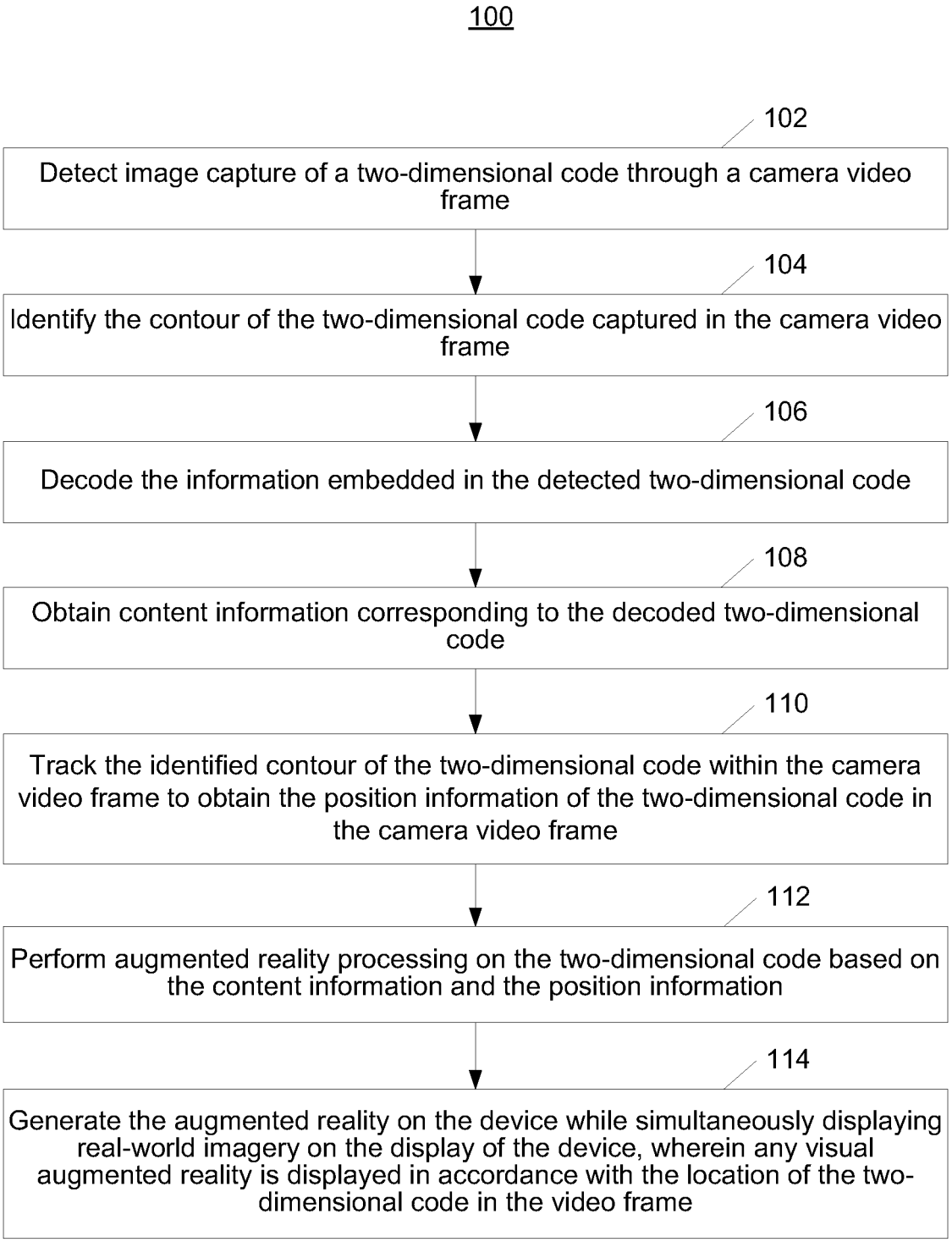

100
102
Detect image capture of a two-dimensional code through a camera video frame
104
Identify the contour of the two-dimensional code captured in the camera video frame
106
Decode the information embedded in the detected two-dimensional code
108
Obtain content information corresponding to the decoded two-dimensional code
110
Track the identified contour of the two-dimensional code within the camera video frame to obtain the position information of the two-dimensional code in the camera video frame
112
Perform augmented reality processing on the two-dimensional code based on the content information and the position information
114
Generate the augmented reality on the device while simultaneously displaying real-world imagery on the display of the device, wherein any visual augmented reality is displayed in accordance with the location of the two-dimensional code in the video frame

