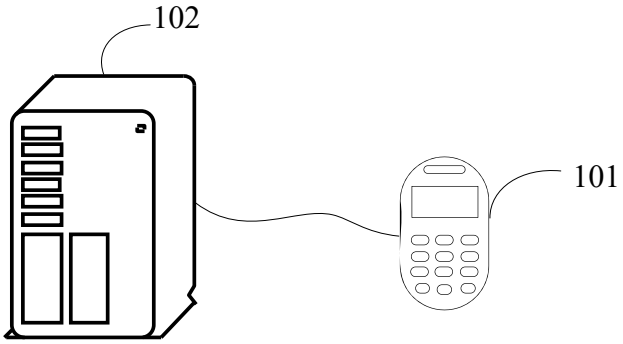

102
101

FIG. 1

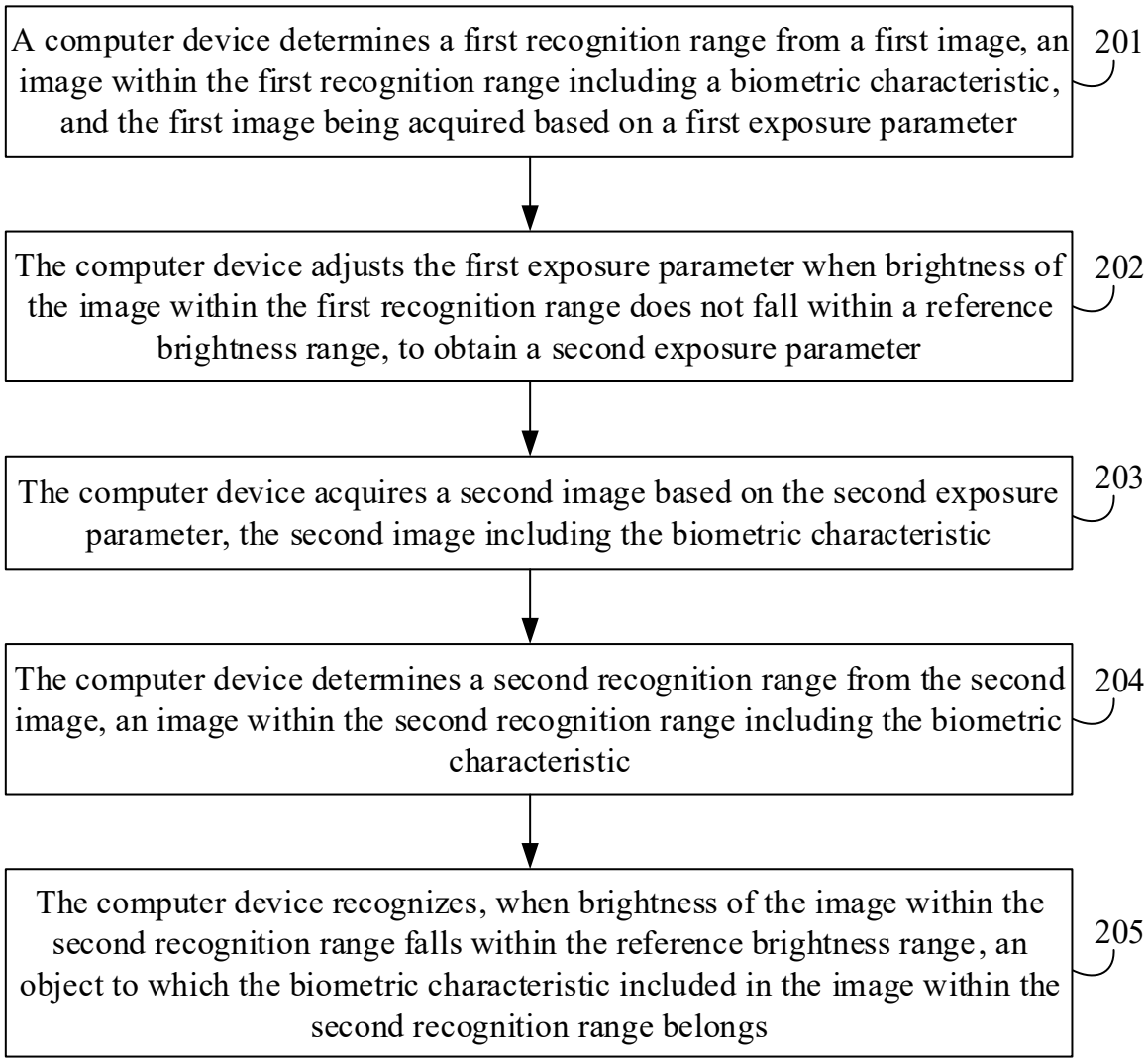

A computer device determines a first recognition range from a first image, an image within the first recognition range including a biometric characteristic, and the first image being acquired based on a first exposure parameter
201
The computer device adjusts the first exposure parameter when brightness of the image within the first recognition range does not fall within a reference brightness range, to obtain a second exposure parameter
202
The computer device acquires a second image based on the second exposure parameter, the second image including the biometric characteristic
203
The computer device determines a second recognition range from the second image, an image within the second recognition range including the biometric characteristic
204
The computer device recognizes, when brightness of the image within the second recognition range falls within the reference brightness range, an object to which the biometric characteristic included in the image within the second recognition range belongs
205

