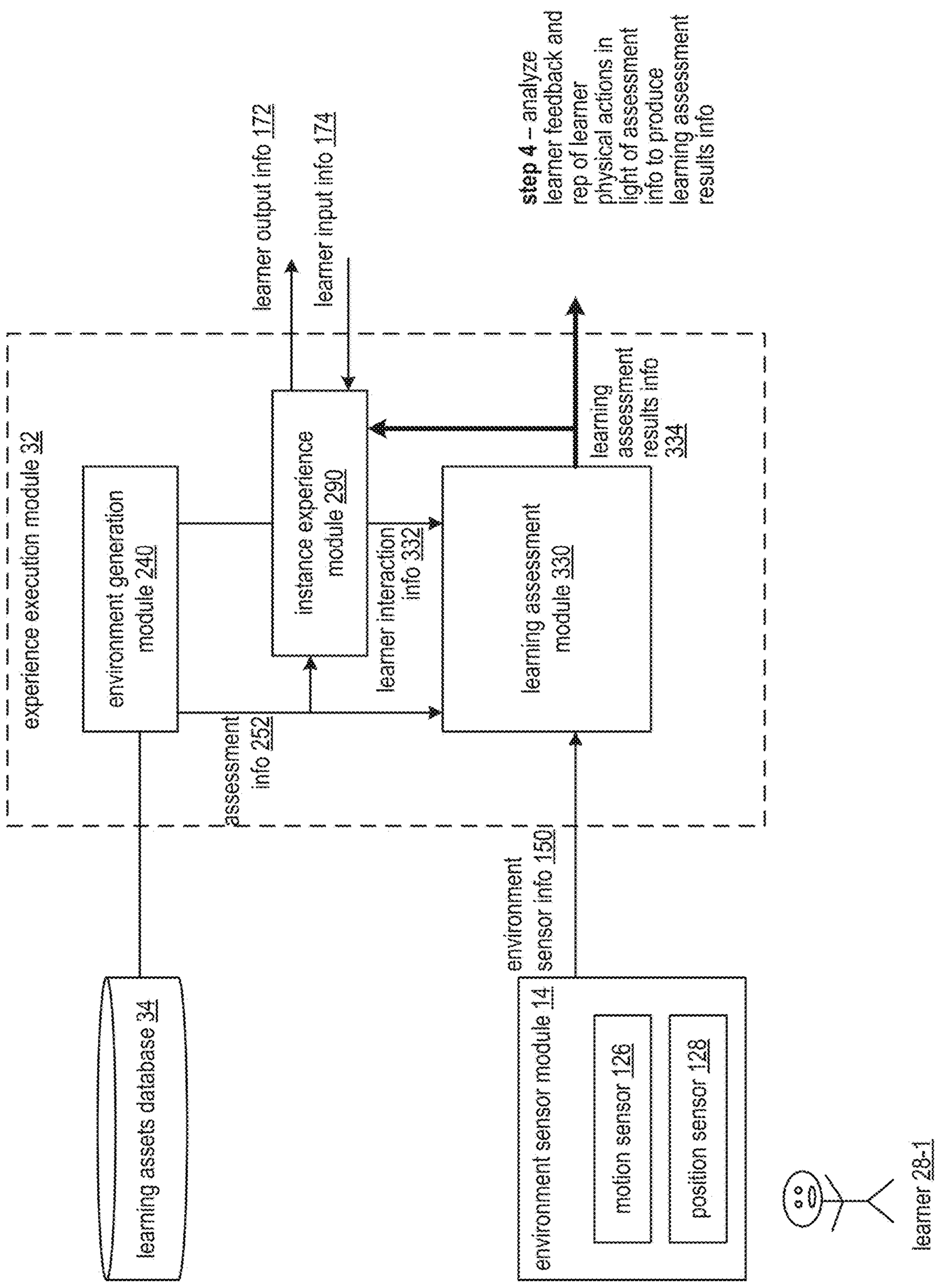

learner output info 172
learner input info 174
step 4 – analyze learner feedback and rep of learner physical actions in light of assessment info to produce learning assessment results info
experience execution module 32
environment generation module 240
instance experience module 290
learning assessment module 330
assessment info 252
learner interaction info 332
learning assessment results info 334
environment sensor info 150
learning assets database 34
environment sensor module 14
motion sensor 126
position sensor 128
learner 28-1

FIG. 17C

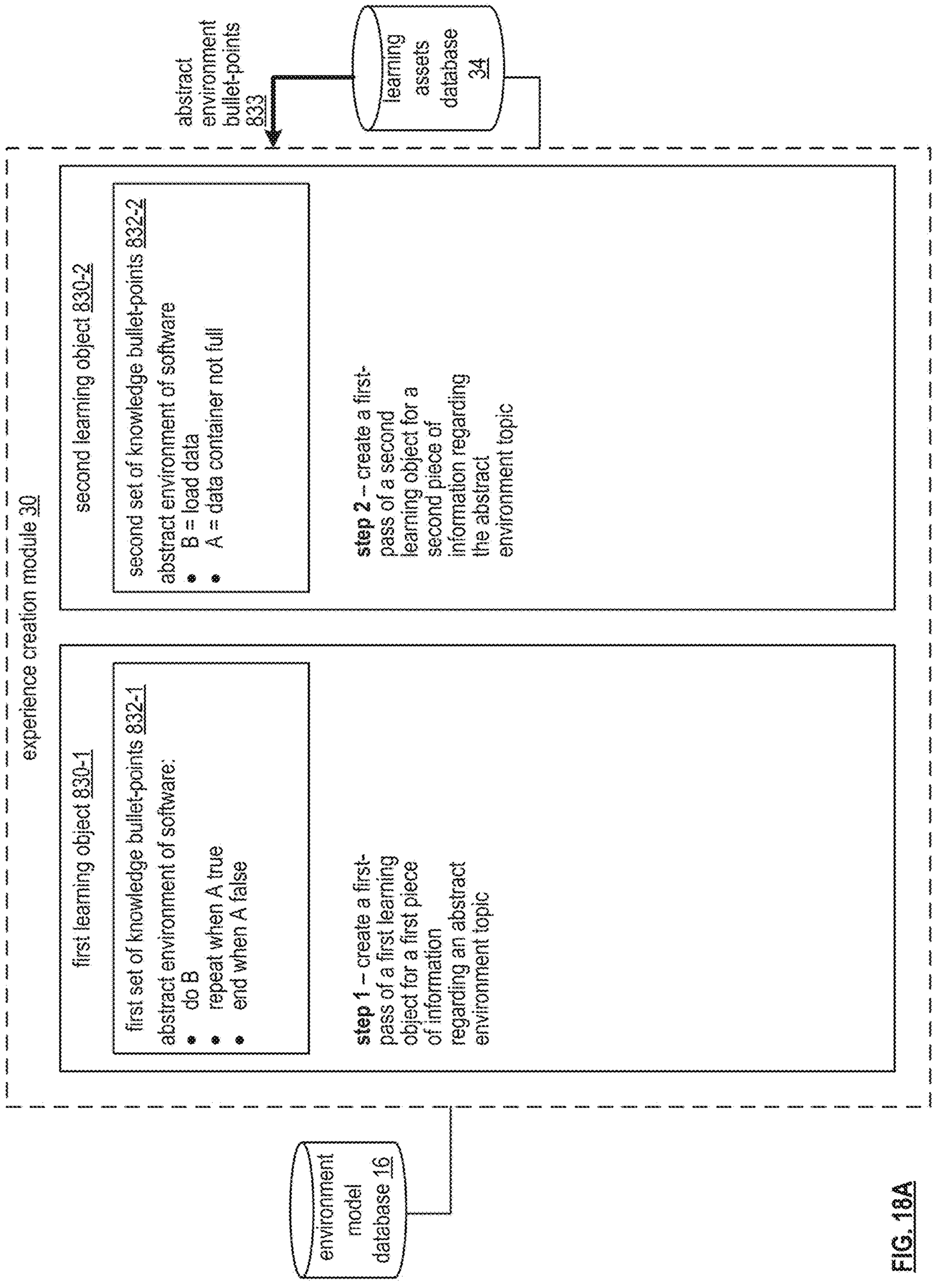

absiract
environment
bullet-points
833
learning
assets
database
34
experience creation module 30
first learning object 830-1
first set of knowledge bullet-points 832-1
abstract environment of software:
do B
repeat when A true
end when A false
step 1 – create a first-pass of a first learning object for a first piece of information regarding an abstract environment topic
second learning object 830-2
second set of knowledge bullet-points 832-2
abstract environment of software
B = load data
A = data container not full
step 2 – create a first-pass of a second learning object for a second piece of information regarding the abstract environment topic
environment
model
database 16

FIG. 18A

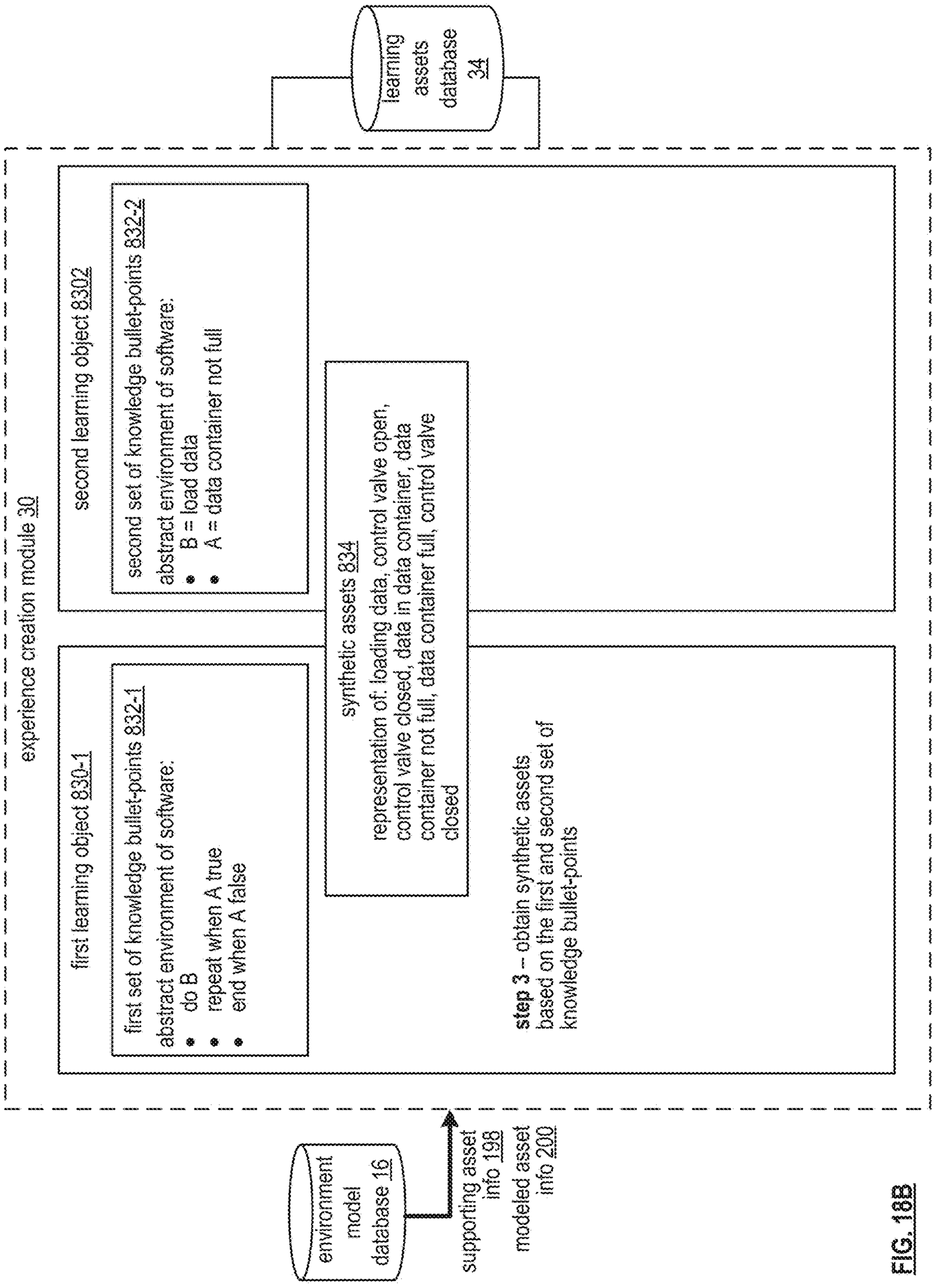

learning assets database 34
experience creation module 30
first learning object 830-1
first set of knowledge bullet-points 832-1
abstract environment of software:
do B
repeat when A true
end when A false
synthetic assets 834
representation of: loading data, control valve open, control valve closed, data in data container, data container not full, data container full, control valve closed
second learning object 8302
second set of knowledge bullet-points 832-2
abstract environment of software:
B = load data
A = data container not full
step 3 – obtain synthetic assets based on the first and second set of knowledge bullet-points
environment model database 16
supporting asset info 198
modeled asset info 200

FIG. 18B

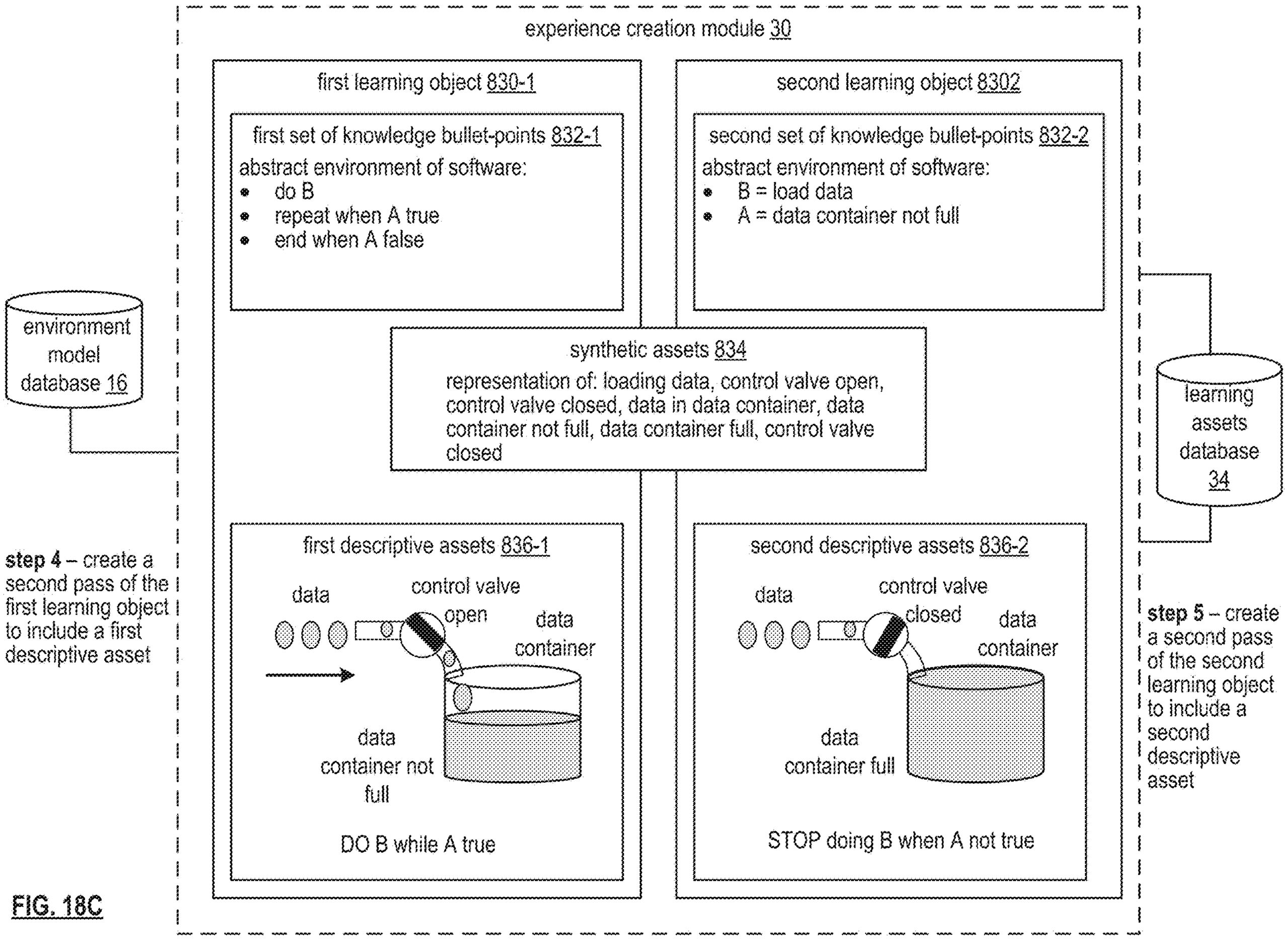

experience creation module 30
first learning object 830-1
first set of knowledge bullet-points 832-1
abstract environment of software:
do B
repeat when A true
end when A false
second learning object 8302
second set of knowledge bullet-points 832-2
abstract environment of software:
B = load data
A = data container not full
environment model database 16
synthetic assets 834
representation of: loading data, control valve open, control valve closed, data in data container, data container not full, data container full, control valve closed
learning assets database 34
first descriptive assets 836-1
data
control valve
open
data container
data container not full
DO B while A true
second descriptive assets 836-2
data
control valve
closed
data container
data container full
STOP doing B when A not true
step 4 – create a second pass of the first learning object to include a first descriptive asset
step 5 – create a second pass of the second learning object to include a second descriptive asset