**Fig. 1**

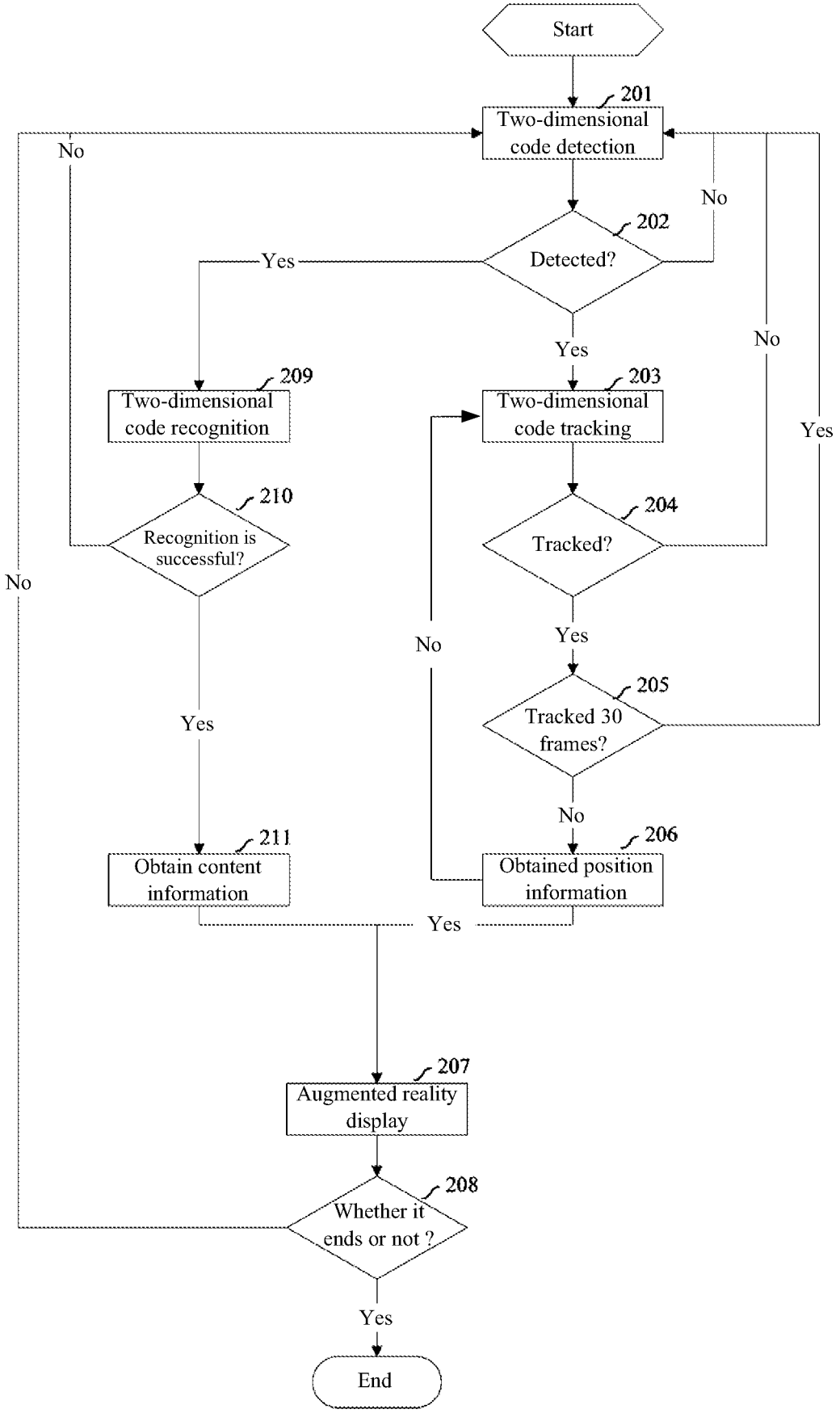

Start
201
Two-dimensional code detection
202
Detected?
No
Yes
209
Two-dimensional code recognition
210
Recognition is successful?
No
Yes
211
Obtain content information
203
Two-dimensional code tracking
204
Tracked?
No
Yes
205
Tracked 30 frames?
No
Yes
206
Obtained position information
No
Yes
207
Augmented reality display
208
Whether it ends or not ?
Yes
End