FIG. 2

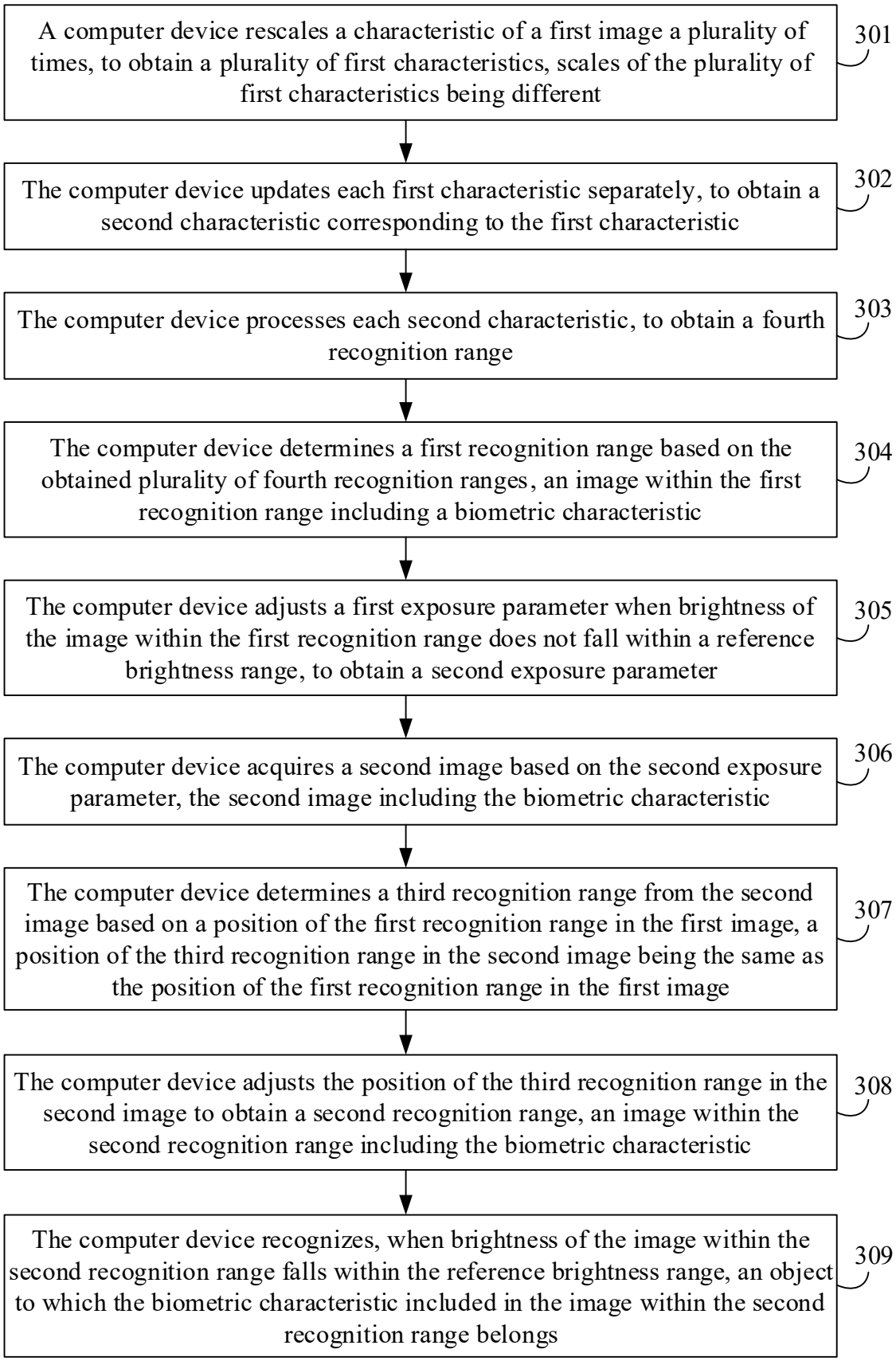

A computer device rescales a characteristic of a first image a plurality of times, to obtain a plurality of first characteristics, scales of the plurality of first characteristics being different
301
The computer device updates each first characteristic separately, to obtain a second characteristic corresponding to the first characteristic
302
The computer device processes each second characteristic, to obtain a fourth recognition range
303
The computer device determines a first recognition range based on the obtained plurality of fourth recognition ranges, an image within the first recognition range including a biometric characteristic
304
The computer device adjusts a first exposure parameter when brightness of the image within the first recognition range does not fall within a reference brightness range, to obtain a second exposure parameter
305
The computer device acquires a second image based on the second exposure parameter, the second image including the biometric characteristic