FIG. 18C

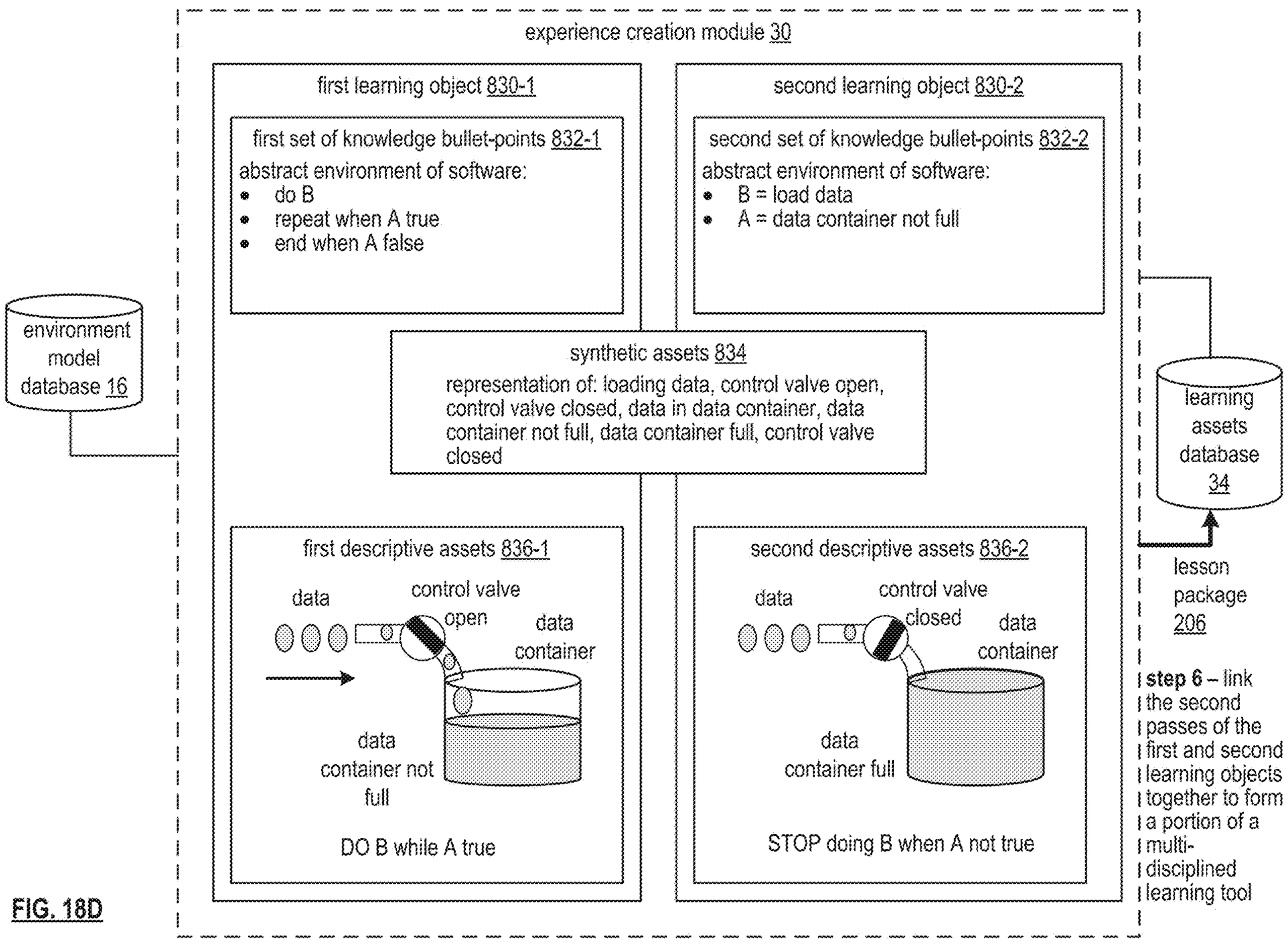

experience creation module 30
first learning object 830-1
first set of knowledge bullet-points 832-1
abstract environment of software:
do B
repeat when A true
end when A false
second learning object 830-2
second set of knowledge bullet-points 832-2
abstract environment of software:
B = load data
A = data container not full
environment model database 16
synthetic assets 834
representation of: loading data, control valve open, control valve closed, data in data container, data container not full, data container full, control valve closed
learning assets database 34
lesson package 206
first descriptive assets 836-1
data
control valve open
data container
data container not full
DO B while A true
second descriptive assets 836-2
data
control valve closed
data container
data container full
STOP doing B when A not true
step 6 – link the second passes of the first and second learning objects together to form a portion of a multi-disciplined learning tool

FIG. 18D

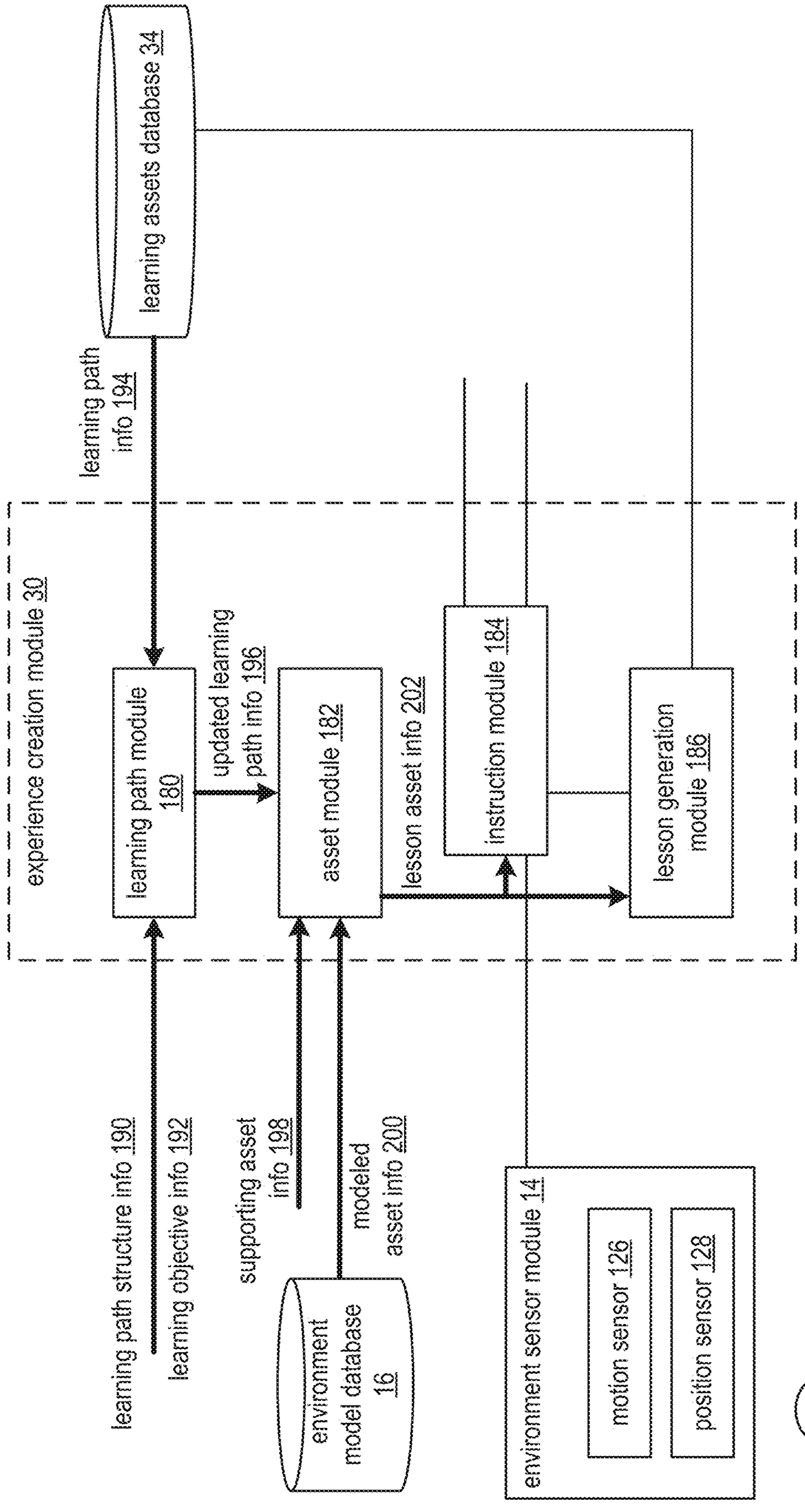

learning assets database 34
learning path info 194
experience creation module 30
learning path module 180
updated learning path info 196
asset module 182
lesson asset info 202
instruction module 184
lesson generation module 186
learning path structure info 190
learning objective info 192
supporting asset info 198
modeled asset info 200
environment model database 16
environment sensor module 14
motion sensor 126
position sensor 128
step 1 – obtain lesson asset info for a lesson
instructor 26-1

FIG. 19A

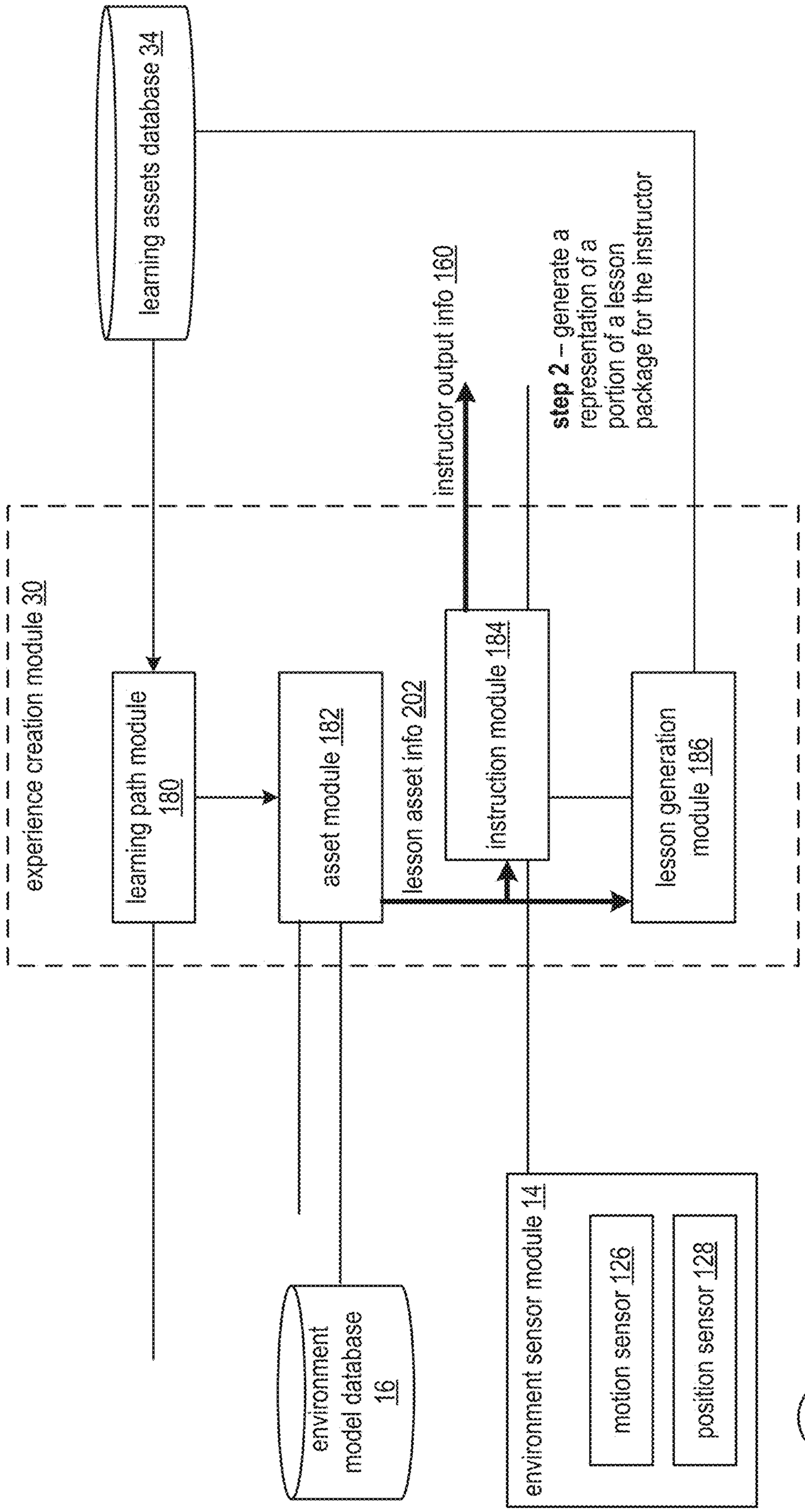

learning assets database 34
experience creation module 30
learning path module 180
asset module 182
lesson asset info 202
instruction module 184
instructor output info 160
lesson generation module 186
step 2 – generate a representation of a portion of a lesson package for the instructor
environment model database 16
environment sensor module 14
motion sensor 126
position sensor 128
instructor 26-1

FIG. 19B

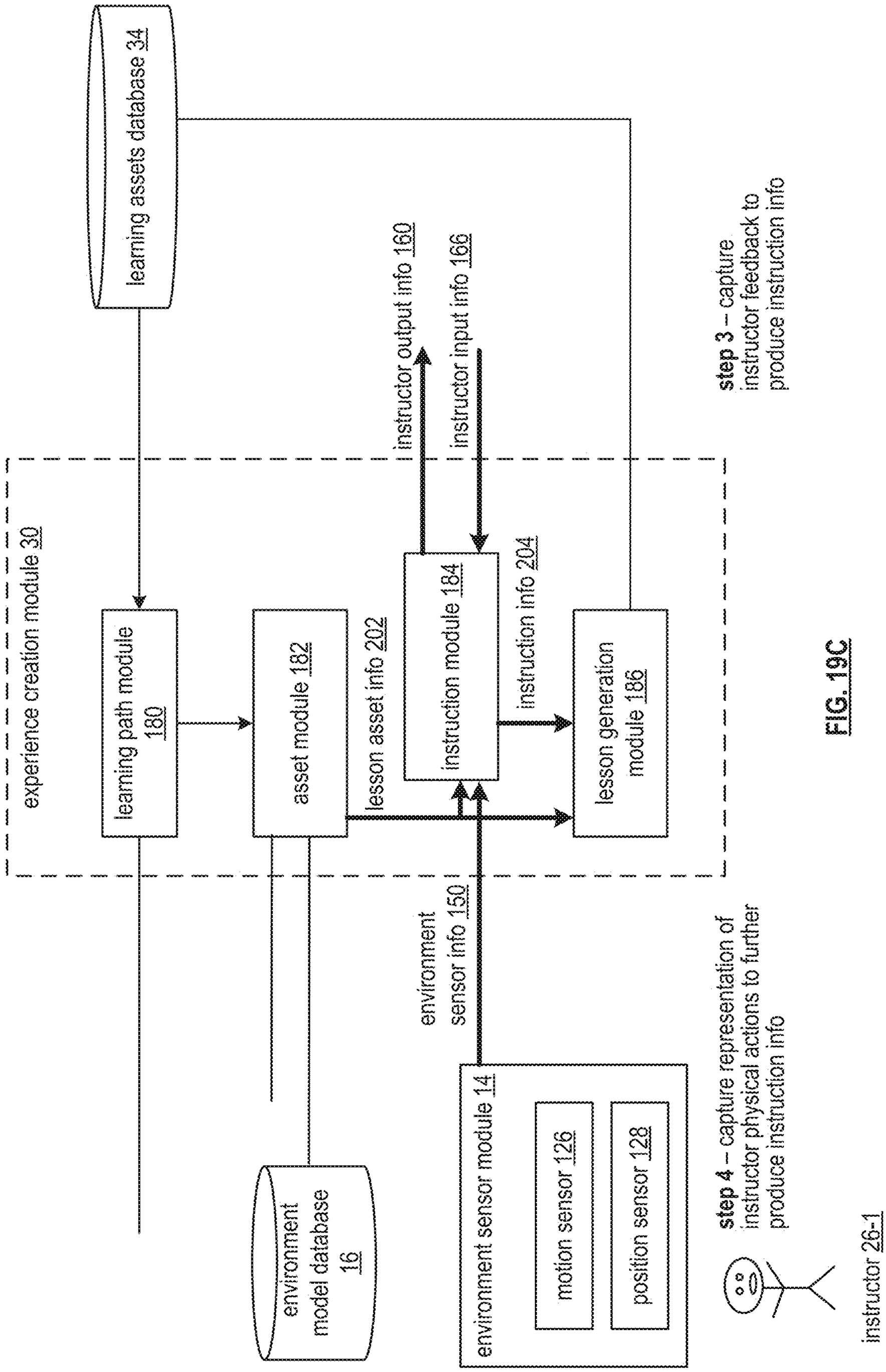

learning assets database 34
experience creation module 30
learning path module 180
asset module 182
instruction module 184
lesson generation module 186
lesson asset info 202
instruction info 204
instructor output info 160
instructor input info 166
environment sensor info 150
environment model database 16
environment sensor module 14
motion sensor 126
position sensor 128
step 3 – capture instructor feedback to produce instruction info
step 4 – capture representation of instructor physical actions to further produce instruction info
instructor 26-1