**Fig. 2**

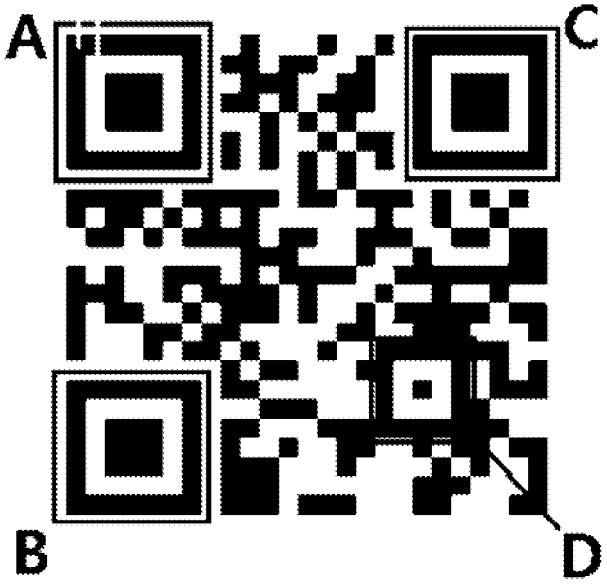



Fig. 3

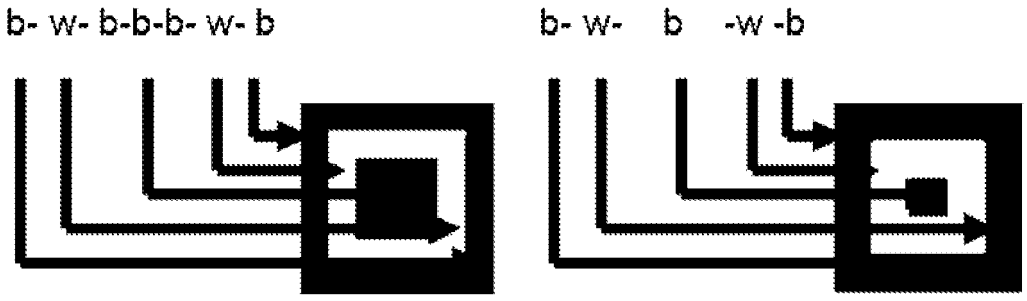



Fig. 4

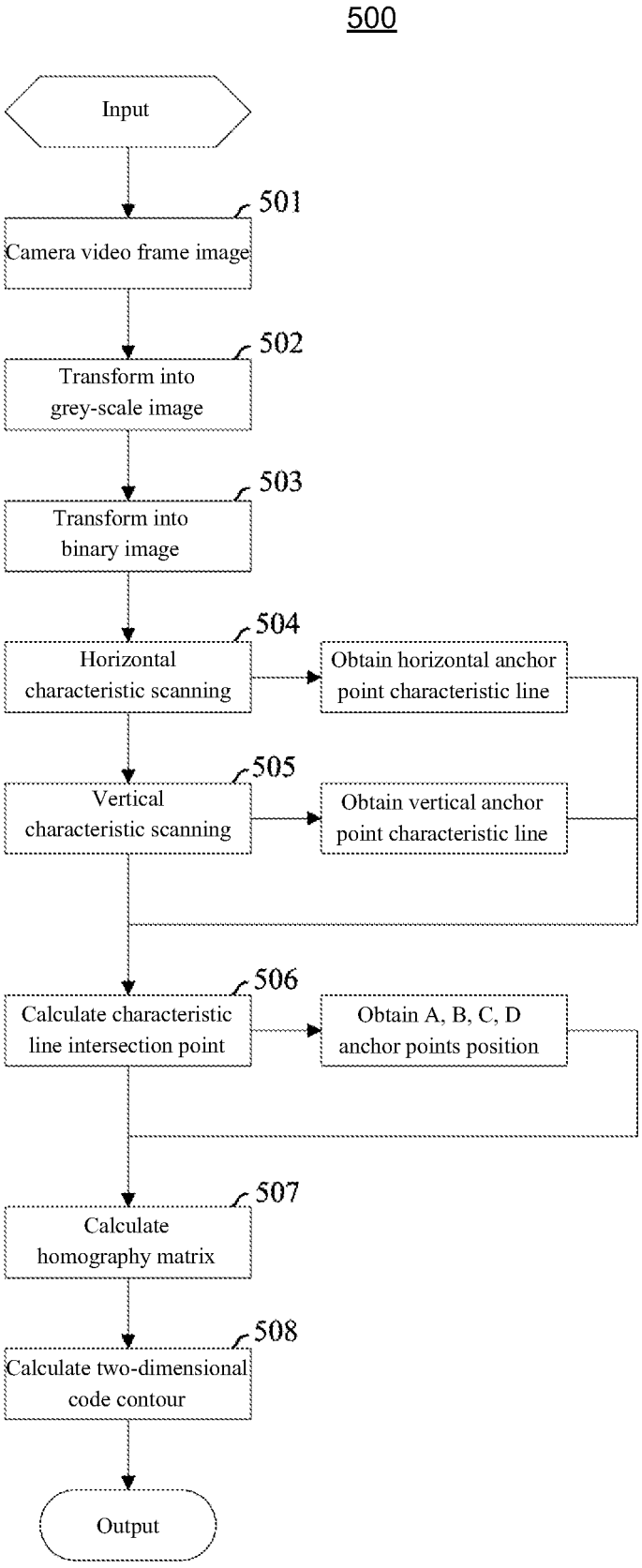

500
Input
501
Camera video frame image
502
Transform into grey-scale image
503
Transform into binary image
504
Horizontal characteristic scanning
Obtain horizontal anchor point characteristic line
505
Vertical characteristic scanning
Obtain vertical anchor point characteristic line
506
Calculate characteristic line intersection point
Obtain A, B, C, D anchor points position
507
Calculate homography matrix
508
Calculate two-dimensional code contour
Output