306
The computer device determines a third recognition range from the second image based on a position of the first recognition range in the first image, a position of the third recognition range in the second image being the same as the position of the first recognition range in the first image
307
The computer device adjusts the position of the third recognition range in the second image to obtain a second recognition range, an image within the second recognition range including the biometric characteristic
308
The computer device recognizes, when brightness of the image within the second recognition range falls within the reference brightness range, an object to which the biometric characteristic included in the image within the second recognition range belongs
309

FIG. 3

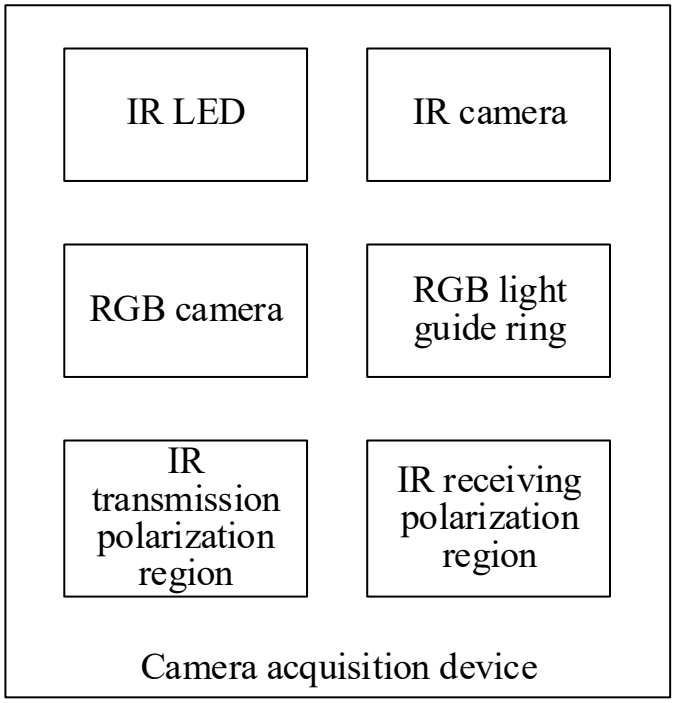

IR LED
IR camera
RGB camera
RGB light guide ring
IR transmission polarization region
IR receiving polarization region
Camera acquisition device