FIG. 19C

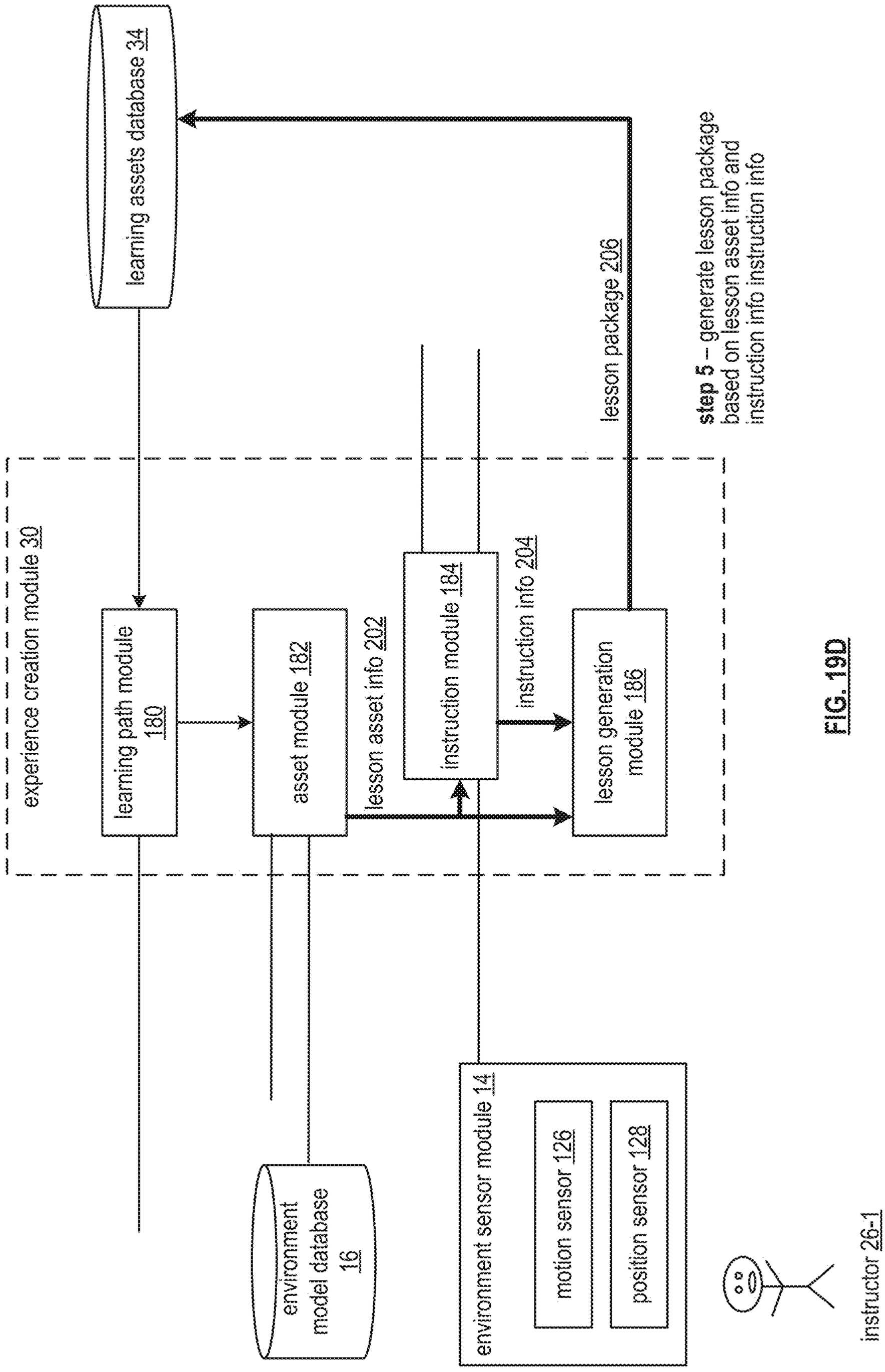

learning assets database 34
experience creation module 30
learning path module 180
asset module 182
lesson asset info 202
instruction module 184
instruction info 204
lesson generation module 186
lesson package 206
step 5 – generate lesson package based on lesson asset info and instruction info instruction info
environment model database 16
environment sensor module 14
motion sensor 126
position sensor 128
instructor 26-1

FIG. 19D

# CREATING AN ABSTRACT CONCEPT MULTI-DISCIPLINED LEARNING TOOL

## CROSS-REFERENCE TO RELATED APPLICATIONS

**[0001]** The present U.S. Utility Patent Application claims priority pursuant to 35 U.S.C. § 119(e) to U.S. Provisional Application No. 62/978,114, entitled "ESTABLISHING A LESSON PACKAGE," filed Feb. 18, 2020, which is hereby incorporated herein by reference in its entirety and made part of the present U.S. Utility Patent Application for all purposes.

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

**[0002]** Not Applicable.

## INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC

**[0003]** Not Applicable.

## BACKGROUND OF THE INVENTION

### Technical Field of the Invention

**[0004]** This invention relates generally to computer systems and more particularly to computer systems providing educational, training, and entertainment content.

### Description of Related Art

**[0005]** Computer systems communicate data, process data, and/or store data. Such computer systems include computing devices that range from wireless smart phones, laptops, tablets, personal computers (PC), work stations, personal three-dimensional (3-D) content viewers, and video game devices, to data centers where data servers store and provide access to digital content. Some digital content is utilized to facilitate education, training, and entertainment. Examples of visual content includes electronic books, reference materials, training manuals, classroom coursework, lecture notes, research papers, images, video clips, sensor data, reports, etc.

**[0006]** A variety of educational systems utilize educational tools and techniques. For example, an educator delivers educational content to students via an education tool of a recorded lecture that has built-in feedback prompts (e.g., questions, verification of viewing, etc.). The educator assess a degree of understanding of the educational content and/or overall competence level of a student from responses to the feedback prompts.

**[0007]** BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

**[0008]** FIG. **1** is a schematic block diagram of an embodiment of a computing system in accordance with the present invention;

**[0009]** FIG. **2**A is a schematic block diagram of an embodiment of a computing entity of a computing system in accordance with the present invention;

**[0010]** FIG. **2**B is a schematic block diagram of an embodiment of a computing device of a computing system in accordance with the present invention;

**[0011]** FIG. **3** is a schematic block diagram of another embodiment of a computing device of a computing system in accordance with the present invention;

**[0012]** FIG. **4** is a schematic block diagram of an embodiment of an environment sensor module of a computing system in accordance with the present invention;

**[0013]** FIG. **5**A is a schematic block diagram of another embodiment of a computing system in accordance with the present invention;

**[0014]** FIG. **5**B is a schematic block diagram of an embodiment of a representation of a learning experience in accordance with the present invention;

**[0015]** FIG. **6** is a schematic block diagram of another embodiment of a representation of a learning experience in accordance with the present invention;

**[0016]** FIG. **7**A is a schematic block diagram of another embodiment of a computing system in accordance with the present invention;

**[0017]** FIG. **7**B is a schematic block diagram of another embodiment of a representation of a learning experience in accordance with the present invention;

**[0018]** FIGS. **8**A-**8**C are schematic block diagrams of another embodiment of a computing system illustrating an example of creating a learning experience in accordance with the present invention;

**[0019]** FIG. **8**D is a logic diagram of an embodiment of a method for creating a learning experience within a computing system in accordance with the present invention;

**[0020]** FIGS. **8**E, **8**F, **8**G, **8**H, **8**J, and **8**K are schematic block diagrams of another embodiment of a computing system illustrating another example of creating a learning experience in accordance with the present invention;

**[0021]** FIGS. **9**A, **9**B, **9**C, and **9**D are schematic block diagrams of an embodiment of a computing system illustrating an example of creating a lesson package in accordance with the present invention;

**[0022]** FIGS. **10**A, **10**B, **10**C, **10**D, and **10**E are schematic block diagrams of an embodiment of a computing system illustrating an example of creating updated learning path information in accordance with the present invention;

**[0023]** FIGS. **11**A, **11**B, **11**C, **11**D, and **11**E are schematic block diagrams of an embodiment of a computing system illustrating an example of creating lesson asset information in accordance with the present invention;

**[0024]** FIGS. **12**A, **12**B, **12**C, and **12**D are schematic block diagrams of an embodiment of a computing system illustrating an example of creating modeled asset information in accordance with the present invention;

**[0025]** FIGS. **13**A, **13**B, and **13**C are schematic block diagrams of an embodiment of a computing system illustrating another example of creating updated learning path information in accordance with the present invention;

**[0026]** FIGS. **14**A, **14**B, and **14**C are schematic block diagrams of an embodiment of a computing system illustrating an example of modifying a lesson package in accordance with the present invention;

**[0027]** FIGS. **15**A, **15**B, **15**C, and **15**D are schematic block diagrams of an embodiment of a computing system illustrating an example of updating descriptive assets and knowledge assessment assets in accordance with the present invention;

**[0028]** FIGS. **16**A, **16**B, **16**C, and **16**D are schematic block diagrams of an embodiment of a computing system

illustrating another example of creating updated learning path information in accordance with the present invention;

**[0029]** FIGS. **17**A, **17**B, and **17**C are schematic block diagrams of an embodiment of a computing system illustrating an example of creating learning assessment results information in accordance with the present invention;

**[0030]** FIGS. **18**A, **18**B, **18**C, and **18**D are schematic block diagrams of an embodiment of a computing system illustrating another example of creating an abstract concept lesson package in accordance with the present invention; and

**[0031]** FIGS. **19**A, **19**B, **19**C, and **19**D are schematic block diagrams of an embodiment of a computing system illustrating another example of creating a lesson package in accordance with the present invention.

## DETAILED DESCRIPTION OF THE INVENTION

**[0032]** FIG. **1** is a schematic block diagram of an embodiment of a computing system **10** that includes a real world environment **12**, an environment sensor module **14**, and environment model database **16**, a human interface module **18**, and a computing entity **20**. The real-world environment **12** includes places **22**, objects **24**, instructors **26-1** through **26**-N, and learners **28-1** through **28**-N. The computing entity **20** includes an experience creation module **30**, an experience execution module **32**, and a learning assets database **34**.

**[0033]** The places **22** includes any area. Examples of places **22** includes a room, an outdoor space, a neighborhood, a city, etc. The objects **24** includes things within the places. Examples of objects **24** includes people, equipment, furniture, personal items, tools, and representations of information (i.e., video recordings, audio recordings, captured text, etc.). The instructors includes any entity (e.g., human or human proxy) imparting knowledge. The learners includes entities trying to gain knowledge and may temporarily serve as an instructor.

**[0034]** In an example of operation of the computing system **10**, the experience creation module **30** receives environment sensor information **38** from the environment sensor module **14** based on environment attributes **36** from the real world environment **12**. The environment sensor information **38** includes time-based information (e.g., static snapshot, continuous streaming) from environment attributes **36** including XYZ position information, place information, and object information (i.e., background, foreground, instructor, learner, etc.). The XYZ position information includes portrayal in a world space industry standard format (e.g., with reference to an absolute position).

**[0035]** The environment attributes **36** includes detectable measures of the real-world environment **12** to facilitate generation of a multi-dimensional (e.g., including time) representation of the real-world environment **12** in a virtual reality and/or augmented reality environment. For example, the environment sensor module **14** produces environment sensor information **38** associated with a medical examination room and a subject human patient (e.g., an MRI). The environment sensor module **14** is discussed in greater detail with reference to FIG. **4**.

**[0036]** Having received the environment sensor information **38**, the experience creation module **30** accesses the environment model database **16** to recover modeled environment information **40**. The modeled environment information **40** includes a synthetic representation of numerous environments (e.g., model places and objects). For example, the modeled environment information **40** includes a 3-D representation of a typical human circulatory system. The models include those that are associated with certain licensing requirements (e.g., copyrights, etc.).

**[0037]** Having received the modeled environment information **40**, the experience creation module **30** receives instructor information **44** from the human interface module **18**, where the human interface module **18** receives human input/output (I/O) **42** from instructor **26-1**. The instructor information **44** includes a representation of an essence of communication with a participant instructor. The human I/O **42** includes detectable fundamental forms of communication with humans or human proxies. The human interface module **18** is discussed in greater detail with reference to FIG. **3**.

**[0038]** Having received the instructor information **44**, the experience creation module **30** interprets the instructor information **44** to identify aspects of a learning experience. A learning experience includes numerous aspects of an encounter between one or more learners and an imparting of knowledge within a representation of a learning environment that includes a place, multiple objects, and one or more instructors. The learning experience further includes an instruction portion (e.g., acts to impart knowledge) and an assessment portion (e.g., further acts and/or receiving of learner input) to determine a level of comprehension of the knowledge by the one or more learners. The learning experience still further includes scoring of the level of comprehension and tallying multiple learning experiences to facilitate higher-level competency accreditations (e.g., certificates, degrees, licenses, training credits, experiences completed successfully, etc.).

**[0039]** As an example of the interpreting of the instructor information **44**, the experience creation module **30** identifies a set of concepts that the instructor desires to impart upon a learner and a set of comprehension verifying questions and associated correct answers. The experience creation module **30** further identifies step-by-step instructor annotations associated with the various objects within the environment of the learning experience for the instruction portion and the assessment portion. For example, the experience creation module **30** identifies positions held by the instructor **26-1** as the instructor narrates a set of concepts associated with the subject patient circulatory system. As a further example, the experience creation module **30** identifies circulatory system questions and correct answers posed by the instructor associated with the narrative.

**[0040]** Having interpreted the instructor information **44**, the experience creation module **30** renders the environment sensor information **38**, the modeled environment information **40**, and the instructor information **44** to produce learning assets information **48** for storage in the learning assets database **34**. The learning assets information **48** includes all things associated with the learning experience to facilitate subsequent recreation. Examples includes the environment, places, objects, instructors, learners, assets, recorded instruction information, learning evaluation information, etc.

**[0041]** Execution of a learning experience for the one or more learners includes a variety of approaches. A first approach includes the experience execution module **32** recovering the learning assets information **48** from the learning assets database **34**, rendering the learning experience as learner information **46**, and outputting the learner

information **46** via the human interface module **18** as further human I/O **42** to one or more of the learners **28-1** through **28**-N. The learner information **46** includes information to be sent to the one or more learners and information received from the one or more learners. For example, the experience execution module **32** outputs learner information **46** associated with the instruction portion for the learner **28-1** and collects learner information **46** from the learner **28-1** that includes submitted assessment answers in response to assessment questions of the assessment portion communicated as further learner information **46** for the learner **28-1**.

**[0042]** A second approach includes the experience execution module **32** rendering the learner information **46** as a combination of live streaming of environment sensor information **38** from the real-world environment **12** along with an augmented reality overlay based on recovered learning asset information **48**. For example, a real world subject human patient in a medical examination room is live streamed as the environment sensor information **38** in combination with a prerecorded instruction portion from the instructor **26-1**.

**[0043]** FIG. **2**A is a schematic block diagram of an embodiment of the computing entity **20** of the computing system **10**. The computing entity **20** includes one or more computing devices **100-1** through **100**-N. A computing device is any electronic device that communicates data, processes data, represents data (e.g., user interface) and/or stores data.

**[0044]** Computing devices include portable computing devices and fixed computing devices. Examples of portable computing devices include an embedded controller, a smart sensor, a social networking device, a gaming device, a smart phone, a laptop computer, a tablet computer, a video game controller, and/or any other portable device that includes a computing core. Examples of fixed computing devices includes a personal computer, a computer server, a cable set-top box, a fixed display device, an appliance, and industrial controller, a video game counsel, a home entertainment controller, a critical infrastructure controller, and/or any type of home, office or cloud computing equipment that includes a computing core.

**[0045]** FIG. **2**B is a schematic block diagram of an embodiment of a computing device **100** of the computing system **10** that includes one or more computing cores **52-1** through **52**-N, a memory module **102**, the human interface module **18**, the environment sensor module **14**, and an I/O module **104**. In alternative embodiments, the human interface module **18**, the environment sensor module **14**, the I/O module **104**, and the memory module **102** may be standalone (e.g., external to the computing device). An embodiment of the computing device **100** will be discussed in greater detail with reference to FIG. **3**.

**[0046]** FIG. **3** is a schematic block diagram of another embodiment of the computing device **100** of the computing system **10** that includes the human interface module **18**, the environment sensor module **14**, the computing core **52-1**, the memory module **102**, and the I/O module **104**. The human interface module **18** includes one or more visual output devices **74** (e.g., video graphics display, 3-D viewer, touchscreen, LED, etc.), one or more visual input devices **80** (e.g., a still image camera, a video camera, a 3-D video camera, photocell, etc.), and one or more audio output devices **78** (e.g., speaker(s), headphone jack, a motor, etc.). The human interface module **18** further includes one or more user input devices **76** (e.g., keypad, keyboard, touchscreen, voice to text, a push button, a microphone, a card reader, a door position switch, a biometric input device, etc.) and one or more motion output devices **106** (e.g., servos, motors, lifts, pumps, actuators, anything to get real-world objects to move).

**[0047]** The computing core **52-1** includes a video graphics module **54**, one or more processing modules **50-1** through **50**-N, a memory controller **56**, one or more main memories **58-1** through **58**-N (e.g., RAM), one or more input/output (I/O) device interface modules **62**, an input/output (I/O) controller **60**, and a peripheral interface **64**. A processing module is as defined at the end of the detailed description.

**[0048]** The memory module **102** includes a memory interface module **70** and one or more memory devices, including flash memory devices **92**, hard drive (HD) memory **94**, solid state (SS) memory **96**, and cloud memory **98**. The cloud memory **98** includes an on-line storage system and an on-line backup system.

**[0049]** The I/O module **104** includes a network interface module **72**, a peripheral device interface module **68**, and a universal serial bus (USB) interface module **66**. Each of the I/O device interface module **62**, the peripheral interface **64**, the memory interface module **70**, the network interface module **72**, the peripheral device interface module **68**, and the USB interface modules **66** includes a combination of hardware (e.g., connectors, wiring, etc.) and operational instructions stored on memory (e.g., driver software) that are executed by one or more of the processing modules **50-1** through **50**-N and/or a processing circuit within the particular module.