**Fig. 5**

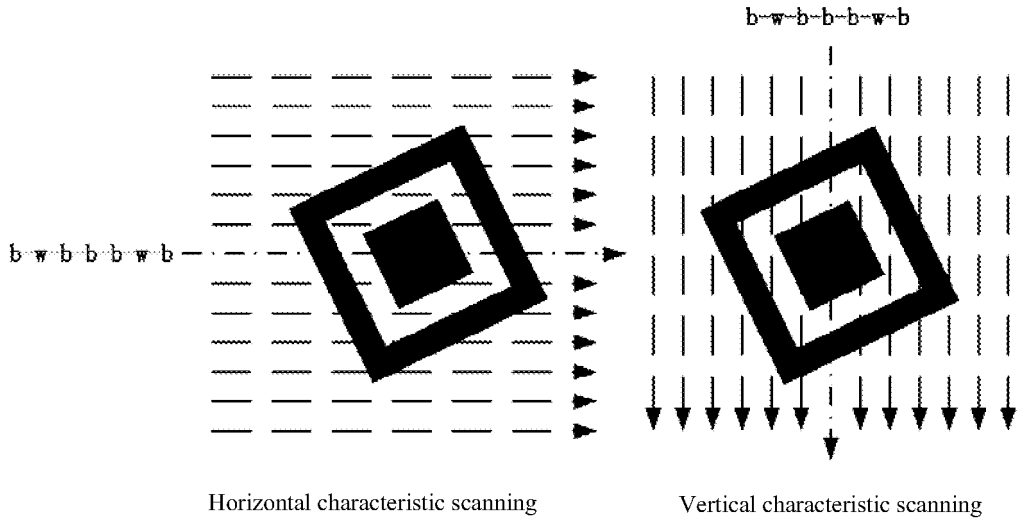

b-w-b-b-b-w-b
b w b b b w b
Horizontal characteristic scanning
Vertical characteristic scanning

**Fig. 6**

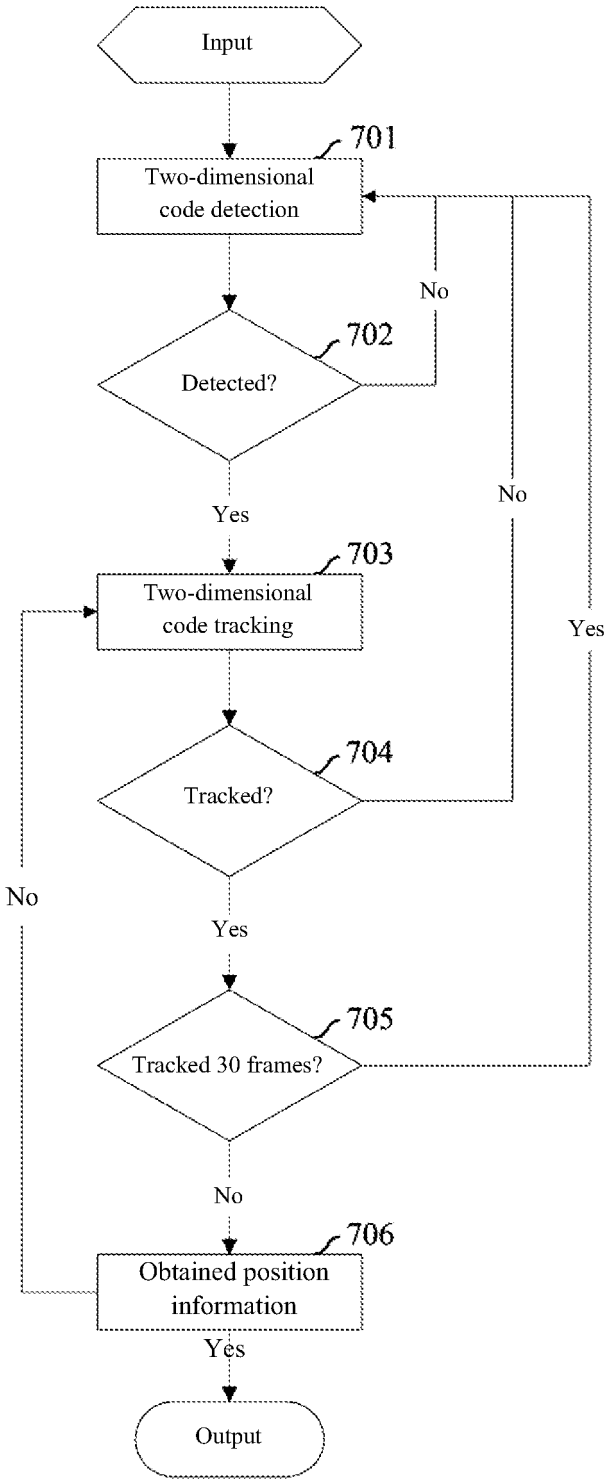

Input
701
Two-dimensional code detection
No
702
Detected?
Yes
No
703
Two-dimensional code tracking
Yes
704
Tracked?
No
Yes
705
Tracked 30 frames?
No
706
Obtained position information
Yes
Output

