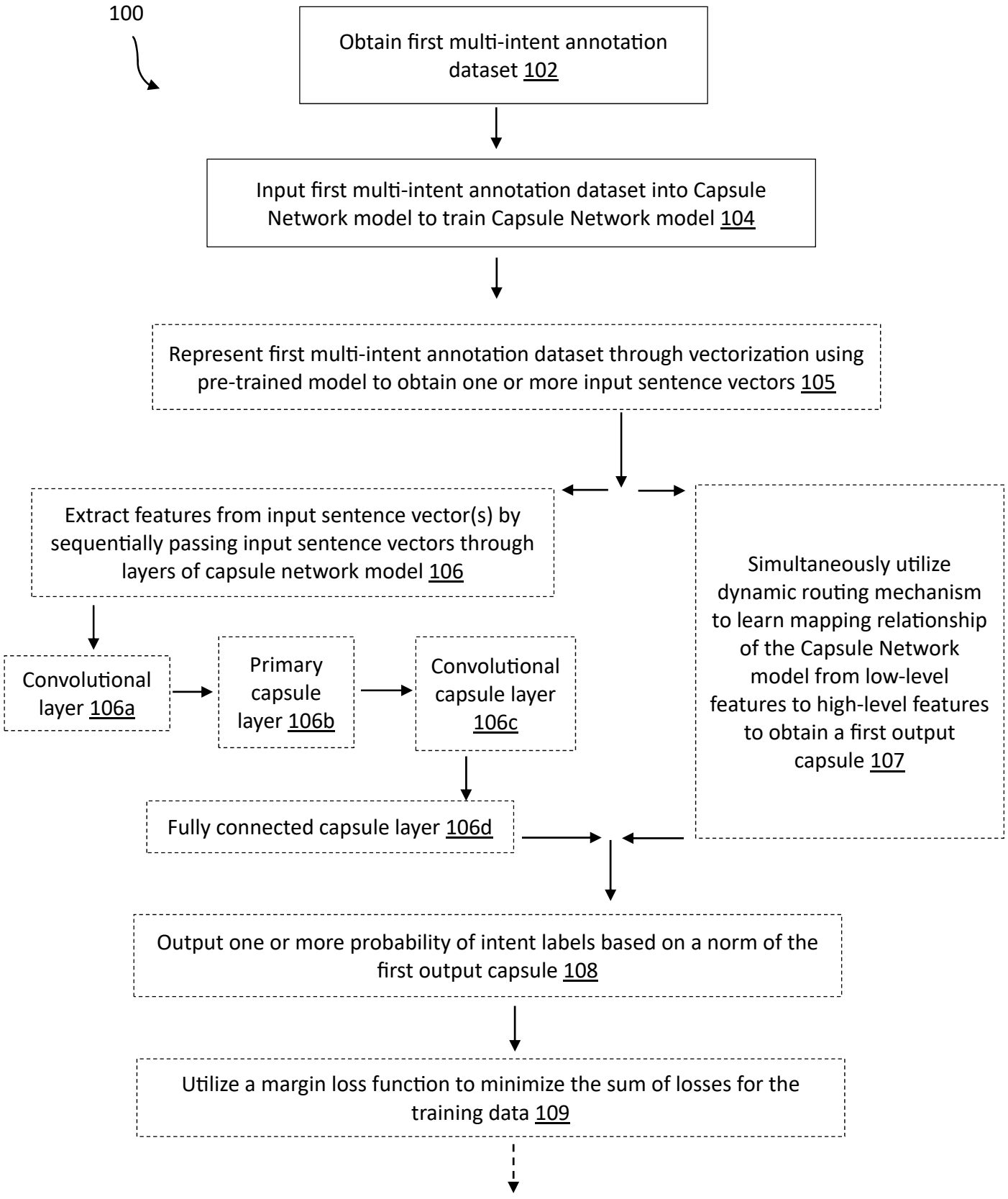
100
Obtain first multi-intent annotation dataset 102
Input first multi-intent annotation dataset into Capsule Network model to train Capsule Network model 104
Represent first multi-intent annotation dataset through vectorization using pre-trained model to obtain one or more input sentence vectors 105
Extract features from input sentence vector(s) by sequentially passing input sentence vectors through layers of capsule network model 106
Convolutional layer 106a
Primary capsule layer 106b
Convolutional capsule layer 106c
Fully connected capsule layer 106d
Simultaneously utilize dynamic routing mechanism to learn mapping relationship of the Capsule Network model from low-level features to high-level features to obtain a first output capsule 107
Output one or more probability of intent labels based on a norm of the first output capsule 108
Utilize a margin loss function to minimize the sum of losses for the training data 109