**[0050]** The I/O module **104** further includes one or more wireless location modems **84** (e.g., global positioning satellite (GPS), Wi-Fi, angle of arrival, time difference of arrival, signal strength, dedicated wireless location, etc.) and one or more wireless communication modems **86** (e.g., a cellular network transceiver, a wireless data network transceiver, a Wi-Fi transceiver, a Bluetooth transceiver, a 315 MHz transceiver, a zig bee transceiver, a 60 GHz transceiver, etc.). The I/O module **104** further includes a telco interface **108** (e.g., to interface to a public switched telephone network), a wired local area network (LAN) **88** (e.g., optical, electrical), and a wired wide area network (WAN) **90** (e.g., optical, electrical). The I/O module **104** further includes one or more peripheral devices (e.g., peripheral devices **1**-P) and one or more universal serial bus (USB) devices (USB devices **1**-U). In other embodiments, the computing device **100** may include more or less devices and modules than shown in this example embodiment.

**[0051]** FIG. **4** is a schematic block diagram of an embodiment of the environment sensor module **14** of the computing system **10** that includes a sensor interface module **120** to output environment sensor information **150** based on information communicated with a set of sensors. The set of sensors includes a visual sensor **122** (e.g., to the camera, 3-D camera, 360° view camera, a camera array, an optical spectrometer, etc.) and an audio sensor **124** (e.g., a microphone, a microphone array). The set of sensors further includes a motion sensor **126** (e.g., a solid-state Gyro, a vibration detector, a laser motion detector) and a position sensor **128** (e.g., a Hall effect sensor, an image detector, a GPS receiver, a radar system).

**[0052]** The set of sensors further includes a scanning sensor **130** (e.g., CAT scan, MRI, x-ray, ultrasound, radio scatter, particle detector, laser measure, further radar) and a

temperature sensor **132** (e.g., thermometer, thermal coupler). The set of sensors further includes a humidity sensor **134** (resistance based, capacitance based) and an altitude sensor **136** (e.g., pressure based, GPS-based, laser-based).

**[0053]** The set of sensors further includes a biosensor **138** (e.g., enzyme, immuno, microbial) and a chemical sensor **140** (e.g., mass spectrometer, gas, polymer). The set of sensors further includes a magnetic sensor **142** (e.g., Hall effect, piezo electric, coil, magnetic tunnel junction) and any generic sensor **144** (e.g., including a hybrid combination of two or more of the other sensors).

**[0054]** FIG. **5**A is a schematic block diagram of another embodiment of a computing system that includes the environment model database **16**, the human interface module **18**, the instructor **26-1**, the experience creation module **30**, and the learning assets database **34** of FIG. **1**. In an example of operation, the experience creation module **30** obtains modeled environment information **40** from the environment model database **16** and renders a representation of an environment and objects of the modeled environment information **40** to output as instructor output information **160**. The human interface module **18** transforms the instructor output information **160** into human output **162** for presentation to the instructor **26-1**. For example, the human output **162** includes a 3-D visualization and stereo audio output.

**[0055]** In response to the human output **162**, the human interface module **18** receives human input **164** from the instructor **26-1**. For example, the human input **164** includes pointer movement information and human speech associated with a lesson. The human interface module **18** transforms the human input **164** into instructor input information **166**. The instructor input information **166** includes one or more of representations of instructor interactions with objects within the environment and explicit evaluation information (e.g., questions to test for comprehension level, and correct answers to the questions).

**[0056]** Having received the instructor input information **166**, the experience creation module **30** renders a representation of the instructor input information **166** within the environment utilizing the objects of the modeled environment information **40** to produce learning asset information **48** for storage in the learnings assets database **34**. Subsequent access of the learning assets information **48** facilitates a learning experience.

**[0057]** FIG. **5**B is a schematic block diagram of an embodiment of a representation of a learning experience that includes a virtual place **168** and a resulting learning objective **170**. A learning objective represents a portion of an overall learning experience, where the learning objective is associated with at least one major concept of knowledge to be imparted to a learner. The major concept may include several sub-concepts. The makeup of the learning objective is discussed in greater detail with reference to FIG. **6**.

**[0058]** The virtual place **168** includes a representation of an environment (e.g., a place) over a series of time intervals (e.g., time 0-N). The environment includes a plurality of objects **24-1** through **24**-N. At each time reference, the positions of the objects can change in accordance with the learning experience. For example, the instructor **26-1** of FIG. **5**A interacts with the objects to convey a concept. The sum of the positions of the environment and objects within the virtual place **168** is wrapped into the learning objective **170** for storage and subsequent utilization when executing the learning experience.

**[0059]** FIG. **6** is a schematic block diagram of another embodiment of a representation of a learning experience that includes a plurality of modules **1**-N. Each module includes a set of lessons **1**-N. Each lesson includes a plurality of learning objectives **1**-N. The learning experience typically is played from left to right where learning objectives are sequentially executed in lesson **1** of module **1** followed by learning objectives of lesson **2** of module **1** etc.

**[0060]** As learners access the learning experience during execution, the ordering may be accessed in different ways to suit the needs of the unique learner based on one or more of preferences, experience, previously demonstrated comprehension levels, etc. For example, a particular learner may skip over lesson **1** of module **1** and go right to lesson **2** of module **1** when having previously demonstrated competency of the concepts associated with lesson **1**.

**[0061]** Each learning objective includes indexing information, environment information, asset information, instructor interaction information, and assessment information. The index information includes one or more of categorization information, topics list, instructor identification, author identification, identification of copyrighted materials, keywords, concept titles, prerequisites for access, and links to related learning objectives.

**[0062]** The environment information includes one or more of structure information, environment model information, background information, identifiers of places, and categories of environments. The asset information includes one or more of object identifiers, object information (e.g., modeling information), asset ownership information, asset type descriptors (e.g., 2-D, 3-D). Examples include models of physical objects, stored media such as videos, scans, images, digital representations of text, digital audio, and graphics.

**[0063]** The instructor interaction information includes representations of instructor annotations, actions, motions, gestures, expressions, eye movement information, facial expression information, speech, and speech inflections. The content associated with the instructor interaction information includes overview information, speaker notes, actions associated with assessment information, (e.g., pointing to questions, revealing answers to the questions, motioning related to posing questions) and conditional learning objective execution ordering information (e.g., if the learner does this then take this path, otherwise take another path).

**[0064]** The assessment information includes a summary of desired knowledge to impart, specific questions for a learner, correct answers to the specific questions, multiple-choice question sets, and scoring information associated with writing answers. The assessment information further includes historical interactions by other learners with the learning objective (e.g., where did previous learners look most often within the environment of the learning objective, etc.), historical responses to previous comprehension evaluations, and actions to facilitate when a learner responds with a correct or incorrect answer (e.g., motion stimulus to activate upon an incorrect answer to increase a human stress level).

**[0065]** FIG. **7**A is a schematic block diagram of another embodiment of a computing system that includes the learning assets database **34**, the experience execution module **32**, the human interface module **18**, and the learner **28-1** of FIG. **1**. In an example of operation, the experience execution module **32** recovers learning asset information **48** from the learning assets database **34** (e.g., in accordance with a selection by the learner **28-1**). The experience execution

module **32** renders a group of learning objectives associated with a common lesson within an environment utilizing objects associated with the lesson to produce learner output information **172**. The learner output information **172** includes a representation of a virtual place and objects that includes instructor interactions and learner interactions from a perspective of the learner.

**[0066]** The human interface module **18** transforms the learner output information **172** into human output **162** for conveyance of the learner output information **172** to the learner **28-1**. For example, the human interface module **18** facilitates displaying a 3-D image of the virtual environment to the learner **28-1**.

**[0067]** The human interface module **18** transforms human input **164** from the learner **28-1** to produce learner input information **174**. The learner input information **174** includes representations of learner interactions with objects within the virtual place (e.g., answering comprehension level evaluation questions).

**[0068]** The experience execution module **32** updates the representation of the virtual place by modifying the learner output information **172** based on the learner input information **174** so that the learner **28-1** enjoys representations of interactions caused by the learner within the virtual environment. The experience execution module **32** evaluates the learner input information **174** with regards to evaluation information of the learning objectives to evaluate a comprehension level by the learner **28-1** with regards to the set of learning objectives of the lesson.

**[0069]** FIG. **7**B is a schematic block diagram of another embodiment of a representation of a learning experience that includes the learning objective **170** and the virtual place **168**. In an example of operation, the learning objective **170** is recovered from the learning assets database **34** of FIG. **7**A and rendered to create the virtual place **168** representations of objects **24-1** through **24**-N in the environment from time references zero through N. For example, a first object is the instructor **26-1** of FIG. **5**A, a second object is the learner **28-1** of FIG. **7**A, and the remaining objects are associated with the learning objectives of the lesson, where the objects are manipulated in accordance with annotations of instructions provided by the instructor **26-1**.

**[0070]** The learner **28-1** experiences a unique viewpoint of the environment and gains knowledge from accessing (e.g., playing) the learning experience. The learner **28-1** further manipulates objects within the environment to support learning and assessment of comprehension of objectives of the learning experience.

**[0071]** FIGS. **8**A-**8**C are schematic block diagrams of another embodiment of a computing system illustrating an example of creating a learning experience. The computing system includes the environment model database **16**, the experience creation module **30**, and the learning assets database **34** of FIG. **1**. The experience creation module **30** includes a learning path module **180**, an asset module **182**, an instruction module **184**, and a lesson generation module **186**.

**[0072]** In an example of operation, FIG. **8** A illustrates the learning path module **180** determining a learning path (e.g., structure and ordering of learning objectives to complete towards a goal such as a certificate or degree) to include multiple modules and/or lessons. For example, the learning path module **180** obtains learning path information **194** from the learning assets database **34** and receives learning path structure information **190** and learning objective information **192** (e.g., from an instructor) to generate updated learning path information **196**.

**[0073]** The learning path structure information **190** includes attributes of the learning path and the learning objective information **192** includes a summary of desired knowledge to impart. The updated learning path information **196** is generated to include modifications to the learning path information **194** in accordance with the learning path structure information **190** in the learning objective information **192**.

**[0074]** The asset module **182** determines a collection of common assets for each lesson of the learning path. For example, the asset module **182** receives supporting asset information **198** (e.g., representation information of objects in the virtual space) and modeled asset information **200** from the environment model database **16** to produce lesson asset information **202**. The modeled asset information **200** includes representations of an environment to support the updated learning path information **196** (e.g., modeled places and modeled objects) and the lesson asset information **202** includes a representation of the environment, learning path, the objectives, and the desired knowledge to impart.

**[0075]** FIG. **8**B further illustrates the example of operation where the instruction module **184** outputs a representation of the lesson asset information **202** as instructor output information **160**. The instructor output information **160** includes a representation of the environment and the asset so far to be experienced by an instructor who is about to input interactions with the environment to impart the desired knowledge.

**[0076]** The instruction module **184** receives instructor input information **166** from the instructor in response to the instructor output information **160**. The instructor input information **166** includes interactions from the instructor to facilitate imparting of the knowledge (e.g., instructor annotations, pointer movements, highlighting, text notes, and speech) and testing of comprehension of the knowledge (e.g., valuation information such as questions and correct answers). The instruction module **184** obtains assessment information (e.g., comprehension test points, questions, correct answers to the questions) for each learning objective based on the lesson asset information **202** and produces instruction information **204** (e.g., representation of instructor interactions with objects within the virtual place, evaluation information).

**[0077]** FIG. **8**C further illustrates the example of operation where the lesson generation module **186** renders (e.g., as a multidimensional representation) the objects associated with each lesson (e.g., assets of the environment) within the environment in accordance with the instructor interactions for the instruction portion and the assessment portion of the learning experience. Each object is assigned a relative position in XYZ world space within the environment to produce the lesson rendering.

**[0078]** The lesson generation module **186** outputs the rendering as a lesson package **206** for storage in the learning assets database **34**. The lesson package **206** includes everything required to replay the lesson for a subsequent learner (e.g., representation of the environment, the objects, the interactions of the instructor during both the instruction and evaluation portions, questions to test comprehension, correct answers to the questions, a scoring approach for evaluating comprehension, all of the learning objective information associated with each learning objective of the lesson).

**[0079]** FIG. **8**D is a logic diagram of an embodiment of a method for creating a learning experience within a computing system (e.g., the computing system **10** of FIG. **1**). In particular, a method is presented in conjunction with one or more functions and features described in conjunction with FIGS. **1**-**7**B, and also FIGS. **8**A-**8**C. The method includes step **220** where a processing module of one or more processing modules of one or more computing devices within the computing system determines updated learning path information based on learning path information, learning path structure information, and learning objective information. For example, the processing module combines a previous learning path with obtained learning path structure information in accordance with learning objective information to produce the updated learning path information (i.e., specifics for a series of learning objectives of a lesson).

**[0080]** The method continues at step **222** where the processing module determines lesson asset information based on the updated learning path information, supporting asset information, and modeled asset information. For example, the processing module combines assets of the supporting asset information (e.g., received from an instructor) with assets and a place of the modeled asset information in accordance with the updated learning path information to produce the lesson asset information. The processing module selects assets as appropriate for each learning objective (e.g., to facilitate the imparting of knowledge based on a predetermination and/or historical results).

**[0081]** The method continues at step **224** where the processing module obtains instructor input information. For example, the processing module outputs a representation of the lesson asset information as instructor output information and captures instructor input information for each lesson in response to the instructor output information. Further obtain asset information for each learning objective (e.g., extract from the instructor input information).

**[0082]** The method continues at step **226** where the processing module generates instruction information based on the instructor input information. For example, the processing module combines instructor gestures and further environment manipulations based on the assessment information to produce the instruction information.

**[0083]** The method continues at step **228** where the processing module renders, for each lesson, a multidimensional representation of environment and objects of the lesson asset information utilizing the instruction information to produce a lesson package. For example, the processing module generates the multidimensional representation of the environment that includes the objects and the instructor interactions of the instruction information to produce the lesson package. For instance, the processing module includes a 3-D rendering of a place, background objects, recorded objects, and the instructor in a relative position XYZ world space over time.

**[0084]** The method continues at step **230** where the processing module facilitates storage of the lesson package. For example, the processing module indexes the one or more lesson packages of the one or more lessons of the learning path to produce indexing information (e.g., title, author, instructor identifier, topic area, etc.). The processing module stores the indexed lesson package as learning asset information in a learning assets database.

**[0085]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0086]** FIGS. **8**E, **8**F, **8**G, **8**H, **8**J, and **8**K are schematic block diagrams of another embodiment of a computing system illustrating another example of a method to create a learning experience. The embodiment includes creating a multi-disciplined learning tool regarding a topic. The multi-disciplined aspect of the learning tool includes both disciplines of learning and any form/format of presentation of content regarding the topic. For example, a first discipline includes mechanical systems, a second discipline includes electrical systems, and a third discipline includes fluid systems when the topic includes operation of a combustion based engine. The computing system includes the environment model database **16** of FIG. **1**, the learning assets database **34** of FIG. **1**, and the experience creation module **30** of FIG. **1**.

**[0087]** FIG. **8**E illustrates the example of operation where the experience creation module **30** creates a first-pass of a first learning object **700-1** for a first piece of information regarding the topic to include a first set of knowledge bullet-points **702-1** regarding the first piece of information. The creating includes utilizing guidance from an instructor and/or reusing previous knowledge bullet-points for a related topic. For example, the experience creation module **30** extracts the bullet-points from one or more of learning path structure information **190** and learning objective information **192** when utilizing the guidance from the instructor. As another example, the experience creation module **30** extracts the bullet-points from learning path information **194** retrieved from the learning assets database **34** when utilizing previous knowledge bullet points for the related topic.

**[0088]** Each piece of information is to impart additional knowledge related to the topic. The additional knowledge of the piece of information includes a characterization of learnable material by most learners in just a few minutes. As a specific example, the first piece of information includes "4 cycle engine intake cycles" when the topic includes "how a 4 cycle engine works."

**[0089]** Each of the knowledge bullet-points are to impart knowledge associated with the associated piece of information in a logical (e.g., sequential) and knowledge building fashion. As a specific example, the experience creation module **30** creates the first set of knowledge bullet-points **702-1** based on instructor input to include a first bullet point "intake stroke: intake valve opens, air/fuel mixture pulled into cylinder by piston" and a second bullet point "compression stroke: intake valve closes, piston compresses air/fuel mixture in cylinder" when the first piece of information includes the "4 cycle engine intake cycles."

**[0090]** FIG. **8**F further illustrates the example of operation where the experience creation module **30** creates a first-pass of a second learning object **700-2** for a second piece of information regarding the topic to include a second set of

knowledge bullet-points **702-2** regarding the second piece of information. As a specific example, the experience creation module **30** creates the second set of knowledge bullet-points **702-2** based on the instructor input to include a first bullet point "power stroke: spark plug ignites air/fuel mixture pushing piston" and a second bullet point "exhaust stroke: exhaust valve opens and piston pushes exhaust out of cylinder, exhaust valve closes" when the second piece of information includes "4 cycle engine outtake cycles."

**[0091]** FIG. **8**G further illustrates the example of operation where the experience creation module **30** obtains illustrative assets **704** based on the first and second set of knowledge bullet-points **702-1** and **702-2**. The illustrative assets **704** depicts one or more aspects regarding the topic pertaining to the first and second pieces of information. Examples of illustrative assets includes background environments, objects within the environment (e.g., things, tools), where the objects and the environment are represented by multi-dimensional models (e.g., 3-D model) utilizing a variety of representation formats including video, scans, images, text, audio, graphics etc.