FIG. 4

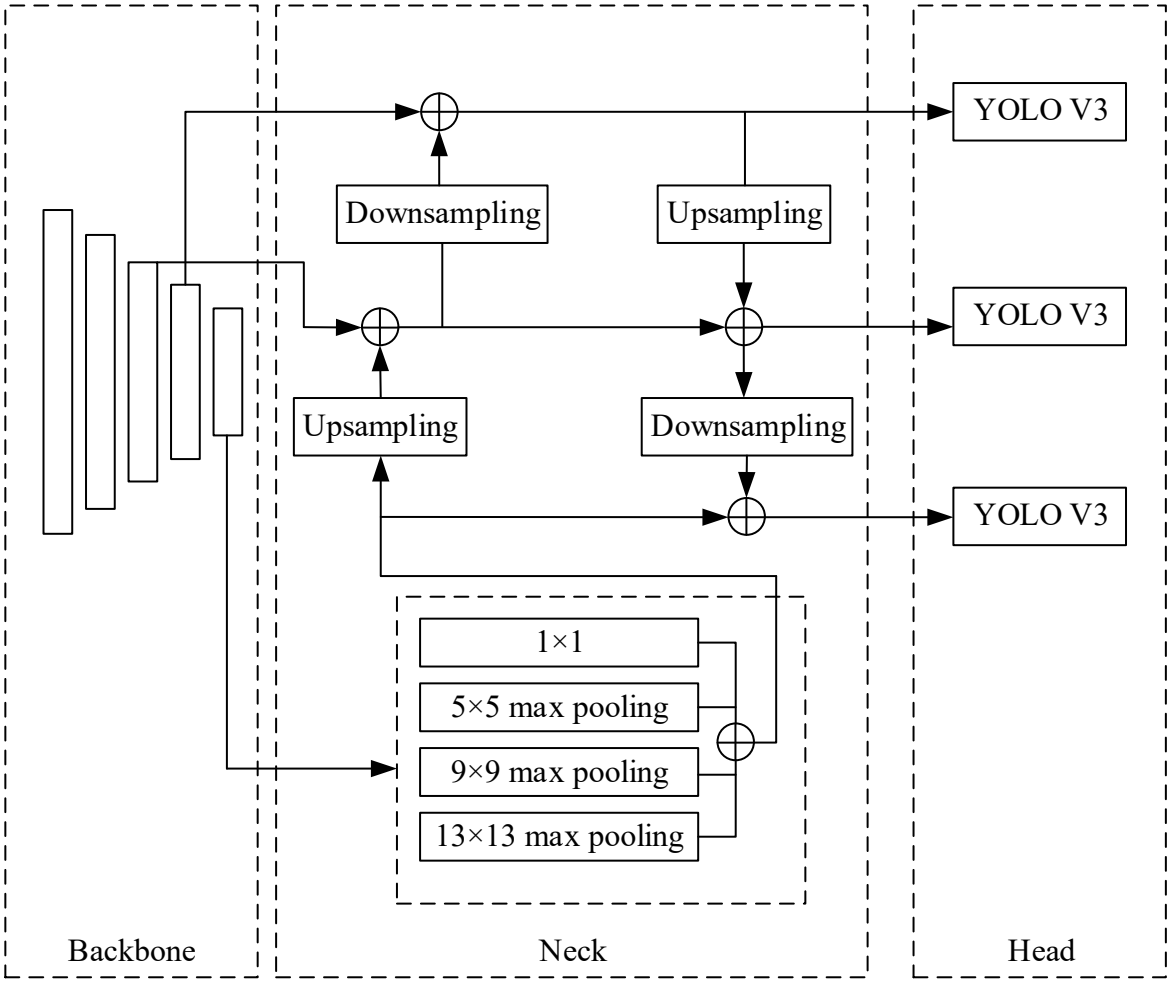

YOLO V3
Downsampling
Upsampling
YOLO V3
Upsampling
Downsampling
YOLO V3
1×1
5×5 max pooling
9×9 max pooling
13×13 max pooling
Backbone
Neck
Head