FIG. 1A

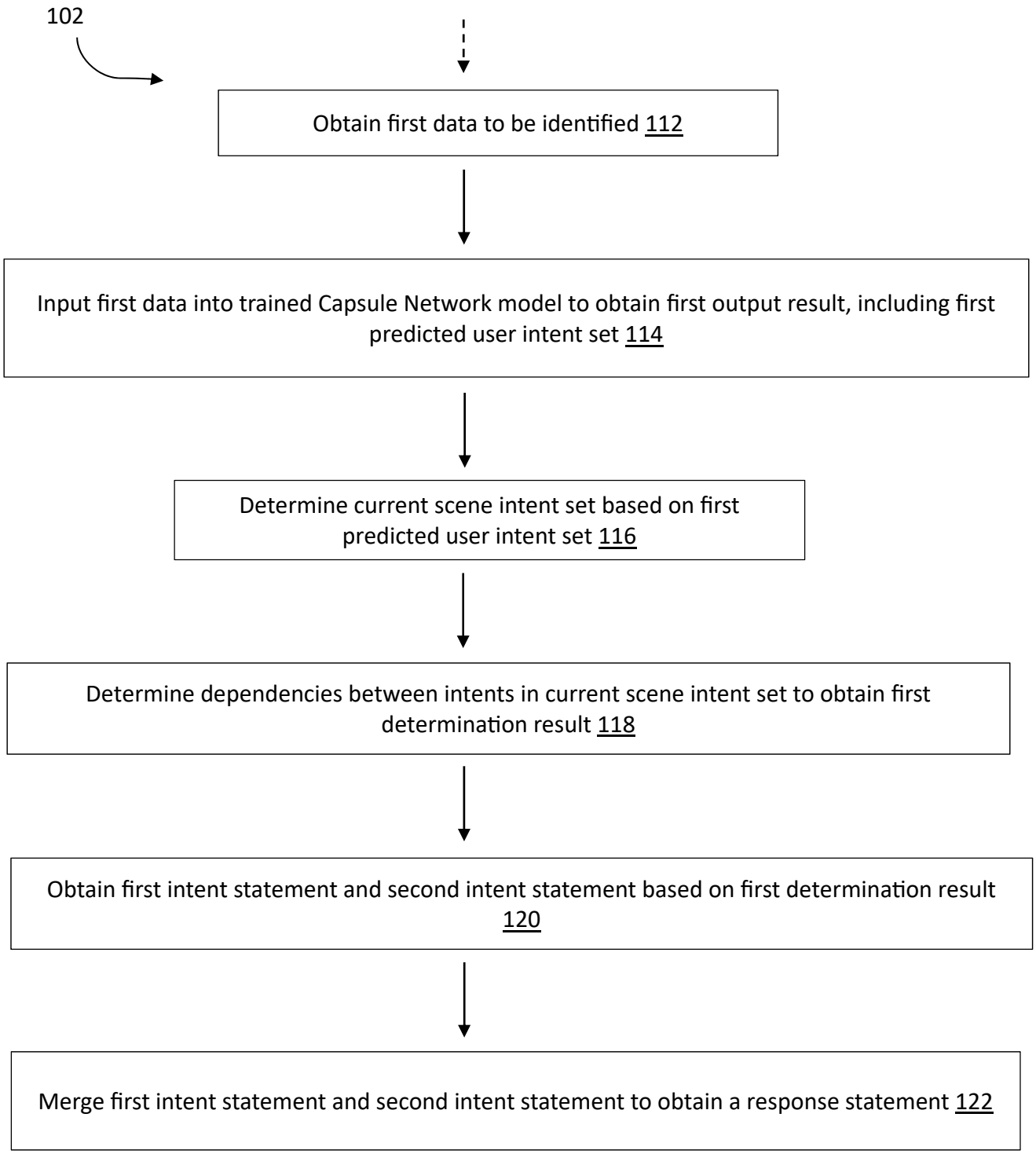
102
Obtain first data to be identified 112
Input first data into trained Capsule Network model to obtain first output result, including first predicted user intent set 114
Determine current scene intent set based on first predicted user intent set 116
Determine dependencies between intents in current scene intent set to obtain first determination result 118
Obtain first intent statement and second intent statement based on first determination result 120
Merge first intent statement and second intent statement to obtain a response statement 122