**[0092]** The obtaining of the illustrative assets **704** includes a variety of approaches. A first approach includes interpreting instructor input information to identify the illustrative asset. For example, the experience creation module **30** interprets instructor input information to identify a cylinder asset.

**[0093]** A second approach includes identifying a first object of the first and second set of knowledge bullet-points as an illustrative asset. For example, the experience creation module **30** identifies the piston object from both the first and second set of knowledge bullet-points.

**[0094]** A third approach includes determining the illustrative assets **704** based on the first object of the first and second set of knowledge bullet-points. For example, the experience creation module **30** accesses the environment model database **16** to extract information about an asset from one or more of supporting asset information **198** and modeled asset information **200** for a sparkplug when interpreting the first and second set of knowledge bullet-points.

**[0095]** FIG. **8**H further illustrates the example of operation where the experience creation module **30** creates a second-pass of the first learning object **700-1** to further include first descriptive assets **706-1** regarding the first piece of information based on the first set of knowledge bullet-points **702-1** and the illustrative assets **704**. Descriptive assets include instruction information that utilizes the illustrative asset **704** to impart knowledge and subsequently test for knowledge retention. The embodiments of the descriptive assets includes multiple disciplines and multiple dimensions to provide improved learning by utilizing multiple senses of a learner. Examples of the instruction information includes annotations, actions, motions, gestures, expressions, recorded speech, speech inflection information, review information, speaker notes, and assessment information.

**[0096]** The creating the second-pass of the first learning object **700-1** includes generating a representation of the illustrative assets **704** based on a first knowledge bullet-point of the first set of knowledge bullet-points **702-1**. For example, the experience creation module **30** renders 3-D frames of a 3-D model of the cylinder, the piston, the spark plug, the intake valve, and the exhaust valve in motion when performing the intake stroke where the intake valve opens and the air/fuel mixture is pulled into the cylinder by the piston.

**[0097]** The creating of the second-pass of the first learning object **700-1** further includes generating the first descriptive assets **706-1** utilizing the representation of the illustrative assets **704**. For example, the experience creation module **30** renders 3-D frames of the 3-D models of the various engine parts without necessarily illustrating the first set of knowledge bullet-points **702-1**.

**[0098]** In an embodiment where the experience creation module **30** generates the representation of the illustrative assets **704**, the experience creation module **30** outputs the representation of the illustrative asset **704** as instructor output information **160** to an instructor. For example, the 3-D model of the cylinder and associated parts.

**[0099]** The experience creation module **30** receives instructor input information **166** in response to the instructor output information **160**. For example, the instructor input information **166** includes instructor annotations to help explain the intake stroke (e.g., instructor speech, instructor pointer motions). The experience creation module **30** interprets the instructor input information **166** to produce the first descriptive assets **706-1**. For example, the renderings of the engine parts include the intake stroke as annotated by the instructor.

**[0100]** FIG. **8**J further illustrates the example of operation where the experience creation module **30** creates a second-pass of the second learning object **700-2** to further include second descriptive assets **706-2** regarding the second piece of information based on the second set of knowledge bullet-points **702-2** and the illustrative assets **704**. For example, the experience creation module **30** creates 3-D renderings of the power stroke and the exhaust stroke as annotated by the instructor based on further instructor input information **166**.

**[0101]** FIG. **8**K further illustrates the example of operation where the experience creation module **30** links the second-passes of the first and second learning objects **700-1** and **700-2** together to form at least a portion of the multi-disciplined learning tool. For example, the experience creation module **30** aggregates the first learning object **700-1** and the second learning object **700-2** to produce a lesson package **206** for storage in the learning assets database **34**.

**[0102]** In an embodiment, the linking of the second-passes of the first and second learning objects **700-1** and **700-2** together to form the at least the portion of the multi-disciplined learning tool includes generating index information for the second-passes of first and second learning objects to indicate sharing of the illustrative asset **704**. For example, the experience creation module **30** generates the index information to identify the first learning object **700-1** and the second learning object **700-2** as related to the same topic.

**[0103]** The linking further includes facilitating storage of the index information and the first and second learning objects **700-1** and **700-2** in the learning assets database **34** to enable subsequent utilization of the multi-disciplined learning tool. For example, the experience creation module **30** aggregates the first learning object **700-1**, the second learning object **700-2**, and the index information to produce the lesson package **206** for storage in the learning assets database **34**.

**[0104]** The method described above with reference to FIGS. **8**E-**8**K in conjunction with the experience creation

module **30** can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices including various embodiments of the computing entity **20** of FIG. **2**A. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing entities of the computing system **10**, cause boy one or more computing devices to perform any or all of the method steps described above.

**[0105]** FIGS. **9**A, **9**B, **9**C, and **9**D are schematic block diagrams of an embodiment of a computing system illustrating an example of creating a lesson package. The computing system includes the experience creation module **30** of FIG. **1** and the learning assets database **34** of FIG. **1**.

**[0106]** FIG. **9**A illustrates an example of operation of steps of a method for creating a lesson package for a multi-disciplined learning tool regarding first and second topics, where, in a first step, the experience creation module **30** obtains first lesson asset information **202-1** regarding the first topic. The experience creation module **30** obtains first lesson asset information **202-1** regarding the first topic by at least one of generating the first lesson asset information **202-1** as previously discussed and extracting the first lesson asset information **202-1** from a lesson package **206-1** recovered from the learning assets database **34**.

**[0107]** The first lesson asset information **202-1** is regarding the first topic that includes operation of a piston within a cylinder of an engine. The first lesson asset information **202-1** includes a first learning object **700-1** and a second learning object **700-2**. The first learning object **700-1** includes a first set of knowledge bullet-points **702-1** for a first piece of information regarding the first topic. For example, the first piece of information regarding the first topic includes piston and valve operation during intake and compression strokes of the engine.

**[0108]** The second learning object **700-2** includes a second set of knowledge bullet-points **702-2** for a second piece of information regarding the first topic. For example, the second piece of information regarding the first topic includes piston and valve operation during power and exhaust strokes of the engine.

**[0109]** The first learning object **700-1** and the second learning object **700-2** further include a first lesson illustrative asset **704-1** that depicts an aspect regarding the first topic pertaining to the first and second pieces of information. For example, first lesson illustrative assets **704-1** includes those assets associated with the first learning object **700-1** and the second learning object **700-2**, where at least one asset is common to both the first and second learning objects. For instance, first lesson illustrative assets **704-1** includes assets for a cylinder, a piston, a spark plug, and intake valve, and exhaust valve, and a connecting rod.

**[0110]** The first learning object **700-1** further includes a first descriptive asset **706-1** regarding the first piece of information based on the first set of knowledge bullet-points **702-1** and the first lesson illustrative asset **704-1**. For example, first descriptive assets **706-1** illustrate the operation of the piston and valves of the engine for the intake and compression strokes to illustrate the first set of knowledge bullet points **702-1** utilizing the first lesson illustrative assets **704-1**.

**[0111]** The second learning object **700-2** further includes a second descriptive asset **706-2** regarding the second piece of information based on the second set of knowledge bullet-points **702-2** and the first lesson illustrative asset **704-1**. For example, second descriptive assets **706-2** illustrate the operation of the piston and valves of the engine for the power and exhaust strokes to illustrate the second set of knowledge bullet-points **702-2** utilizing the first lesson illustrative assets **704-1**.

**[0112]** Having obtained the first lesson asset information **202-1** regarding the first topic, in a second step of the example method for creating the lesson package for the multi-disciplined learning tool regarding the first and second topics, the experience creation module **30** obtains second lesson asset information **202-2** regarding the second topic. The experience creation module **30** obtains the second lesson asset information **202-2** regarding the second topic by at least one of generating the second lesson asset information **202-2** and extracting the second lesson asset information **202-2** from the lesson package **206-1** recovered from the learning assets database **34**.

**[0113]** As an example of generating the second lesson asset information **202-2**, the experience creation module **30** generates the third learning object **700-3** and the fourth learning object **700-4** based on the first learning object **700-1** and the second learning object **700-2**, where the aspect regarding the second topic is associated with the aspect regarding the first topic. For example, the experience creation module **30** generates the third learning object **700-3** and the fourth learning object **700-4** to further illustrate operation of the engine with regards to the connecting rod and a crank, where the connecting rod is common to the third and fourth learning objects and to the first and second learning objects.

**[0114]** The second lesson asset information **202-2** is regarding the second topic that includes operation of the connecting rod and a crank of the engine. The second lesson asset information **202-2** includes a third learning object **700-3** and a fourth learning object **700-4**. The third learning object **700-3** includes a third set of knowledge bullet-points points **702-3** for a third piece of information regarding the second topic. For example, the third piece of information regarding the second topic includes connecting rod and crank operation during the intake and compression strokes of the engine.

**[0115]** The fourth learning object **700-4** includes a fourth set of knowledge bullet-points **702-4** for a fourth piece of information regarding the second topic. For example, the fourth piece of information regarding the second topic includes connecting rod and crank operation during the power and exhaust strokes of the engine.

**[0116]** The third learning object **700-3** and the fourth learning object **700-4** further include a second lesson illustrative asset **704-2** that depicts an aspect regarding the second topic pertaining to the third and fourth pieces of information. For example, second lesson illustrative assets **704-2** includes those assets associated with the third learning object **700-3** and the fourth learning object **700-4**, where at least one asset is common to both the third and fourth

learning objects. For instance, second lesson illustrative assets **704-2** includes assets for the connecting rod and crank.

**[0117]** The third learning object **700-3** further includes a third descriptive asset **706-3** regarding the third piece of information based on the third set of knowledge bullet-points **702-3** and the second lesson illustrative asset **704-2**. For example, third descriptive assets **706-3** illustrate the operation of the connecting rod and crank of the engine for the intake and compression strokes to illustrate the third set of knowledge bullet-points **702-3** utilizing the second lesson illustrative assets **704-2**.

**[0118]** The fourth learning object **700-4** further includes a fourth descriptive asset **706-4** regarding the fourth piece of information based on the fourth set of knowledge bullet-points **702-4** and the second lesson illustrative asset **704-2**. For example, fourth descriptive assets **706-4** illustrate the operation of the connecting rod and crank of the engine for the power and exhaust strokes to illustrate the fourth set of knowledge bullet-points **702-4** utilizing the second lesson illustrative assets **704-2**.

**[0119]** FIG. **9**B further illustrates the example of operation of the steps of the method for creating the lesson package where, having obtained the first and second lesson asset information, in a third step, the experience creation module **30** generates a set of common lesson illustrative assets **802** based on the first lesson illustrative asset **704-1** and the second lesson illustrative asset **704-2**. The generating the set of common lesson illustrative assets **802** includes a series of sub-steps.

**[0120]** A first sub-step includes establishing the set of common lesson illustrative assets **802** to include the first and second lesson illustrative assets. For example, the experience creation module **30** imports the first lesson illustrative asset **704-1** (e.g., just one asset such as the piston) and the second lesson illustrative asset **704-2** (e.g., just another one such as the connecting rod) to produce the common lesson illustrative asset **802**. A second sub-step includes updating the set of common lesson illustrative assets **802** to further include another illustrative asset associated with the first lesson illustrative asset **704-1**. For example, the experience creation module **30** imports all remaining assets of the first lesson illustrative assets **704-1** (e.g., cylinder, spark plug, intake valve, exhaust valve, and connecting rod).

**[0121]** A third sub-step of the generating of the set of common lesson illustrative assets **802** includes updating the set of common lesson illustrative assets **802** to further include yet another illustrative asset associated with the second lesson illustrative asset **704-2**. For example, the experience creation module **30** imports all remaining assets of the second lesson illustrative assets **704-2** (e.g., the crank).

**[0122]** When the set of common lesson illustrative assets **802** includes a redundant lesson illustrative asset (e.g., the connecting rod), the generating of the set of common lesson illustrative assets **802** further includes a fourth sub-step that includes updating the set of common lesson illustrative assets **802** to eliminate the redundant lesson illustrative asset. For example, the experience creation module **30** eliminates redundant assets for the connecting rod.

**[0123]** FIG. **9**C further illustrates the example of operation of the steps of the method for creating the lesson package where, having produced the set of common lesson illustrative assets **802**, in a fourth step, the experience creation module **30** generates combined lesson asset information **800** regarding the first and second topics utilizing the common lesson illustrative assets **802**. The combined lesson asset information **800** includes a representation of the first learning object **700-1**, the second learning object **700-2**, the third learning object **700-3**, and the fourth learning object **700-4**.

**[0124]** The generating of the combined lesson asset information **800** regarding the first and second topics includes establishing the combined lesson asset information **800** to include the first learning object **700-1**, the second learning object **700-2**, the third learning object **700-3**, and the fourth learning object **700-4**.

**[0125]** FIG. **9**D further illustrates the example of operation of the steps of the method for creating the lesson package where, having produce the set of common lesson illustrative assets **802**, in a fifth step (e.g., as an additional step to step **4** or as an alternative step to step **4**), the experience creation module **30** generates the combined lesson asset information **800** regarding the first and second topics by one or more of a variety of steps. A first step of the variety of steps includes generating a fifth learning object **700-5** to include the first and third learning objects. The fifth learning object **700-5** includes the first set of knowledge bullet-points **702-1** and the third set of knowledge bullet-points points **702-3**.

**[0126]** A second step of the variety of steps includes generating a sixth learning object **700-6** to include the second and fourth learning objects. The sixth learning object **700-6** includes the second set of knowledge bullet-points **702-2** and the fourth set of knowledge bullet-points points **7 2-4**.

**[0127]** A third step of the variety of steps includes generating a fifth descriptive asset **706-5** for the fifth learning object **700-5** based on the first set of knowledge bullet-points **702-1**, the third set of knowledge bullet-points points **702-3**, and the set of common lesson illustrative assets **802**. For example, the experience creation module **30** generates the fifth descriptive asset **706-5** to illustrate the operation of the engine including all of the assets for the intake and compression strokes.

**[0128]** A fourth step of the variety of steps includes generating a sixth descriptive asset **706-6** for the sixth learning object **700-6** based on the second set of knowledge bullet-points **702-2**, the fourth set of knowledge bullet-points **702-4**, and the set of common lesson illustrative assets **802**. For example, the experience creation module **30** generates the sixth descriptive asset **706-6** to illustrate the operation of the engine including all of the assets for the power and exhaust strokes.

**[0129]** Having generated the combined lesson asset information **800**, in a fifth step of the in a second step of the example method for creating the lesson package for the multi-disciplined learning tool regarding the first and second topics, the experience creation module **30** links the combined lesson asset information **800** and the set of common lesson illustrative assets **802** to form at least a portion of the multi-disciplined learning tool. For example, the experience creation module **30** aggregates the combined lesson asset information **800** and the set of common lesson illustrative assets **802** to produce a lesson package **206** for storage in the learning assets database **34**.

**[0130]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g.,

a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0131]** FIGS. **10**A, **10**B, **10**C, **10**D, and **10**E are schematic block diagrams of an embodiment of a computing system illustrating an example of creating updated learning path information. The computing system includes the experience creation module **30** of FIG. **1** and the learning assets database **34** of FIG. **1**. The experience creation module **30** includes the learning path module **180** of FIG. **8**A.

**[0132]** FIG. **10**A illustrates a method of operation where in a first step the experience creation module **30** determines knowledge bullet-points for a desired learning path. In a first example, the experience creation module **30** recovers the knowledge bullet-points from the learning assets database **34**. In a second example, the experience creation module **30** generates the knowledge bullet-points based on learning path structure information **190** and/or learner input information **174**. For instance, the experience creation module **30** extracts knowledge bullet-points as specified by an instructor from the learning path structure information **190**. In another instance, the experience creation module **30** extracts further knowledge bullet-points as desired by a student from the learner input information **174** (e.g., expressions of desired learnings, learning objective requirements, interests, previous lessons, explicit new learning objective requirements, etc.).

**[0133]** FIG. **10**B further illustrates the method of operation where, having determined the knowledge bullet-points, in a second step the experience creation module **30** determines which of the knowledge bullet-points are covered by existing learning objects. For example, the learning path module **180** compares the knowledge bullet-points to knowledge bullet-points extracted from learning path information **194** recovered from the learning assets database **34** to identify learning objects already available from the learning assets database **34**. For instance, the learning path module **180** identifies learning objects **850-1**, **850-2**, and **850-4** that include knowledge bullet-points that compare favorably to the knowledge bullet-points determined in the preceding step.

**[0134]** During the step of identifying which of the knowledge bullet-points compared to those stored in learning objects of the learning assets database **34**, the learning path module **180** may identify knowledge bullet-points that do not favorably map to those stored in the learning assets database **34**. Such orphaned knowledge bullet-points will require further steps for support as discussed below.

**[0135]** FIG. **10**C further illustrates the method of operation where, having determined which of the knowledge bullet-points are covered by the existing learning objects, in a third step the experience creation module **30** determines a learning path that includes the existing learning objects. For example, the learning path module **180** arranges the identified learning objects **850-1**, **850-2**, and **850-4** as part of the learning path. Note that the knowledge bullet-points **3-2** and **3-1** at this point do not map to an existing learning object.

**[0136]** FIG. **10**D further illustrates the method of operation where, when a particular knowledge bullet-point is uncovered, in a fourth step the experience creation module **30** generates an additional learning object. For example, the learning path module **180** generates a learning object **850-3** based on the knowledge bullet-points **3-2** and **3-1** as previously discussed with regards to FIGS. **8**A-**8**K.