FIG. 5

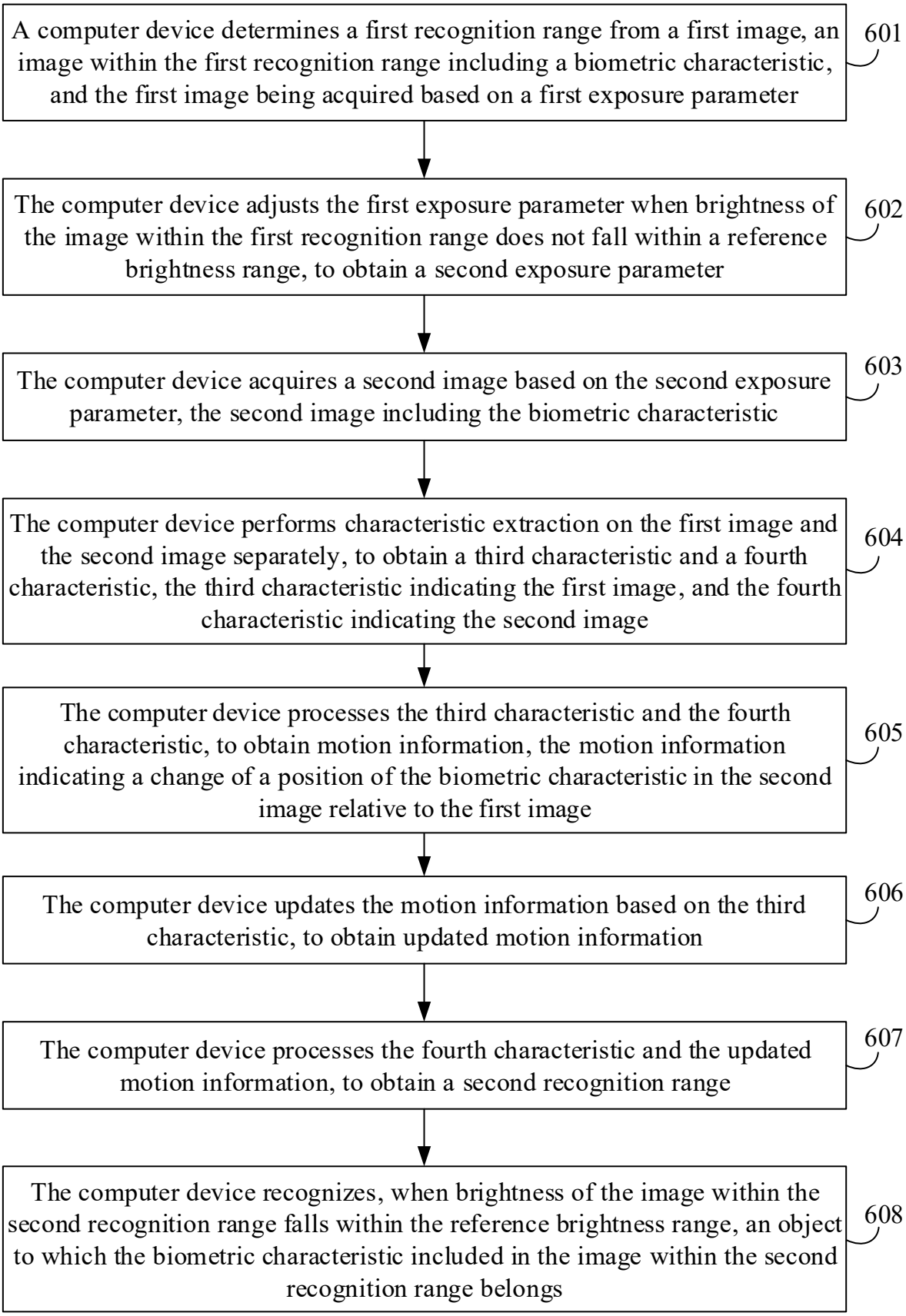

A computer device determines a first recognition range from a first image, an image within the first recognition range including a biometric characteristic, and the first image being acquired based on a first exposure parameter
601
The computer device adjusts the first exposure parameter when brightness of the image within the first recognition range does not fall within a reference brightness range, to obtain a second exposure parameter
602
The computer device acquires a second image based on the second exposure parameter, the second image including the biometric characteristic
603
The computer device performs characteristic extraction on the first image and the second image separately, to obtain a third characteristic and a fourth characteristic, the third characteristic indicating the first image, and the fourth characteristic indicating the second image
604