FIG. 1B

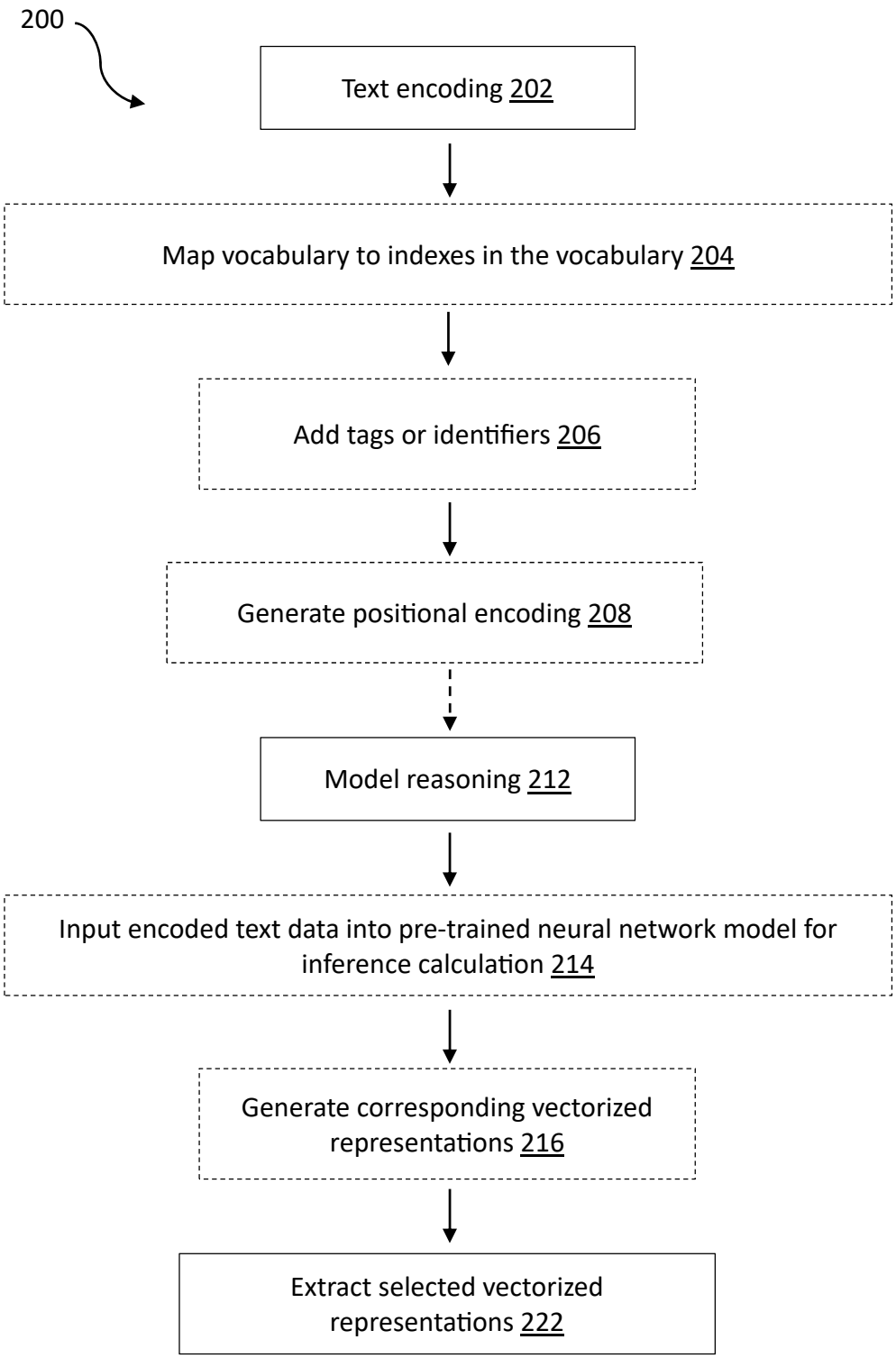
200
Text encoding 202
Map vocabulary to indexes in the vocabulary 204
Add tags or identifiers 206
Generate positional encoding 208
Model reasoning 212
Input encoded text data into pre-trained neural network model for inference calculation 214
Generate corresponding vectorized representations 216
Extract selected vectorized representations 222