**Fig. 7**

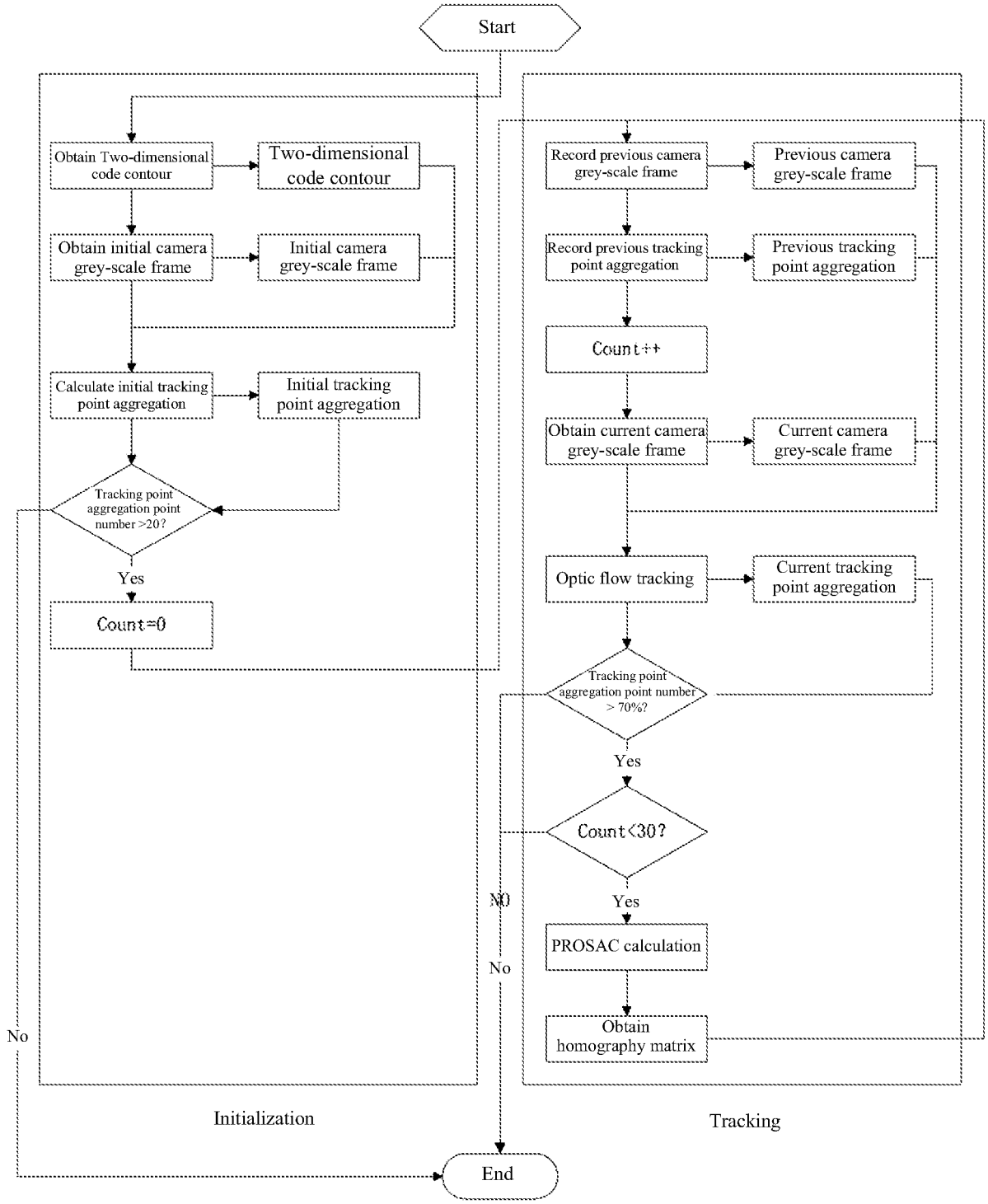

Start
Obtain Two-dimensional code contour
Two-dimensional code contour
Obtain initial camera grey-scale frame
Initial camera grey-scale frame
Calculate initial tracking point aggregation
Initial tracking point aggregation
Tracking point aggregation point number >20?
Yes
Count=0
No
Initialization
Record previous camera grey-scale frame
Previous camera grey-scale frame
Record previous tracking point aggregation
Previous tracking point aggregation
Count++
Obtain current camera grey-scale frame
Current camera grey-scale frame
Optic flow tracking
Current tracking point aggregation
Tracking point aggregation point number > 70%?
Yes
Count<30?
NO
Yes
No
PROSAC calculation
Obtain homography matrix
Tracking
End