The computer device processes the third characteristic and the fourth characteristic, to obtain motion information, the motion information indicating a change of a position of the biometric characteristic in the second image relative to the first image
605
The computer device updates the motion information based on the third characteristic, to obtain updated motion information
606
The computer device processes the fourth characteristic and the updated motion information, to obtain a second recognition range
607
The computer device recognizes, when brightness of the image within the second recognition range falls within the reference brightness range, an object to which the biometric characteristic included in the image within the second recognition range belongs
608

FIG. 6

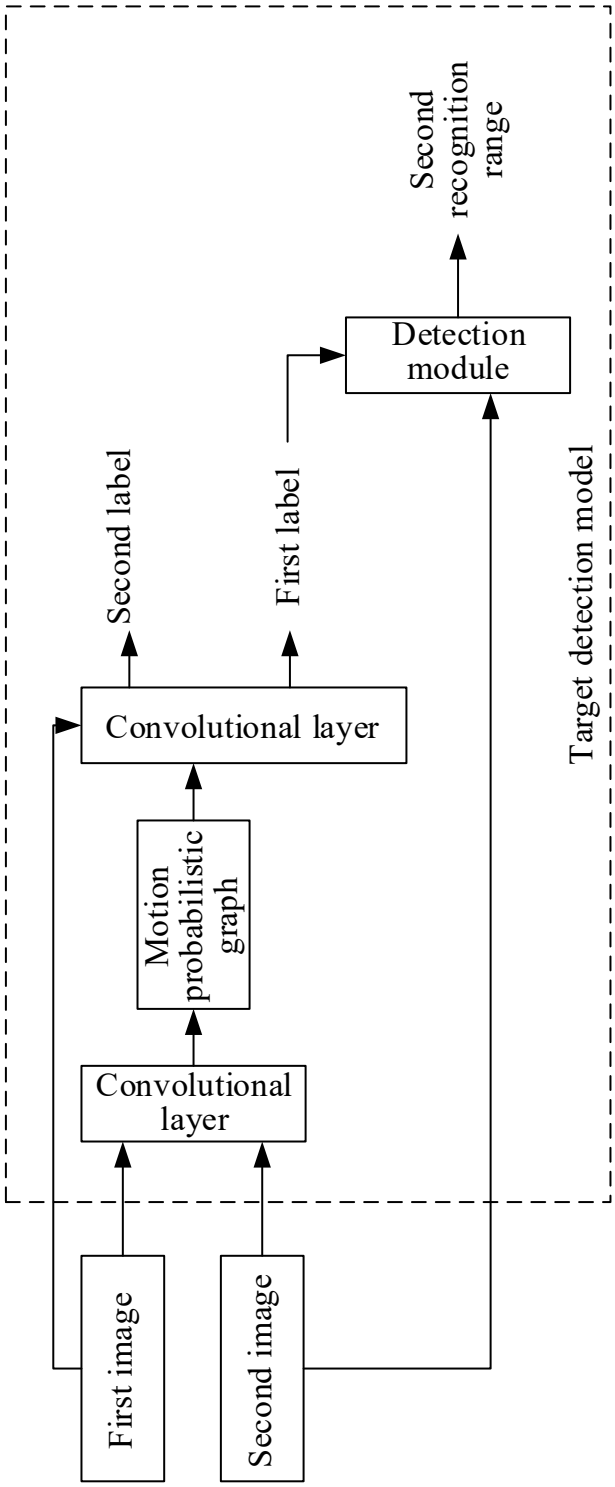

Second recognition range
Detection module
Second label
First label
Target detection model
Convolutional layer
Motion probabilistic graph
Convolutional layer
First image
Second image