FIG. 2

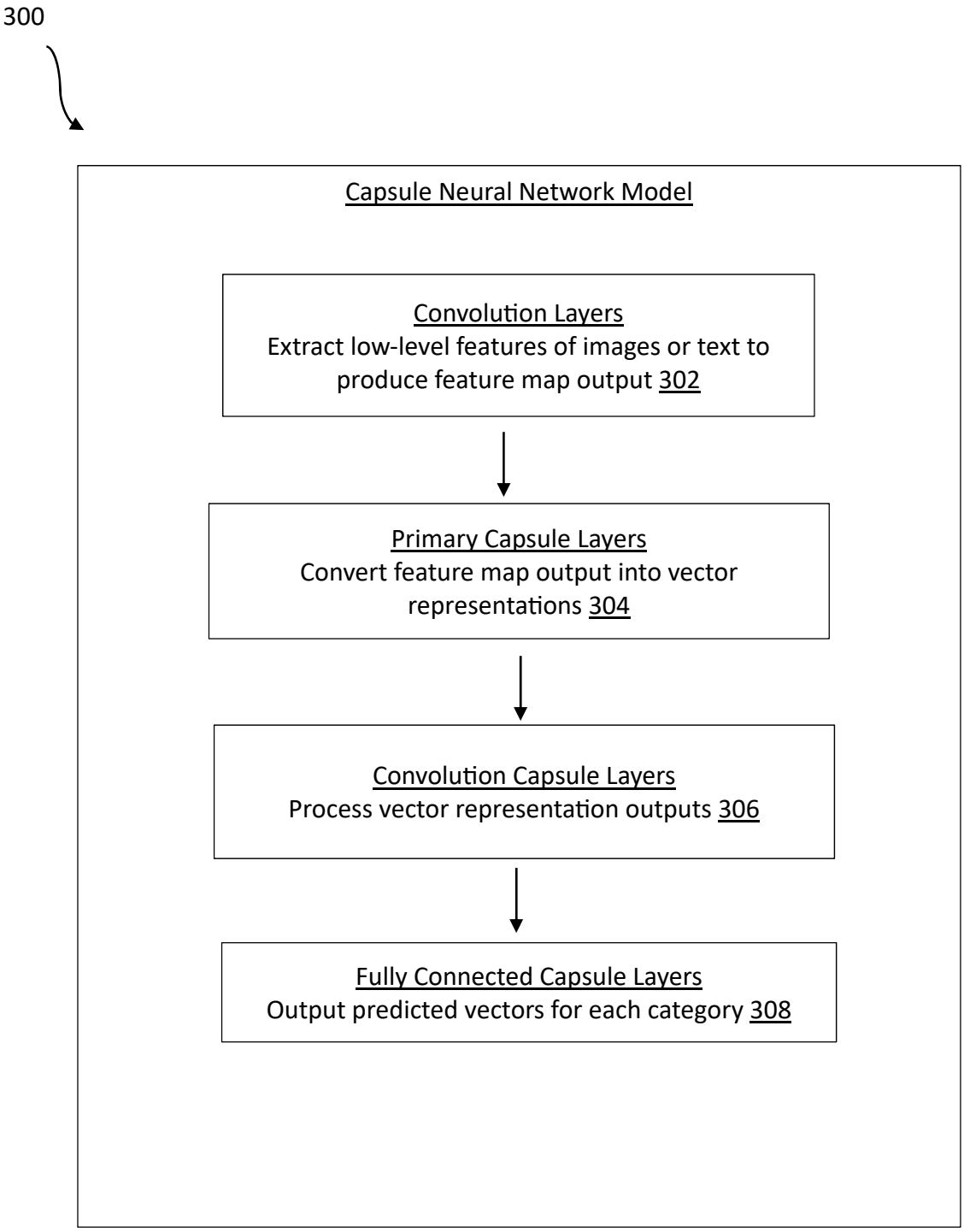
300
Capsule Neural Network Model
Convolution Layers
Extract low-level features of images or text to produce feature map output 302
Primary Capsule Layers
Convert feature map output into vector representations 304
Convolution Capsule Layers
Process vector representation outputs 306
Fully Connected Capsule Layers
Output predicted vectors for each category 308