**[0137]** FIG. **10**E further illustrates the method of operation where, when a sufficient number of learning objects have been generated, in a fifth step the experience creation module **30** generates updated learning path information for storage. For example, the learning path module **180** arranges the learning objects **850-1** through **850-4** in a logical order to support a lesson and generates the updated learning path information **196** utilizing the learning objects for storage in the learning assets database **34**.

**[0138]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0139]** FIGS. **11**A, **11**B, **11**C, **10**D, and **11**E are schematic block diagrams of an embodiment of a computing system illustrating an example of creating lesson asset information. The computing system includes the experience creation module **30** of FIG. **1**, the environment sensor module **14** of FIG. **1**, and the learning assets database **34** of FIG. **1**. The experience creation module **30** includes the asset module **182** of FIG. **8**A.

**[0140]** FIG. **11**A illustrates a method of operation where in a first step the experience creation module **30** determines knowledge bullet-points for a desired learning path. In a first example, the asset module **182** recovers the knowledge bullet-points from the learning assets database **34**. In a second example, the asset module **182** generates the knowledge bullet-points based on learning path structure information **190** and/or learning objective information **192**. For instance, the asset module **182** extracts knowledge bullet-points as specified by an instructor from the learning path structure information **190**. In another instance, the asset module **182** extracts further knowledge bullet-points as desired by the instructor for specific learning objects from the learning objective information **192**.

**[0141]** FIG. **11**B further illustrates the method of operation where, having determined the knowledge bullet-points, in a second step the experience creation module **30** identifies asset requirements for required illustrative assets based on the knowledge bullet-points. For example, the asset module **182** maps each knowledge bullet-point to an asset requirement and to a particular asset (e.g., particular object) to help portray the knowledge bullet-point.

**[0142]** FIG. **11**C further illustrates the method of operation where, having identified the required illustrative assets, in a third step the experience creation module **30** obtains environment sensor information for the required illustrative

assets. For example, the asset module **182** obtains environment sensor information **150** from the environment sensor module **14**, where the environment sensor information **150** is associated with at least some of the required illustrative assets. For instance, the asset module **182** obtains environment sensor information **150** with regards to scans of an engine piston when the required illustrative assets includes the piston.

**[0143]** FIG. **11**D further illustrates the method of operation where, having obtained the environment sensor information **150**, in a fourth step the experience creation module **30** generates illustrative assets based on the environment sensor information **150**. For example, the asset module **182** generates a three-dimensional model of the piston associated with the scan included in the environment sensor information **150** to produce illustrative asset **704**.

**[0144]** FIG. **11**E further illustrates the method of operation where, having produced the illustrative assets **704**, in a fifth step the experience creation module **30** stores the illustrative assets as lesson asset information. For example, the asset module **182** stores the illustrative asset **704** as lesson asset information **202** in the learning assets database **34**.

**[0145]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0146]** FIGS. **12**A, **12**B, **12**C, and **12**D are schematic block diagrams of an embodiment of a computing system illustrating an example of creating modeled asset information. The computing system includes the experience creation module **30** of FIG. **1**, the environment sensor module **14** of FIG. **1**, the environment model database **16** of FIG. **1**, and the learning assets database **34** of FIG. **1**. The experience creation module **30** includes the asset module **182** of FIG. **8**A.

**[0147]** FIG. **12**A illustrates a method of operation where in a first step the experience creation module **30** identifies required illustrative assets based on learning path inputs. In a first example, the asset module **182** recovers asset requirements from the learning assets database **34**. In a second example, the asset module **182** determines asset requirements from learning path structure information **190** and/or learning objective information **192**. For instance, the asset module **182** extracts asset requirements as specified by an instructor from the learning path structure information **190**. In another instance, the asset module **182** extracts further asset requirements as desired by the instructor for specific learning objects from the learning objective information **192**.

**[0148]** FIG. **12**B further illustrates the method of operation where, having identified the required illustrative assets, in a first step the experience creation module **30** obtains environment sensor information for the required illustrative assets. For example the asset module **182** obtains environment sensor information **150** from the environment sensor information module for a cylinder wall of an engine as required by at least some of the asset requirements.

**[0149]** Having obtained the environment sensor information, in a second step the experience creation module **30** generates measured illustrative assets based on the environment sensor information. For example, the asset module **182** generates the measured illustrative assets **860** based the environment sensor information **150** that pertains to the cylinder wall of an actual engine.

**[0150]** FIG. **12**C further illustrates the method of operation where, having generated the measured illustrative assets **860** and when the illustrative assets are incomplete, in a fourth step the experience creation module **30** obtains modeled environment information for remaining required illustrative assets. For example, the asset module **182** obtains modeled environment information **40** from the environment model database **16**. For instance, the asset module **182** recovers modeled environment information **40** that pertains to a new model for a new piston to accompany the cylinder walls of the engine.

**[0151]** Having obtained the modeled environment information **40**, in a fifth step the experience creation module **30** generates engineered illustrative assets based on the modeled environment information **40**. For example, the asset module **182** generates the engineered illustrative assets **862** to include the new model of the new piston.

**[0152]** FIG. **12**D further illustrates the method of operation where, having produced the measured and engineered illustrative assets, in a sixth step the experience creation module **30** stores the measured and engineered illustrative assets as modeled asset information. For example, the asset module **182** stores the measured illustrative assets **860** and the engineered illustrative assets **862** as the modeled asset information **200** in the learning assets database **34**.

**[0153]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0154]** FIGS. **13**A, **13**B, and **13**C are schematic block diagrams of an embodiment of a computing system illustrating another example of creating updated learning path information. The computing system includes the experience creation module **30** of FIG. **1**, the environment model database **16**, and the learning assets database **34** of FIG. **1**. The experience creation module **30** includes the learning path module **180** of FIG. **8**A and the asset module **182** of FIG. **8**A.

**[0155]** FIG. **13**A illustrates a method of operation where in a first step the experience creation module **30** determines knowledge bullet-points for a desired learning path. In a first example, the learning path module **180** recovers the knowledge bullet-points from the learning assets database **34**. In a second example, the learning path module **180** generates the

knowledge bullet-points based on learning path structure information **190** and/or learner input information **174**. For instance, the experience creation module **30** extracts knowledge bullet-points as specified by an instructor from the learning path structure information **190**. In another instance, the learning path module **180** extracts further knowledge bullet-points as desired by a student from the learner input information **174** (e.g., interesting products and/or services, expressions of desired learnings, learning objective requirements, interests, previous lessons, explicit new learning objective requirements, etc.).

**[0156]** Having determined the knowledge bullet-points, in a second step the experience creation module obtains learning objects for the knowledge bullet-points. For example, the learning path module **180** compares the knowledge bullet-points to knowledge bullet-points extracted from learning path information **194** recovered from the learning assets database **34** to identify learning objects already available from the learning assets database **34**. For instance, the learning path module **180** identifies learning objects **850-1**, **850-2**, and **850-4** that include knowledge bullet-points that compare favorably to the knowledge bullet-points determined in the preceding step and forwards the learning objects to the asset module **182**.

**[0157]** FIG. **13**B further illustrates the method of operation where, having received the learning objects and associated illustrative assets, the asset module **182** obtains modeled environment information that includes additional objects to promote learning and awareness (e.g., product placement branding). For example, the asset module **182** obtains modeled environment information **40** from the environment model database **16** for objects that are associated with the illustrative asset **704** and/or the learning objects **850-1**, **850-2**, and **850-4**. For instance, the asset module **182** obtains modeled environment information **40** that includes a model for a newer version of a product that is depicted in the learning object **850-1** and represented by one of the illustrative asset **704**.

**[0158]** Having obtained the modeled environment information **40**, in a fourth step the asset module **182** extracts additional objects to produce updated illustrative assets **870**. For example, the asset module **182** extracts the model of the newer version of the product from the modeled environment information **40** and replaces an older version of the product in the illustrative assets **704** with the model of the newer version of the product to produce the updated illustrative assets **870**.

**[0159]** FIG. **13**C further illustrates the method of operation where, having produced the learning objects and the updated illustrative assets for the learning objects, in a fifth step the experience creation module **30** generates updated learning path information for storage utilizing the updated illustrative assets **870** and the learning objects. For example, the asset module **182** aggregates the learning objects **850-1**, **850-2**, and **850-4** that now utilize the updated illustrative assets **870** to produce the updated learning path information **196** for storage in the learning assets database **34**.

**[0160]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0161]** FIGS. **14**A, **14**B, and **14**C are schematic block diagrams of an embodiment of a computing system illustrating an example of modifying a lesson package. The computing system includes the experience creation module **30** of FIG. **1** and the learning assets database **34** of FIG. **1**.

**[0162]** FIG. **14**A illustrates an example method of operation where in a first step the experience creation module **30** obtains a first learning object regarding a topic associated with the lesson package and a second learning object regarding the topic. For instance, the experience creation module **30** generates the learning objects. In another instance, the experience creation module **30** extracts a first learning object **750-1** and a second learning object **750-2** from the lesson package **206** recovered from the learning assets database **34**.

**[0163]** The first learning object **750-1** includes a first set of knowledge bullet-points **752-1** for a first piece of information regarding the topic. The second learning object **750-2** includes a second set of knowledge bullet-points **752-2** for a second piece of information regarding the topic. The first learning object **750-1** and the second learning object **750-2** further include at least one illustrative asset **754** that depicts an aspect regarding the topic pertaining to the first and second pieces of information.

**[0164]** The first learning object **750-1** further includes a first descriptive asset **756-1** regarding the first piece of information based on the first set of knowledge bullet-points **752-1** and the illustrative asset **754**. The second learning object further includes a second descriptive asset **756-2** regarding the second piece of information based on the second set of knowledge bullet-points **752-2** and the illustrative asset **754**.

**[0165]** FIG. **14**B further illustrates the example method of operation to modify a lesson package where, having obtained the first and second learning objects, in a second step the experience creation module **30** derives a first set of knowledge test-points **760-1** for the first learning object **750-1** regarding the topic based on the first set of knowledge bullet-points **752-1**. The knowledge test-points include question and answers for a first piece of information of the topic.

**[0166]** The deriving the first set of knowledge test-points **760-1** for the first learning object **750-1** based on the first set of knowledge bullet-points **752-1** includes a variety of one or more sub-steps. A first sub-step includes interpreting a first knowledge bullet-point of the first set of knowledge bullet-points **752-1** in accordance with the illustrative asset **754** and the first descriptive asset **756-1** of the first learning object **750-1** to produce a first knowledge test-point of the first set of knowledge test-points **760-1**. For example, the experience creation module **30** derives a first question to include what are the steps of the intake stroke and derives a first answer to include the intake valve opens and air/fuel mixture is pulled into the cylinder by the piston based on the first set of knowledge bullet-points **752-1**.

**[0167]** A second sub-step includes interpreting a second knowledge bullet-point of the first set of knowledge bullet-points **752-1** in accordance with the illustrative asset **754**

and the first descriptive asset **756-1** of the first learning object **750-1** to produce a second knowledge test-point of the first set of knowledge test-points **760-1**. For example, the experience creation module **30** derives a second question to include what are the steps of the compression stroke and derives a second answer to include the intake valve closes and the piston compresses the air/fuel mixture in the cylinder based on the first set of knowledge bullet-points **752-1**.

**[0168]** A third sub-step includes interpreting instructor input information to identify a third knowledge test-point of the first set of knowledge test-points **760-1**. For example, the experience creation module **30** obtains instructor input information that includes a third question and a third answer associated with the intake and/or compression strokes of the engine.

**[0169]** Having derived the first set of knowledge test-points **760-1**, in a third step of the example method of operation of the modifying of the lesson package, the experience creation module **30** derive a second set of knowledge test-points **760-2** for the second learning object **750-2** regarding the topic based on the second set of knowledge bullet-points **752-2**. The deriving the second set of knowledge test-points **760-2** for the second learning object **750-2** based on the second set of knowledge bullet-points **752-2** includes a variety of sub-steps.

**[0170]** A first sub-step includes the experience creation module **30** interpreting a first knowledge bullet-point of the second set of knowledge bullet-points **752-2** in accordance with the illustrative asset **754** and the second descriptive asset **756-2** of the second learning object **750-2** to produce a first knowledge test-point of the second set of knowledge test-points **760-2**. For example, the experience creation module **30** generates another first question to include what are the steps of power stroke and generates another first answer to include the spark plug ignites the air/fuel mixture pushing the piston.

**[0171]** A second sub-step includes the experience creation module **30** interpreting a second knowledge bullet-point of the second set of knowledge bullet-points **752-2** in accordance with the illustrative asset **754** and the second descriptive asset **756-2** of the second learning object **750-2** to produce a second knowledge test-point of the second set of knowledge test-points **760-2**. For example, the experience creation module **30** generates another second question to include what are the steps of the exhaust stroke and generates another second answer to include the exhaust valve opens and piston pushes exhaust out of the cylinder followed by the exhaust valve closing.

**[0172]** A third sub-step includes the experience creation module **30** interpreting instructor input information to identify a third knowledge test-point of the second set of knowledge test-points **760-2**. For example, the experience creation module **30** obtains instructor input information that includes a third question and a third answer associated with the power and/or exhaust strokes of the engine.

**[0173]** FIG. **14**C further illustrates the example method of operation for modifying the lesson package where, having derived the first and second sets of knowledge test-points, in a fourth step the experience creation module **30** generates at least one first knowledge assessment asset **762-1** for the first learning object **750-1** regarding the topic based on the first set of knowledge test-points **760-1**, the illustrative asset **754**, and the first descriptive asset **756-1** of the first learning object **750-1**.

**[0174]** The generating the first knowledge assessment asset **762-1** for the first learning object **750-1** regarding the topic based on the first set of knowledge test-points **760-1**, the illustrative asset **754**, and the first descriptive asset **756-1** of the first learning object **750-1** includes a variety of sub-steps. A first sub-step includes generating a first representation of the illustrative asset **754** based on a first knowledge test-point of the first set of knowledge test-points **760-1**. For example, rendering a view of the cylinder during the intake stroke.

**[0175]** A second sub-step includes generating a first representation of the first descriptive asset **756-1** of the first learning object **750-1** based on the first knowledge test-point of the first set of knowledge test-points **760-1**. For example, rendering a sequence of movement of the piston during the intake stroke.

**[0176]** A third sub-step includes generating a first portion of the first knowledge assessment asset **762-1** utilizing the first representation of the illustrative asset and the first representation of the first descriptive asset. For example, rendering a sequence of movement of the piston moving through the cylinder during the intake stroke.

**[0177]** A fourth sub-step includes outputting the first portion of the first knowledge assessment asset **762-1** as instructor output information. For example, outputting the rendering of the sequence of movement of the piston moving through the cylinder during the intake stroke.

**[0178]** A fifth sub-step includes receiving instructor input information in response to the instructor output information. For example, obtaining instructor input information with regards to the intake stroke.

**[0179]** A sixth sub-step includes interpreting the instructor input information to update the first portion of the first knowledge assessment asset. For example, modifying the first portion of the first knowledge assessment asset **762-1** to include an instructor annotation with regards to the intake stroke.

**[0180]** Having generated the first knowledge assessment asset **762-1**, in a fifth step of the example method of operation to modify the lesson package, the experience creation module **30** generates at least one second knowledge assessment asset **762-2** for the second learning object **750-2** regarding the topic based on the second set of knowledge test-points **760-2**, the illustrative asset **754**, and the second descriptive asset **756 7 2** of the second learning object **750-2**. The generating the second knowledge assessment asset **762-2** for the second learning object **750-2** regarding the topic based on the second set of knowledge test-points **760-2**, the illustrative asset **754**, and the second descriptive asset **756-2** of the second learning object **750-2** includes a variety of one or more sub-steps.

**[0181]** A first sub-step includes generating a first representation of the illustrative asset **754** based on a first knowledge test-point of the second set of knowledge test-points **760-2**. For example, rendering a view of the cylinder during the power stroke.

**[0182]** A second sub-step includes generating a first representation of the second descriptive asset **756-2** of the second learning object **750-2** based on the first knowledge test-point of the second set of knowledge test-points **760-2**. For example, rendering a sequence of movement of the piston during the power stroke.

**[0183]** A third sub-step includes generating a first portion of the second knowledge assessment asset **762-2** utilizing

the first representation of the illustrative asset and the first representation of the second descriptive asset. For example, rendering a sequence of movement of the piston moving through the cylinder during the power stroke.

**[0184]** A fourth sub-step includes outputting the first portion of the second knowledge assessment asset **762-2** as instructor output information. For example, outputting the rendering of the sequence of movement of the piston moving through the cylinder during the power stroke.

**[0185]** A fifth sub-step includes receiving instructor input information in response to the instructor output information. For example, obtaining instructor input information with regards to the power stroke.

**[0186]** A sixth sub-step includes interpreting the instructor input information to update the first portion of the second knowledge assessment asset. For example, modifying the first portion of the second knowledge assessment asset **762-2** to include in instructor annotation with regards to the power stroke.

**[0187]** Having produced the first and second knowledge assessment assets **762-1** and **762-2**, in a sixth step of the example method of operation to modify the lesson package, the experience creation module **30** updates the first and second learning objects **750-1** and **750-2**. For example, the experience creation module **30** updates the first learning object **750-1** to include the first set of knowledge test-points **760-1** and the first knowledge assessment asset **762-1** for the first learning object **750-1** to produce an updated first learning object. As another example, the experience creation module **30** updates the second learning object **750-2** to include the second set of knowledge test-points **760-2** and the second knowledge assessment asset **762-2** for the second learning object **750-2** to produce an updated second learning object.