FIG. 7

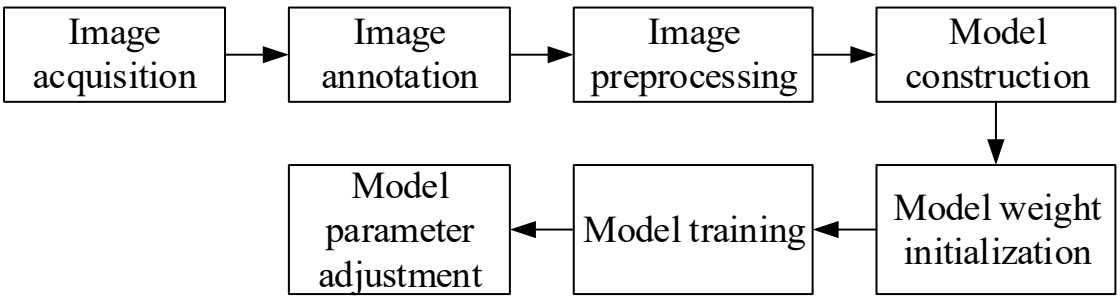


FIG. 8



FIG. 9

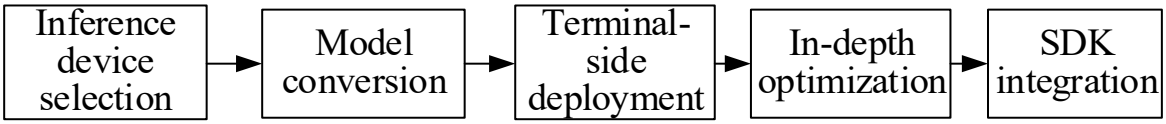


FIG. 10

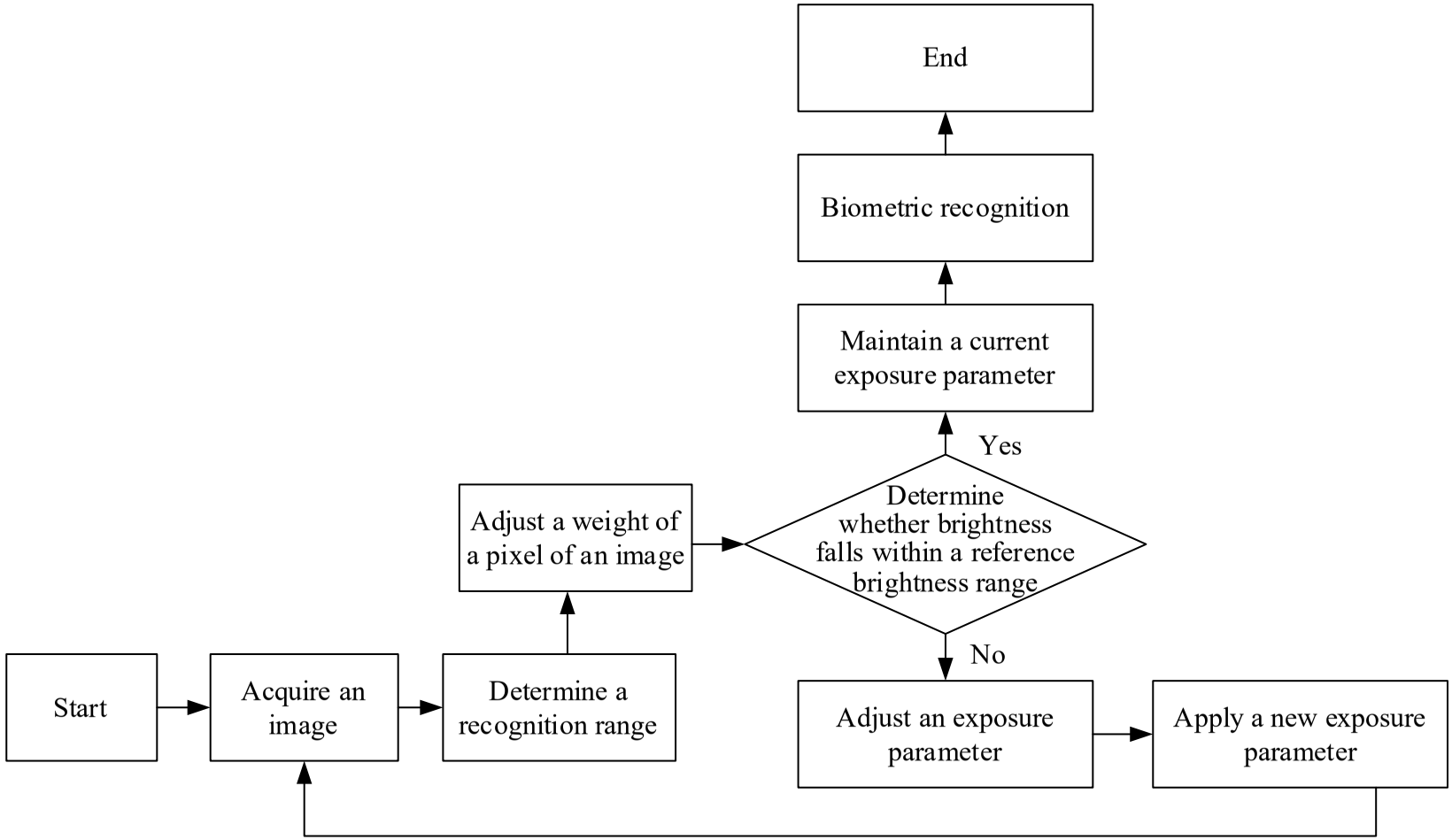

End
Biometric recognition
Maintain a current exposure parameter
Yes