FIG. 3

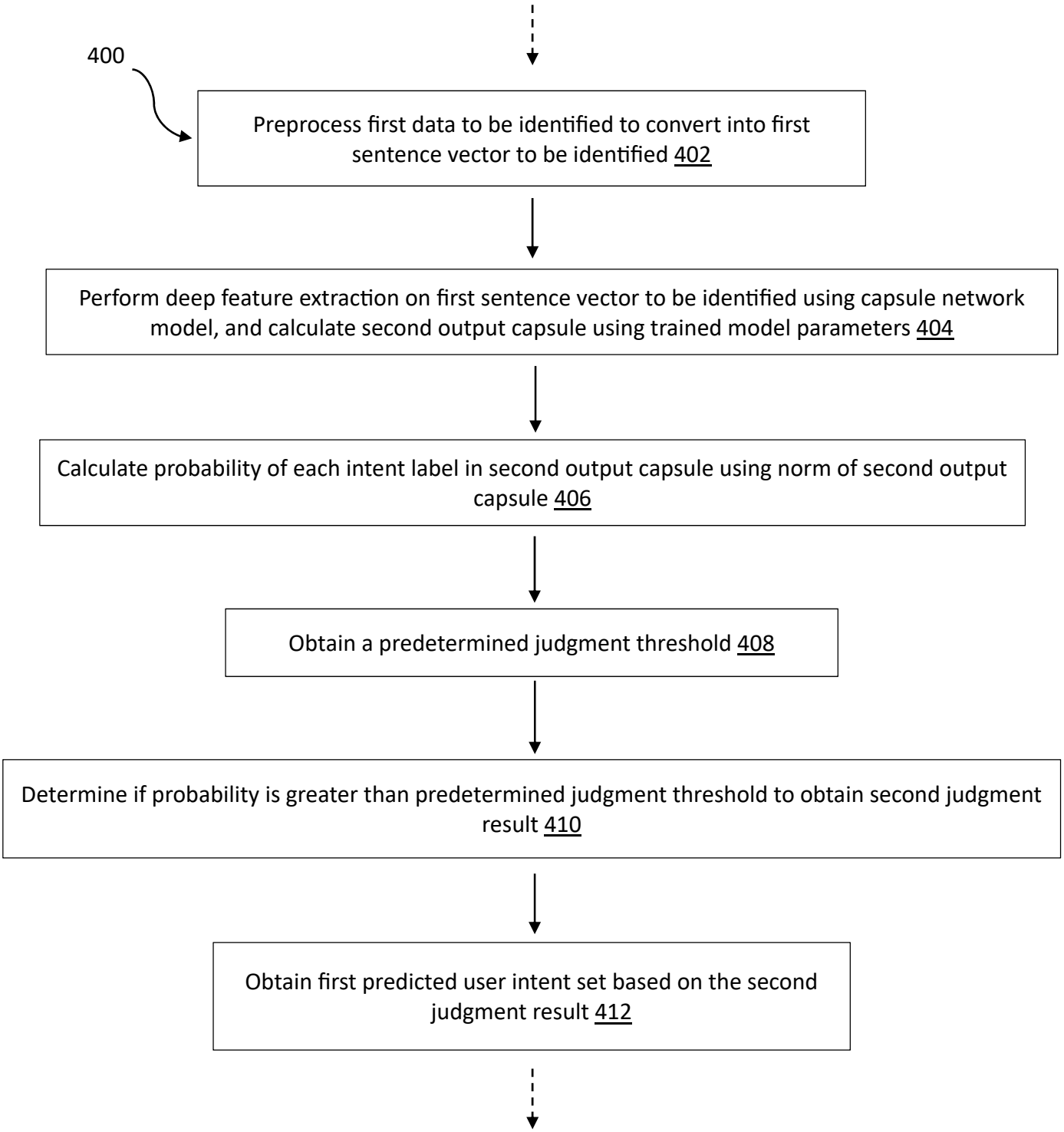
400
Preprocess first data to be identified to convert into first sentence vector to be identified 402
Perform deep feature extraction on first sentence vector to be identified using capsule network model, and calculate second output capsule using trained model parameters 404
Calculate probability of each intent label in second output capsule using norm of second output capsule 406
Obtain a predetermined judgment threshold 408
Determine if probability is greater than predetermined judgment threshold to obtain second judgment result 410
Obtain first predicted user intent set based on the second judgment result 412