**[0188]** Having updated the first and second learning objects, in a seventh step of the example method of operation to modify the lesson package, the experience creation module **40** links the updated first learning object and the updated second learning object together to form a modified multi-disciplined learning tool. For example, the experience creation module **30** stores the first learning object **750-1** and the second learning object **750-2** as assessment information **252** in the learning assets database **34**.

**[0189]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0190]** FIGS. **15**A, **15**B, **15**C, and **15**D are schematic block diagrams of an embodiment of a computing system illustrating an example of updating descriptive assets and knowledge assessment assets. The computing system includes the experience creation module **30** of FIG. **1** and the experience execution module **32** of FIG. **1**.

**[0191]** FIG. **15**A illustrates a method of operation where, in a first step the experience creation module **30** obtains a lesson package that includes a set of learning objects for outputting to the experience execution module **32** as a lesson package **206**. In a first example, the experience creation module **30** recovers the set of learning objects from a database. In a second example, the experience creation module **30** generates one or more of the learning objects of the set of learning objects. For instance, the experience creation module **30** generates a learning object **880-1** to include first descriptive asset **756-1** and first knowledge assessment assets **762-1** based on inputs from an instructor and a student as previously discussed.

**[0192]** FIG. **15**B further illustrates the method of operation where, having obtained the set of learning objects, in a second step the experience creation module, for each learning object of the lesson package, obtains learning assessment results information based on utilization of the lesson package by the experience execution module **32**. For example, the experience creation module **30** receives learning assessment results information **334** from the experience execution module **32** subsequent to utilization of the lesson package **206** by the experience execution module **32** (e.g., execution of the lesson for the student including an assessment of learning retention by the student).

**[0193]** The experience creation module **30** updates each of the learning objects to include assessment results based on the learning assessment results information **334**. For example, the experience creation module **30** updates the learning object **880-1** with first assessment results **764-1** pertaining to the learning object **880-1** from the learning assessment results information **334**.

**[0194]** FIG. **15**C further illustrates the method of operation where, having obtained the learning assessment results information, in a third step the experience creation module **30**, for each learning object of the lesson package, identifies enhancements to the descriptive assets to produce updated descriptive assets based on the corresponding learning assessment results information. For example, the experience creation module **30** modifies second descriptive asset **756-2** of FIG. **15**B utilizing second assessment results **764-2** to produce updated second descriptive asset **766-2**. For instance, when wrong answers related to an object happen too often, the experience creation module **30** determines an update to the object (e.g., new version, different view, taking more time viewing and absorbing knowledge associated with the object, etc.). As another instance, when correct answers related to the object happen too often, the experience creation module **30** determines to further update to the object (e.g., new simple version, different view, take less time viewing and absorbing knowledge associated with the object, etc.).

**[0195]** FIG. **15**D further illustrates the method of operation where, having produced the updated descriptive assets, in a fourth step the experience creation module **30**, for each learning object of the lesson package, identifies enhancements to the assessment assets to produce updated assessment assets based on a corresponding learning assessment results information and updated descriptive assets. For example, the experience creation module **30** modifies second knowledge assessment assets **762-2** to produce updated second knowledge assessment assets **768-2**. For instance, when wrong answers related to an object happen too often, the experience creation module **30** determines an update to

the assessment (e.g., new question, breakdown questions into more step-wise questions, provide a different view, take more time displaying in observing an object, etc.). As another instance, when correct answers related to an object happen too often, the experience creation module **30** determines an update to the assessment (e.g., new harder questions, consolidate step-wise questions, provide a different view, take less time displaying and absorbing an object, etc.).

**[0196]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0197]** FIGS. **16**A, **16**B, **16**C, and **16**D are schematic block diagrams of an embodiment of a computing system illustrating another example of creating updated learning path information. The computing system includes the experience creation module **30** of FIG. **1** and the learning assets database **34** of FIG. **1**. The experience creation module **30** includes the learning path module **180** of FIG. **8**A.

**[0198]** FIG. **16**A illustrates a method of operation where in a first step the experience creation module **30** determines requirements for a desired learning path. In a first example, the learning path module **180** recovers the requirements from the learning assets database **34**. In a second example, the learning path module **180** generates the requirements based on learning path structure information **190** and/or learner input information **174**. For instance, the experience creation module **30** extracts requirements as specified by an instructor from the learning path structure information **190**. In another instance, the learning path module **180** extracts further requirements as desired by a student from the learner input information **174**.

**[0199]** The requirements generally relate to aspects of an indexing approach to identify learning objects stored in the learning assets database **34**. The aspects of the indexing includes topic, sequencing, learning effectiveness level, difficulty level, degree or certificate requirement, content relevant to an interest, instructor rating, and source content rating. For instance, the learning path module **180** generates learning object requirements A-E.

**[0200]** FIG. **16**B further illustrates the method of operation where, having produced the requirements for the desired learning path, in a second step the experience creation module **30** obtains learning objects that compare favorably to the requirements. For example, the learning path module **180** accesses the learning assets database **34** utilizing the learning object requirements A-E to recover learning path information **194** that includes learning objects **890-1**, **890-2**, **890-3**, and **890-4**, where each compare favorably to at least some portion of the learning object requirements A-E.

**[0201]** FIG. **16**C further illustrates the method of operation where, having obtained the learning objects, in a third step the experience creation module **30** selects learning objects based on a comparison of indexing information to the requirements. For example, the learning path module **180** selects learning object **890-1** as a best match to learning object requirements A and E, selects learning object **890-2** as a best match to learning object requirements B, C, and E, and selects learning object **890-3** as a best match to learning object requirements D and E, where learning object requirement E represents favorable effectiveness (e.g., favorable comprehension levels as indicated by assessments).

**[0202]** FIG. **16**D further illustrates the method of operation where, having selected the learning objects, in a fourth step the experience creation module **30** generates the updated learning path information for storage. For example, the experience creation module **30** aggregates the learning objects **890-1**, **890-2**, and **890-3** to produce updated learning path information **196** for storage in the learning assets database **34**.

**[0203]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0204]** FIGS. **17**A, **17**B, and **17**C are schematic block diagrams of an embodiment of a computing system illustrating an example of creating learning assessment results information. The computing system includes the experience execution module **32** of FIG. **1**, the learning assets database **34** of FIG. **1**, and the environment sensor module **14** of FIG. **1**. The experience execution module **32** includes an environment generation module **240**, an instance experience module **290**, and a learning assessment module **330**. The environment sensor module **14** includes the motion sensor **126** of FIG. **4** and the position sensor **128** of FIG. **4**.

**[0205]** FIG. **17**A illustrates an example of operation, where in a first step the experience execution module **32** generates a representation of a first portion of a lesson package. For example, the environment generation module **240** generates instruction information **204** and baseline environment and object information **292** based on a lesson package **206** recovered from the learning assets database **34**. The instruction information **204** includes a representation of instructor interactions with objects within the virtual environment and evaluation information. The baseline environment and object information **292** includes XYZ positioning information of each object within the environment for the lesson package **206**.

**[0206]** The instance experience module **290** generates learner output information **172** for the first portion of the lesson package based on the instruction information **204** and the baseline environment and object information **292**. The learner output information **172** includes a representation of a virtual place with objects, instructor interactions, and learner interactions from a perspective of the learner. The

learner output information **172** further includes representations of the instruction information (e.g., instructor annotations).

**[0207]** FIG. **17**B further illustrates the example of operation where, having generated the representation of the first portion of the lesson package, in a second step the experience execution module **32** captures learner feedback to provide an assessment. For example, the instance experience module **290** generates learner interaction information **332** based on assessment information **252** and learner input information **174**. The learner input information **174** includes session control information, answer object manipulation, and direct answer input (e.g., text, speech). The assessment information **252** includes an updated representation of the assessment information based on learner input information, functionality and/or time correlations of further learner input information to the further learner output information to produce correlated assessment learner input information (e.g., time stamped and manipulated answer information).

**[0208]** Having captured the learner feedback, in a third step the experience execution module **32** captures a representation of learner physical actions to further provide the assessment. For example, the learning assessment module **330** receives environment sensor information **150** from the environment sensor module **14** based on inputs from the learner **28-1** to the motion sensor **126** and the position sensor **128**. For instance, the environment sensor module **14** generates the environment sensor information **150** based on detecting physical manipulation of real-world objects by the student (e.g., tool position, a bat position, a golf club position, etc.).

**[0209]** FIG. **17**C further illustrates the example of operation where, having captured representation of the learner physical actions, in a fourth step the experience execution module **32** analyzes learner feedback and a representation of learner physical actions in light of assessment information to produce learner assessment results information. For example, the learning assessment module **330** analyzes the environment sensor information **150** to interpret physical actions of the learner **28-1** and compares the physical actions to minimum required physical action specifications of the assessment information **252** to determine whether the learner **28-1** is performing at a satisfactory level. When a satisfactory level has been produced and direct questions have been answered via the learner input information **174**, the learning assessment module **330** indicates to the instance experience module **290** to advance the lesson to a next step.

**[0210]** The learning assessment results information **334** includes one or more of a learner identity, a learning object identifier, a lesson identifier, and raw learner interaction information (e.g., a timestamp recording of all learner interactions like points, speech, input text, settings, viewpoints, etc.). The learning assessment results information **334** further includes summarized learner interaction information (e.g., average, mins, maxes of raw interaction information, time spent looking at each view of a learning object, how fast answers are provided, number of wrong answers, number of right answers, etc.).

**[0211]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0212]** FIGS. **18**A, **18**B, **18**C, and **18**D are schematic block diagrams of an embodiment of a computing system illustrating an example of creating an abstract concept lesson package. The embodiment includes creating a multi-disciplined learning tool regarding an abstract environment topic. The computing system includes the environment model database **16** of FIG. **1**, the experience creation module **30** of FIG. **1**, and the learning assets database **34** of FIG. **1**.

**[0213]** FIG. **18**A illustrates an example method of operation where, in a first step the experience creation module **30** creates a first-pass of a first learning object for a first piece of information regarding the abstract environment topic. Examples of an abstract environment includes representations of software, representations of music, representations of different languages, etc.

**[0214]** The creating of the first-pass of the first learning object includes generating a first set of knowledge bullet-points. The creating further includes recovering the first set of knowledge bullet-points from the learning assets database **34**. For example, the experience creation module **30** recovers abstract environment points **833** (e.g., associated with software training) from the learning assets database **34** with regards to the abstract environment of software to generate the first set of knowledge bullet-points **832-1** of the first learning object **830-1**. For instance, the bullet-points describe a software DO loop, which includes statements "do B" and "repeat when A true."

**[0215]** Having created the first-pass of the first learning object, in a second step of the example method of operation the experience creation module **30** creates a first-pass of a second learning object for a second piece of information regarding the abstract environment topic. For example, the experience creation module **30** extracts statements "B=load data" and "A=data container not full" from the abstract environment bullet-points **833** associated with software training to produce a second set of knowledge bullet-points **832-2** of second learning object **830-2**.

**[0216]** FIG. **18**B further illustrates the method of operation where, having created the first-pass of the first and second learning objects, where bullet-points pertain to the abstract environment, in a third step the experience creation module **30** obtains one or more synthetic assets **834** based on the first and second set of knowledge bullet-points. The synthetic asset(s) **834** depict an abstractive aspect (e.g., to support a physical world representation of the operation of software) regarding the abstract environment topic pertaining to the first and second pieces of information. The synthetic assets **834** include animations and/or other portrayals of the knowledge bullet-points associated with the abstract environment. Examples of synthetic assets include a representation of software operations (e.g., loading data), a representation of data in a data container, a representation of the data container not full, and a representation of the data container full.

**[0217]** The obtaining of the synthetic assets **834** includes a series of sub-steps. A first sub-set includes identifying the

abstractive aspect regarding the abstract environment topic based on the first and second pieces of information. For example, the experience creation module **30** utilizes the first and second pieces of information to recover modeled asset information **200** from the environment model database **16**. The experience creation module **30** interprets the modeled asset information **200** to produce the abstractive aspect that includes a fluid control valve combination with a fluid container when the first and second pieces of information pertain to software that loads data until a data container is full.

**[0218]** A second sub-step includes generating the synthetic asset to represent the first and second set of knowledge bullet-points in accordance with the abstractive aspect regarding the abstract environment topic. For example, the experience creation module **30** utilizes the fluid control valve combination with the fluid container to render the synthetic assets **834** to depict loading data (e.g., "do B, B=load data"), control valve open (e.g., "do B"), control valve closed (e.g., "repeat when A true"), data in data container (e.g., "B=load data"), data container not full (e.g., "A=data container not full"), data container full (e.g., "falsehood of A=data container not full"), and control valve closed (e.g., to "end when A false").

**[0219]** The obtaining further includes recovering the synthetic assets **834** directly from the environment model database **16**. For example, the experience creation module **30** extracts the synthetic assets **834** from one or more of supporting asset information **198** and modeled asset information **200** from the environment model database **16**. For instance, the experience creation module **30** produces the synthetic assets **834** to include animations that represent the loading of data, the data in the data container, the data container not full, the data container full, etc.

**[0220]** FIG. **18**C further illustrates the method of operation where, having obtained the synthetic assets **834**, in a fourth step the experience creation module **30** creates a second pass of the first learning object to further include a first descriptive asset, of first descriptive assets **836-1**, regarding the first piece of information based on the first set of knowledge bullet-points **832-1** and the synthetic asset **834**. The creating the second-pass of the first learning object includes a variety of one or more sub-steps.

**[0221]** A first sub-step of the creating the second-pass of the first learning object includes generating a representation of the synthetic asset based on a first knowledge bullet-point of the first set of knowledge bullet-points. For example, the experience creation module **30** renders a representation of the open control valve.

**[0222]** A second sub-step of the creating the second-pass of the first learning object includes generating the first descriptive asset utilizing the representation of the synthetic asset. For example, the experience creation module **30** renders an aggregate representation of the data, the loading of the data, the open control valve, the data container, and the data container not full to represent the software statement "DO B when A true."

**[0223]** A third sub-step of the creating the second-pass of the first learning object includes outputting the representation of the synthetic asset as instructor output information. For example, the experience creation module **30** outputs the rendering of the representation of the open control valve.

**[0224]** A fourth sub-step of the creating the second-pass of the first learning object includes receiving instructor input information in response to the instructor output information. For example, the experience creation module **30** receives the instructor input information that includes guidance with regards to aggregating the multiple representations.

**[0225]** A fifth sub-step of the creating the second-pass of the first learning object includes interpreting the instructor input information to produce the first descriptive asset. For example, the experience creation module **30** interprets the guidance with regards to aggregating the multiple representations to affect the generating of the first descriptive asset.

**[0226]** Having created the first descriptive assets, in a fifth step of the example method, the experience creation module **30** creates a second pass of the second learning object to further include a second descriptive asset, of second descriptive assets **836-2**, regarding the second piece of information based on the second set of knowledge bullet-points **832-2** and the synthetic asset **834**. For example, the experience creation module **30** aggregates the representations of the data, the loading of the data, the control valve closed, the data container, and the data container full to represent stop doing B when A not true utilizing artifacts of software "B =load data and A =data container not full" associated with the software statement "DO B while A true."

**[0227]** FIG. **18**D further illustrates the method of operation where, having created the second passes of the first and second learning objects, the experience creation module **30** links the second passes of the first and second learning objects together to form a portion of the multi-disciplined learning tool. The linking includes a series of sub-steps.

**[0228]** A first sub-step of the linking includes generating index information for the second-passes of first and second learning objects to indicate sharing of the synthetic asset. For example, the experience creation module **30** generates the index information to identify the first learning object **830-1** and the second learning object **830-2** as related to the same topic abstract environment.

**[0229]** A second sub-step of the linking includes facilitating storage of the index information and the first and second learning objects **830-1** and **830-2** in the learning assets database **34** to enable subsequent utilization of the multi-disciplined learning tool. For example, the experience creation module **30** aggregates the first learning object **830-1**, the second learning object **830-2**, and the index information to produce lesson package **206** for storage in the learning assets database **34**.

**[0230]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0231]** FIGS. **19**A, **19**B, **19**C, and **19**D are schematic block diagrams of an embodiment of a computing system illustrating another example of creating a lesson package. The computing system includes the environment model database **16** of FIG. **1**, the environment sensor module **14** of

FIG. **1**, the experience creation module **30** of FIG. **1**, and the learning assets database **34** of FIG. **1**. The environment sensor module **14** includes the motion sensor **126** of FIG. **4** and the position sensor **128** of FIG. **4**. The experience creation module **30** includes the learning path module **180** of FIG. **8**A, the asset module **182** of FIG. **8**A, the instruction module **184** of FIG. **8**A, and the lesson generation module **186** of FIG. **8**A.

**[0232]** FIG. **19**A illustrates an example of operation where, in a first step the experience creation module obtains lesson asset information for a lesson. For example, the learning path module **180** recovers learning path information **194** from the learning assets database **34** and receives learning path structure information **190** and learning objective information **192** from an instructor to produce updated learning path information **196** that includes structure and learning object information including instructor based on inputs.

**[0233]** The asset module **182** receives supporting asset information **198** and recovers modeled asset information **200** from the environment model database **16** to produce the lesson asset information **202** further based on the updated learning path information **196**. The learning asset information **202** represents information of the environment to support the updated learning path and objects within the environment.

**[0234]** FIG. **19**B further illustrates the method of operation where, having obtained the lesson asset information **202**, in a second step the experience creation module **30** generates a representation of a portion of a lesson package of the lesson asset information **202** for an instructor **26-1**. For example, the instruction module **184** generates instructor output information **160** based on the lesson asset information **202**. The instructor output information **160** includes a representation of the environment and the assets so far (e.g., start of the lesson).