**Fig. 8**

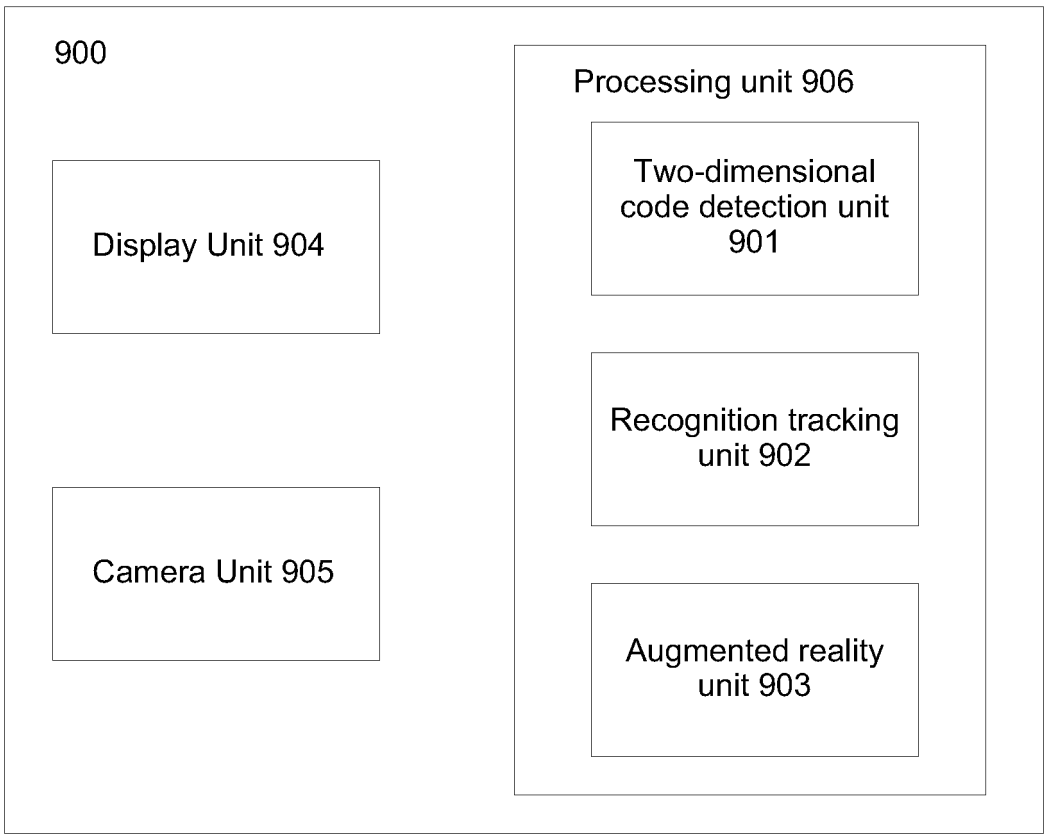
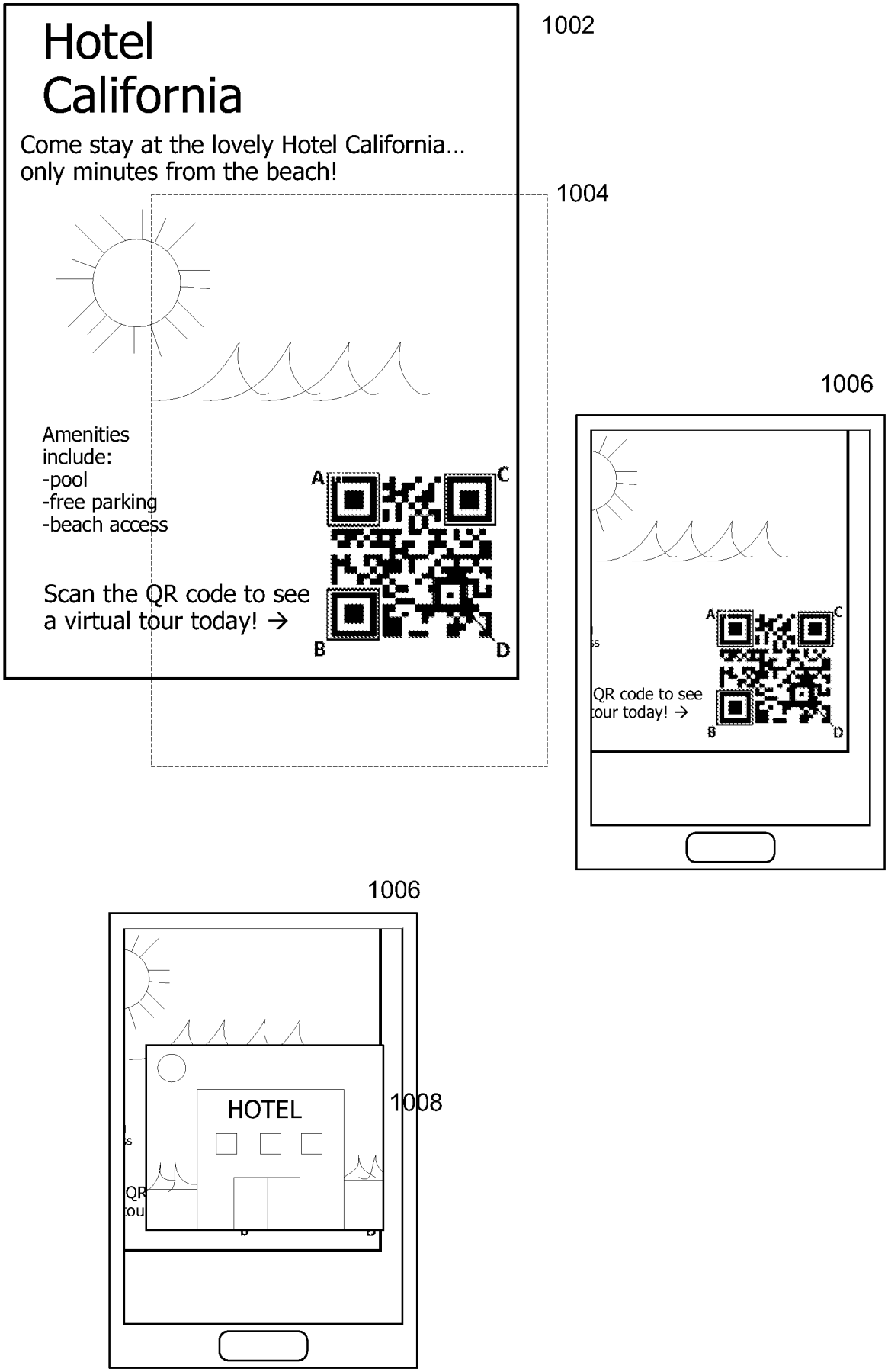