FIG. 4

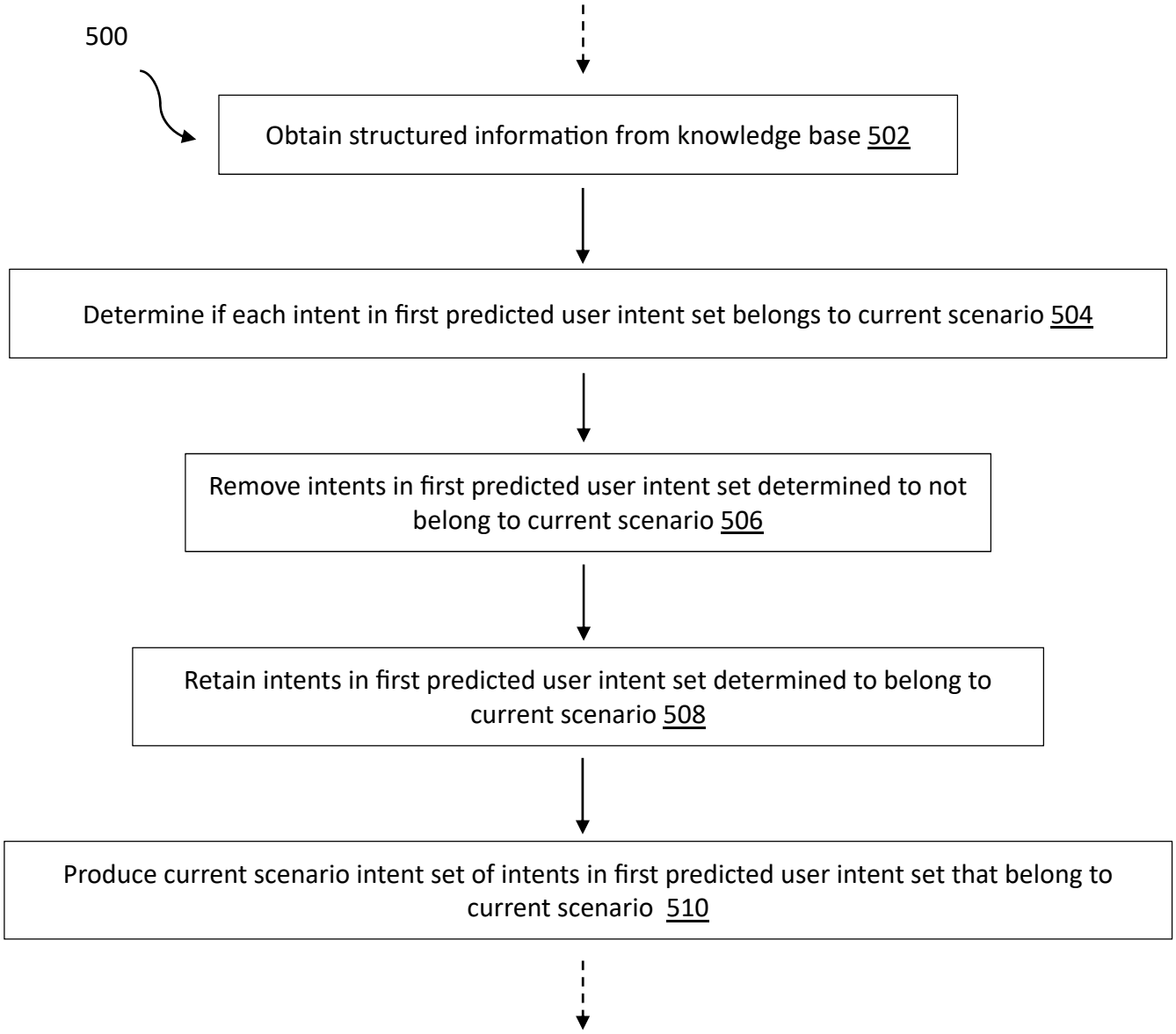
500
Obtain structured information from knowledge base 502
Determine if each intent in first predicted user intent set belongs to current scenario 504
Remove intents in first predicted user intent set determined to not belong to current scenario 506
Retain intents in first predicted user intent set determined to belong to current scenario 508
Produce current scenario intent set of intents in first predicted user intent set that belong to current scenario 510