**[0235]** FIG. **19**C further illustrates the method of operation where, having generated the representation of the lesson package for the instructor, in a third step the experience creation module **30** captures instructor feedback to produce instruction information. For example, the instruction module **184**, receives instructor input information **166** from the instructor **26-1** in response to the instructor output information **160**. The instructor input information **166** includes a representation of instructor interactions with objects within the virtual environment including composite evaluation information (e.g., explicit questions and answers).

**[0236]** Having captured instructor feedback, in a fourth step the experience creation module captures a representation of instructor physical actions to further produce instruction information. For example, the instruction module **184** receives environment sensor information **150** from the environment sensor module **14**. The environment sensor module **14** detects physical manipulation of real world objects by the instructor **26-1** via the motion sensor **126** and position sensor **128** to produce the environment sensor information **150**. The physical manipulations includes detecting a tool position, detecting a pointer position, detecting where a hand is, detecting a facial expression, detecting where a finger is pointing, detecting where eyes are looking, detecting feet position, etc.

**[0237]** Having received the environment sensor information **150** and the instructor input information **166**, the instruction module **184** generates instruction information **204** based on the environment sensor information **150** and the instructor input information **166**. The instruction information **204** includes a representation of instructor interactions with objects within the virtual environment and the composite evaluation information.

**[0238]** FIG. **19**D further illustrates the method of operation where, having generated the instruction information **204**, in a fifth step the experience creation module generates a lesson package. For example, the lesson generation module **186** generates the lesson package **206** for storage in the learning assets database **34** based on the lesson asset information **202** and the instruction information **204**.

**[0239]** The method described above in conjunction with the processing module can alternatively be performed by other modules of the computing system **10** of FIG. **1** or by other devices. In addition, at least one memory section (e.g., a computer readable memory, a non-transitory computer readable storage medium, a non-transitory computer readable memory organized into a first memory element, a second memory element, a third memory element, a fourth element section, a fifth memory element, a sixth memory element, etc.) that stores operational instructions can, when executed by one or more processing modules of the one or more computing devices of the computing system **10**, cause the one or more computing devices to perform any or all of the method steps described above.

**[0240]** It is noted that terminologies as may be used herein such as bit stream, stream, signal sequence, etc. (or their equivalents) have been used interchangeably to describe digital information whose content corresponds to any of a number of desired types (e.g., data, video, speech, audio, etc. any of which may generally be referred to as 'data').

**[0241]** As may be used herein, the terms "substantially" and "approximately" provides an industry-accepted tolerance for its corresponding term and/or relativity between items. Such an industry-accepted tolerance ranges from less than one percent to fifty percent and corresponds to, but is not limited to, component values, integrated circuit process variations, temperature variations, rise and fall times, and/or thermal noise. Such relativity between items ranges from a difference of a few percent to magnitude differences. As may also be used herein, the term(s) "configured to", "operably coupled to", "coupled to", and/or "coupling" includes direct coupling between items and/or indirect coupling between items via an intervening item (e.g., an item includes, but is not limited to, a component, an element, a circuit, and/or a module) where, for an example of indirect coupling, the intervening item does not modify the information of a signal but may adjust its current level, voltage level, and/or power level. As may further be used herein, inferred coupling (i.e., where one element is coupled to another element by inference) includes direct and indirect coupling between two items in the same manner as "coupled to". As may even further be used herein, the term "configured to", "operable to", "coupled to", or "operably coupled to" indicates that an item includes one or more of power connections, input(s), output(s), etc., to perform, when activated, one or more its corresponding functions and may further include inferred coupling to one or more other items. As may still further be used herein, the term "associated with", includes direct and/or indirect coupling of separate items and/or one item being embedded within another item.

**[0242]** As may be used herein, the term "compares favorably", indicates that a comparison between two or more

items, signals, etc., provides a desired relationship. For example, when the desired relationship is that signal **1** has a greater magnitude than signal **2**, a favorable comparison may be achieved when the magnitude of signal **1** is greater than that of signal **2** or when the magnitude of signal **2** is less than that of signal **1**. As may be used herein, the term "compares unfavorably", indicates that a comparison between two or more items, signals, etc., fails to provide the desired relationship.

**[0243]** As may be used herein, one or more claims may include, in a specific form of this generic form, the phrase "at least one of a, b, and c" or of this generic form "at least one of a, b, or c", with more or less elements than "a", "b", and "c". In either phrasing, the phrases are to be interpreted identically. In particular, "at least one of a, b, and c" is equivalent to "at least one of a, b, or c" and shall mean a, b, and/or c. As an example, it means: "a" only, "b" only, "c" only, "a" and "b", "a" and "c", "b" and "c", and/or "a", "b", and "c".

**[0244]** As may also be used herein, the terms "processing module", "processing circuit", "processor", and/or "processing unit" may be a single processing device or a plurality of processing devices. Such a processing device may be a microprocessor, micro-controller, digital signal processor, microcomputer, central processing unit, field programmable gate array, programmable logic device, state machine, logic circuitry, analog circuitry, digital circuitry, and/or any device that manipulates signals (analog and/or digital) based on hard coding of the circuitry and/or operational instructions. The processing module, module, processing circuit, and/or processing unit may be, or further include, memory and/or an integrated memory element, which may be a single memory device, a plurality of memory devices, and/or embedded circuitry of another processing module, module, processing circuit, and/or processing unit. Such a memory device may be a read-only memory, random access memory, volatile memory, non-volatile memory, static memory, dynamic memory, flash memory, cache memory, and/or any device that stores digital information. Note that if the processing module, module, processing circuit, and/or processing unit includes more than one processing device, the processing devices may be centrally located (e.g., directly coupled together via a wired and/or wireless bus structure) or may be distributedly located (e.g., cloud computing via indirect coupling via a local area network and/or a wide area network). Further note that if the processing module, module, processing circuit, and/or processing unit implements one or more of its functions via a state machine, analog circuitry, digital circuitry, and/or logic circuitry, the memory and/or memory element storing the corresponding operational instructions may be embedded within, or external to, the circuitry comprising the state machine, analog circuitry, digital circuitry, and/or logic circuitry. Still further note that, the memory element may store, and the processing module, module, processing circuit, and/or processing unit executes, hard coded and/or operational instructions corresponding to at least some of the steps and/or functions illustrated in one or more of the Figures. Such a memory device or memory element can be included in an article of manufacture.

**[0245]** One or more embodiments have been described above with the aid of method steps illustrating the performance of specified functions and relationships thereof. The boundaries and sequence of these functional building blocks and method steps have been arbitrarily defined herein for convenience of description. Alternate boundaries and sequences can be defined so long as the specified functions and relationships are appropriately performed. Any such alternate boundaries or sequences are thus within the scope and spirit of the claims. Further, the boundaries of these functional building blocks have been arbitrarily defined for convenience of description. Alternate boundaries could be defined as long as the certain significant functions are appropriately performed. Similarly, flow diagram blocks may also have been arbitrarily defined herein to illustrate certain significant functionality.

**[0246]** To the extent used, the flow diagram block boundaries and sequence could have been defined otherwise and still perform the certain significant functionality. Such alternate definitions of both functional building blocks and flow diagram blocks and sequences are thus within the scope and spirit of the claims. One of average skill in the art will also recognize that the functional building blocks, and other illustrative blocks, modules and components herein, can be implemented as illustrated or by discrete components, application specific integrated circuits, processors executing appropriate software and the like or any combination thereof.

**[0247]** In addition, a flow diagram may include a "start" and/or "continue" indication. The "start" and "continue" indications reflect that the steps presented can optionally be incorporated in or otherwise used in conjunction with other routines. In this context, "start" indicates the beginning of the first step presented and may be preceded by other activities not specifically shown. Further, the "continue" indication reflects that the steps presented may be performed multiple times and/or may be succeeded by other activities not specifically shown. Further, while a flow diagram indicates a particular ordering of steps, other orderings are likewise possible provided that the principles of causality are maintained.

**[0248]** The one or more embodiments are used herein to illustrate one or more aspects, one or more features, one or more concepts, and/or one or more examples. A physical embodiment of an apparatus, an article of manufacture, a machine, and/or of a process may include one or more of the aspects, features, concepts, examples, etc. described with reference to one or more of the embodiments discussed herein. Further, from figure to figure, the embodiments may incorporate the same or similarly named functions, steps, modules, etc. that may use the same or different reference numbers and, as such, the functions, steps, modules, etc. may be the same or similar functions, steps, modules, etc. or different ones.

**[0249]** Unless specifically stated to the contra, signals to, from, and/or between elements in a figure of any of the figures presented herein may be analog or digital, continuous time or discrete time, and single-ended or differential. For instance, if a signal path is shown as a single-ended path, it also represents a differential signal path. Similarly, if a signal path is shown as a differential path, it also represents a single-ended signal path. While one or more particular architectures are described herein, other architectures can likewise be implemented that use one or more data buses not expressly shown, direct connectivity between elements, and/or indirect coupling between other elements as recognized by one of average skill in the art.

**[0250]** The term "module" is used in the description of one or more of the embodiments. A module implements one or

more functions via a device such as a processor or other processing device or other hardware that may include or operate in association with a memory that stores operational instructions. A module may operate independently and/or in conjunction with software and/or firmware. As also used herein, a module may contain one or more sub-modules, each of which may be one or more modules.

**[0251]** As may further be used herein, a computer readable memory includes one or more memory elements. A memory element may be a separate memory device, multiple memory devices, or a set of memory locations within a memory device. Such a memory device may be a read-only memory, random access memory, volatile memory, non-volatile memory, static memory, dynamic memory, flash memory, cache memory, and/or any device that stores digital information. The memory device may be in a form a solid-state memory, a hard drive memory, cloud memory, thumb drive, server memory, computing device memory, and/or other physical medium for storing digital information.

**[0252]** While particular combinations of various functions and features of the one or more embodiments have been expressly described herein, other combinations of these features and functions are likewise possible. The present disclosure is not limited by the particular examples disclosed herein and expressly incorporates these other combinations.

What is claimed is:

**1**. A method for creating a multi-disciplined learning tool regarding an abstract environment topic, the method comprises:

creating, by a computing entity, a first-pass of a first learning object for a first piece of information regarding the abstract environment topic to include a first set of knowledge bullet-points regarding the first piece of information;

creating, by the computing entity, a first-pass of a second learning object for a second piece of information regarding the abstract environment topic to include a second set of knowledge bullet-points regarding the second piece of information;

obtaining, by the computing entity, a synthetic asset based on the first and second set of knowledge bullet-points, wherein the synthetic asset depicts an abstractive aspect regarding the abstract environment topic pertaining to the first and second pieces of information;

creating, by the computing entity, a second-pass of the first learning object to further include a first descriptive asset regarding the first piece of information based on the first set of knowledge bullet-points and the synthetic asset;

creating, by the computing entity, a second-pass of the second learning object to further include a second descriptive asset regarding the second piece of information based on the second set of knowledge bullet-points and the synthetic asset; and

linking, by the computing entity, the second-passes of the first and second learning objects together to form at least a portion of the multi-disciplined learning tool.

**2**. The method of claim **1**, wherein the obtaining the synthetic asset comprises:

identifying the abstractive aspect regarding the abstract environment topic based on the first and second pieces of information; and

generating the synthetic asset to represent the first and second set of knowledge bullet-points in accordance with the abstractive aspect regarding the abstract environment topic.

**3**. The method of claim **1** further comprises:

generating, by the computing entity, a representation of the first descriptive asset; and

updating, by the computing entity, the first learning object with the representation of the first descriptive asset to produce the second-pass of the first learning object.

**4**. The method of claim **1**, wherein the linking the second-passes of the first and second learning objects together to form the at least the portion of the multi-disciplined learning tool comprises:

generating index information for the second-passes of first and second learning objects to indicate sharing of the synthetic asset; and

facilitating storage of the index information and the first and second learning objects in a learning assets database to enable subsequent utilization of the multi-disciplined learning tool.

**5**. The method of claim **1**, wherein the creating the second-pass of the first learning object comprises:

generating a representation of the synthetic asset based on a first knowledge bullet-point of the first set of knowledge bullet-points.

**6**. The method of claim **5** further comprises one or more of:

generating the first descriptive asset utilizing the representation of the synthetic asset;

outputting the representation of the synthetic asset as instructor output information;

receiving instructor input information in response to the instructor output information; and

interpreting the instructor input information to produce the first descriptive asset.

**7**. A computing device comprises:

an interface;

a local memory; and

a processing module operably coupled to the interface and the local memory, wherein the processing module functions to:

create a first-pass of a first learning object for a first piece of information regarding an abstract environment topic to include a first set of knowledge bullet-points regarding the first piece of information;

create a first-pass of a second learning object for a second piece of information regarding the abstract environment topic to include a second set of knowledge bullet-points regarding the second piece of information;

obtain a synthetic asset based on the first and second set of knowledge bullet-points, wherein the synthetic asset depicts an abstractive aspect regarding the abstract environment topic pertaining to the first and second pieces of information;

create a second-pass of the first learning object to further include a first descriptive asset regarding the first piece of information based on the first set of knowledge bullet-points and the synthetic asset;

create a second-pass of the second learning object to further include a second descriptive asset regarding

the second piece of information based on the second set of knowledge bullet-points and the synthetic asset; and

link the second-passes of the first and second learning objects together to form at least a portion of a multi-disciplined learning tool.

**8**. The computing device of claim **7**, wherein the processing module functions to obtain the synthetic asset by:

identifying the abstractive aspect regarding the abstract environment topic based on the first and second pieces of information; and

generating the synthetic asset to represent the first and second set of knowledge bullet-points in accordance with the abstractive aspect regarding the abstract environment topic.

**9**. The computing device of claim **7**, wherein the processing module further functions to:

generate a representation of the first descriptive asset; and

update the first learning object with the representation of the first descriptive asset to produce the second-pass of the first learning object.

**10**. The computing device of claim **7**, wherein the processing module functions to link the second-passes of the first and second learning objects together to form the at least the portion of the multi-disciplined learning tool by:

generating index information for the second-passes of first and second learning objects to indicate sharing of the synthetic asset; and

facilitating storage, via the interface, of the index information and the first and second learning objects in a learning assets database to enable subsequent utilization of the multi-disciplined learning tool.

**11**. The computing device of claim **7**, wherein the processing module functions to create the second-pass of the first learning object by:

generating a representation of the synthetic asset based on a first knowledge bullet-point of the first set of knowledge bullet-points.

**12**. The computing device of claim **11**, wherein the processing module further functions to:

generate the first descriptive asset utilizing the representation of the synthetic asset;

output, via the interface, the representation of the synthetic asset as instructor output information;

receive, via the interface, instructor input information in response to the instructor output information; and

interpret the instructor input information to produce the first descriptive asset.

**13**. A computer readable memory comprises:

a first memory element that stores operational instructions that, when executed by a processing module, causes the processing module to:

create a first-pass of a first learning object for a first piece of information regarding an abstract environment topic to include a first set of knowledge bullet-points regarding the first piece of information; and

create a first-pass of a second learning object for a second piece of information regarding the abstract environment topic to include a second set of knowledge bullet-points regarding the second piece of information;

a second memory element that stores operational instructions that, when executed by the processing module, causes the processing module to:

obtain a synthetic asset based on the first and second set of knowledge bullet-points, wherein the synthetic asset depicts an abstractive aspect regarding the abstract environment topic pertaining to the first and second pieces of information;

a third memory element that stores operational instructions that, when executed by the processing module, causes the processing module to:

create a second-pass of the first learning object to further include a first descriptive asset regarding the first piece of information based on the first set of knowledge bullet-points and the synthetic asset; and

create a second-pass of the second learning object to further include a second descriptive asset regarding the second piece of information based on the second set of knowledge bullet-points and the synthetic asset; and

a fourth memory element that stores operational instructions that, when executed by the processing module, causes the processing module to:

link the second-passes of the first and second learning objects together to form at least a portion of a multi-disciplined learning tool.

**14**. The computer readable memory of claim **13**, wherein the processing module functions to execute the operational instructions stored by the second memory element to cause the processing module to obtain the synthetic asset by:

identifying the abstractive aspect regarding the abstract environment topic based on the first and second pieces of information; and

generating the synthetic asset to represent the first and second set of knowledge bullet-points in accordance with the abstractive aspect regarding the abstract environment topic.

**15**. The computer readable memory of claim **13** further comprises:

a fifth memory element that stores operational instructions that, when executed by the processing module, causes the processing module to:

generate a representation of the first descriptive asset; and

update the first learning object with the representation of the first descriptive asset to produce the second-pass of the first learning object.

**16**. The computer readable memory of claim **13**, wherein the processing module functions to execute the operational instructions stored by the fourth memory element to cause the processing module to link the second-passes of the first and second learning objects together to form the at least the portion of the multi-disciplined learning tool by:

generating index information for the second-passes of first and second learning objects to indicate sharing of the synthetic asset; and

facilitating storage of the index information and the first and second learning objects in a learning assets database to enable subsequent utilization of the multi-disciplined learning tool.

**17**. The computer readable memory of claim **13**, wherein the processing module functions to execute the operational instructions stored by the third memory element to cause the processing module to create the second-pass of the first learning object by:

generating a representation of the synthetic asset based on a first knowledge bullet-point of the first set of knowledge bullet-points.

**18**. The computer readable memory of claim **17**, wherein the processing module further functions to execute the operational instructions stored by the third memory element to cause the processing module to:

generate the first descriptive asset utilizing the representation of the synthetic asset;

output the representation of the synthetic asset as instructor output information;

receive instructor input information in response to the instructor output information; and

interpret the instructor input information to produce the first descriptive asset.

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