900
Processing unit 906
Two-dimensional code detection unit 901
Display Unit 904
Recognition tracking unit 902
Camera Unit 905
Augmented reality unit 903

**Fig. 9**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California
Come stay at the lovely Hotel California…
only minutes from the beach!
Amenities
include:
-pool
-free parking
-beach access
Scan the QR code to see
a virtual tour today! →
A
C
B
D
1002
1004
1006
1006
HOTEL
1008

Fig 10

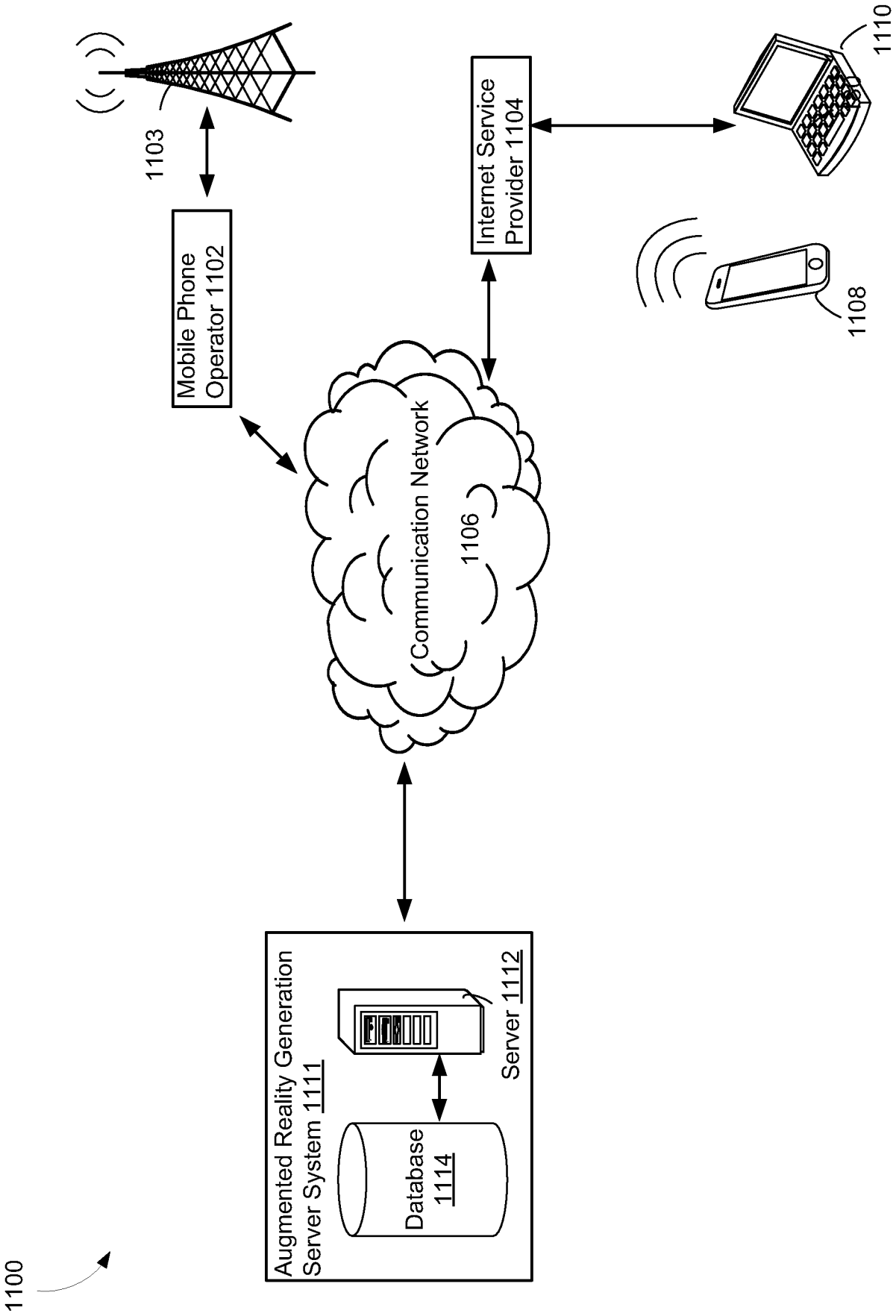
1100
Augmented Reality Generation Server System 1111
Server 1112
Database 1114
Communication Network 1106
Mobile Phone Operator 1102
1103
Internet Service Provider 1104
1110
1108