FIG. 5

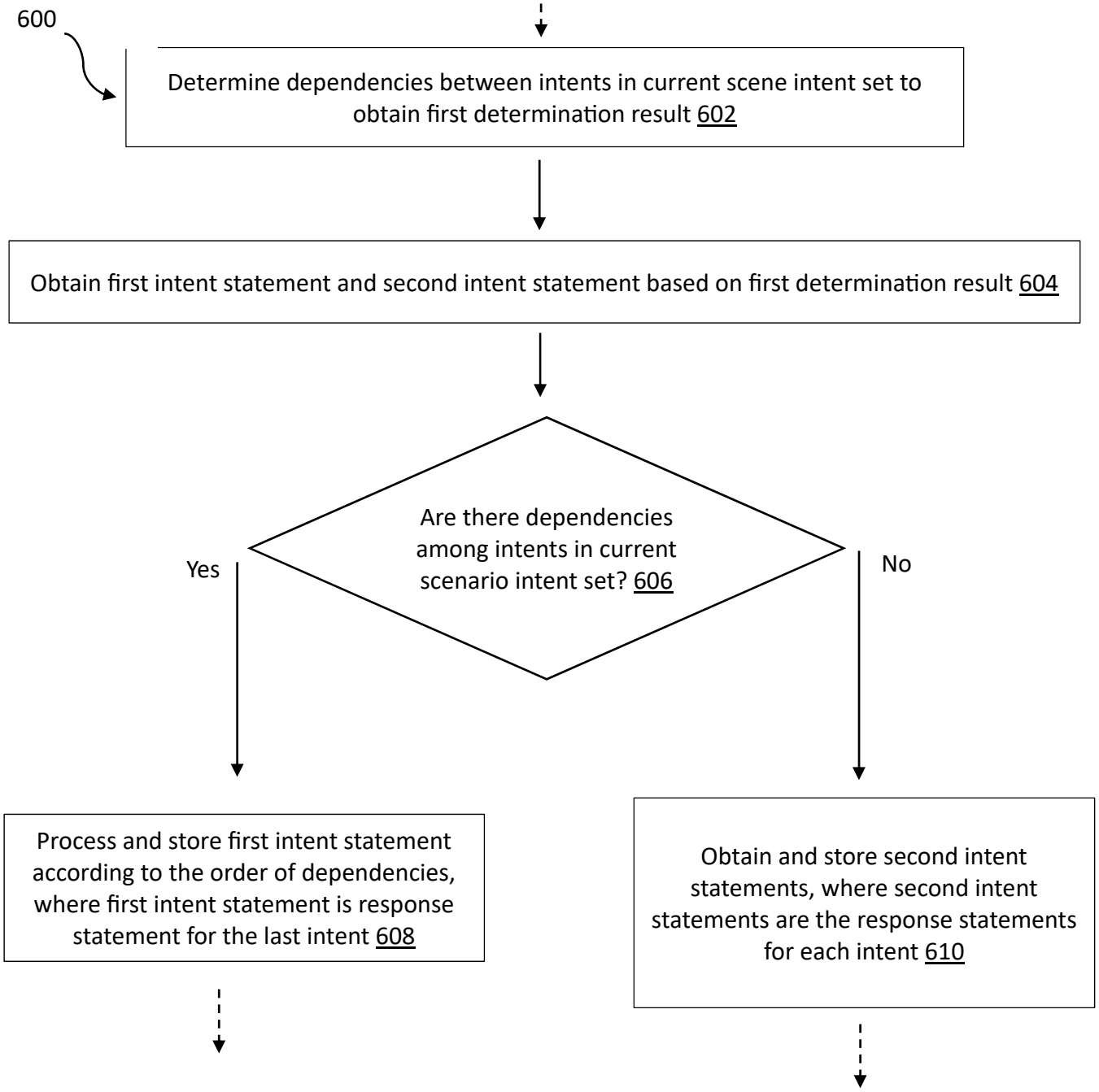
600
Determine dependencies between intents in current scene intent set to obtain first determination result 602
Obtain first intent statement and second intent statement based on first determination result 604
Are there dependencies among intents in current scenario intent set? 606
Yes
No
Process and store first intent statement according to the order of dependencies, where first intent statement is response statement for the last intent 608
Obtain and store second intent statements, where second intent statements are the response statements for each intent 610

FIG. 6

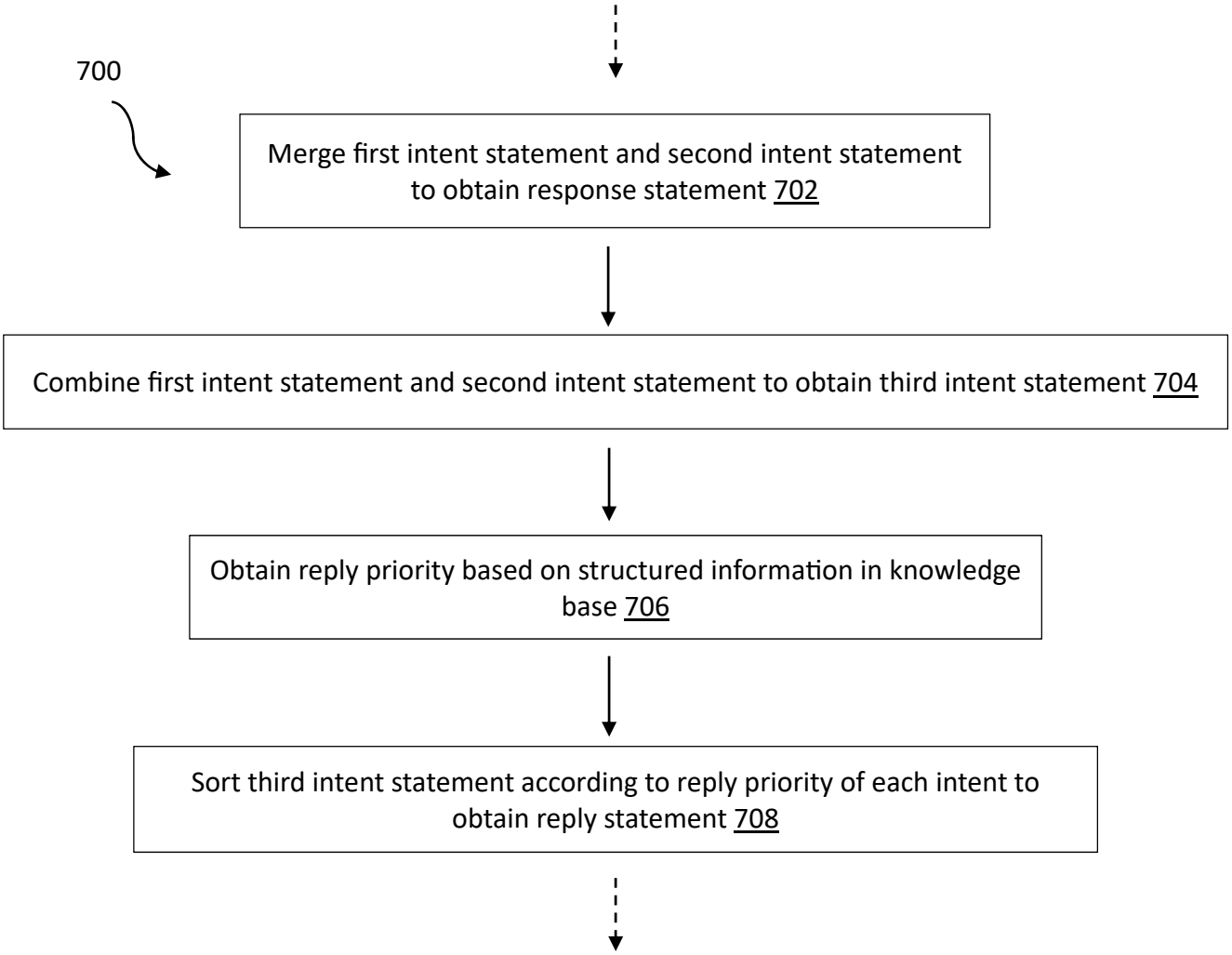
700
Merge first intent statement and second intent statement to obtain response statement 702
Combine first intent statement and second intent statement to obtain third intent statement 704
Obtain reply priority based on structured information in knowledge base 706
Sort third intent statement according to reply priority of each intent to obtain reply statement 708

FIG. 7

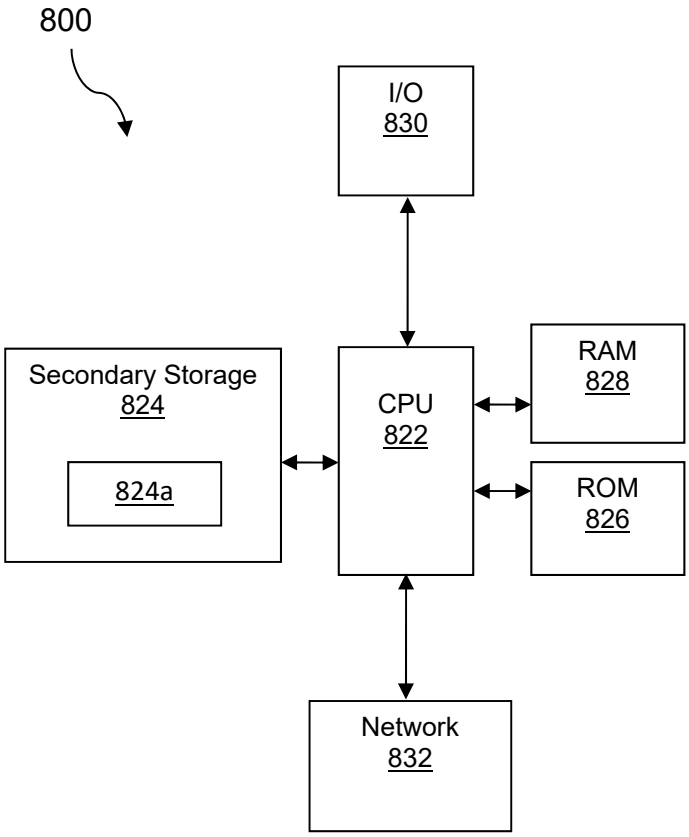
800
I/O
830
Secondary Storage
824
824a
CPU
822
RAM
828
ROM
826
Network
832

FIG. 8