Fig 11

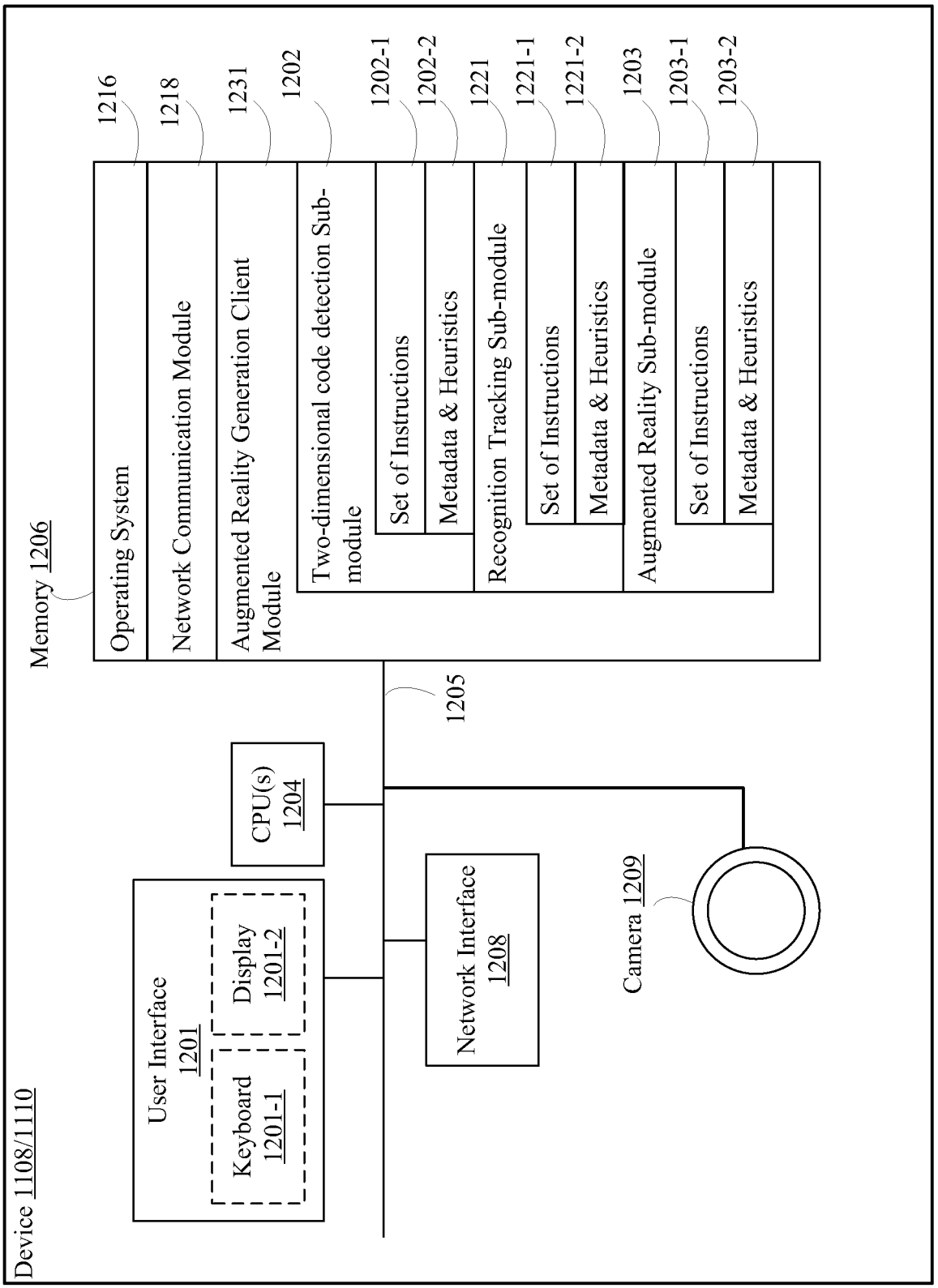
Device 1108/1110
Memory 1206
Operating System
1216
Network Communication Module
1218
Augmented Reality Generation Client Module
1231
1202
Two-dimensional code detection Sub-module
1202-1
Set of Instructions
1202-2
Metadata & Heuristics
1221
Recognition Tracking Sub-module
1221-1
Set of Instructions
1221-2
Metadata & Heuristics
1203
Augmented Reality Sub-module
1203-1
Set of Instructions
1203-2
Metadata & Heuristics
1205
CPU(s) 1204
User Interface 1201
Keyboard 1201-1
Display 1201-2
Network Interface 1208
Camera 1209

Fig 12