Determine whether brightness falls within a reference brightness range
Adjust a weight of a pixel of an image
No
Start
Acquire an image
Determine a recognition range
Adjust an exposure parameter
Apply a new exposure parameter

FIG. 11

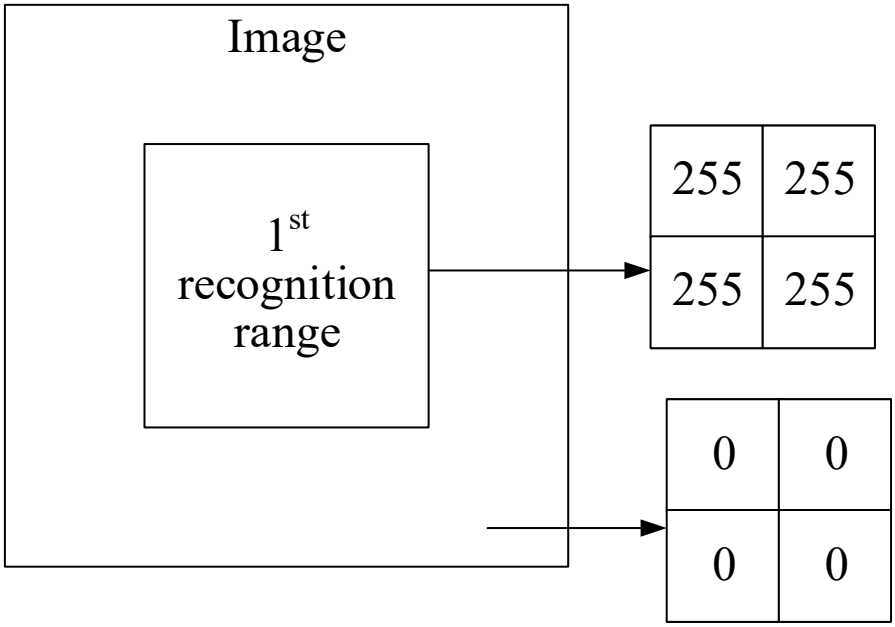


FIG. 12

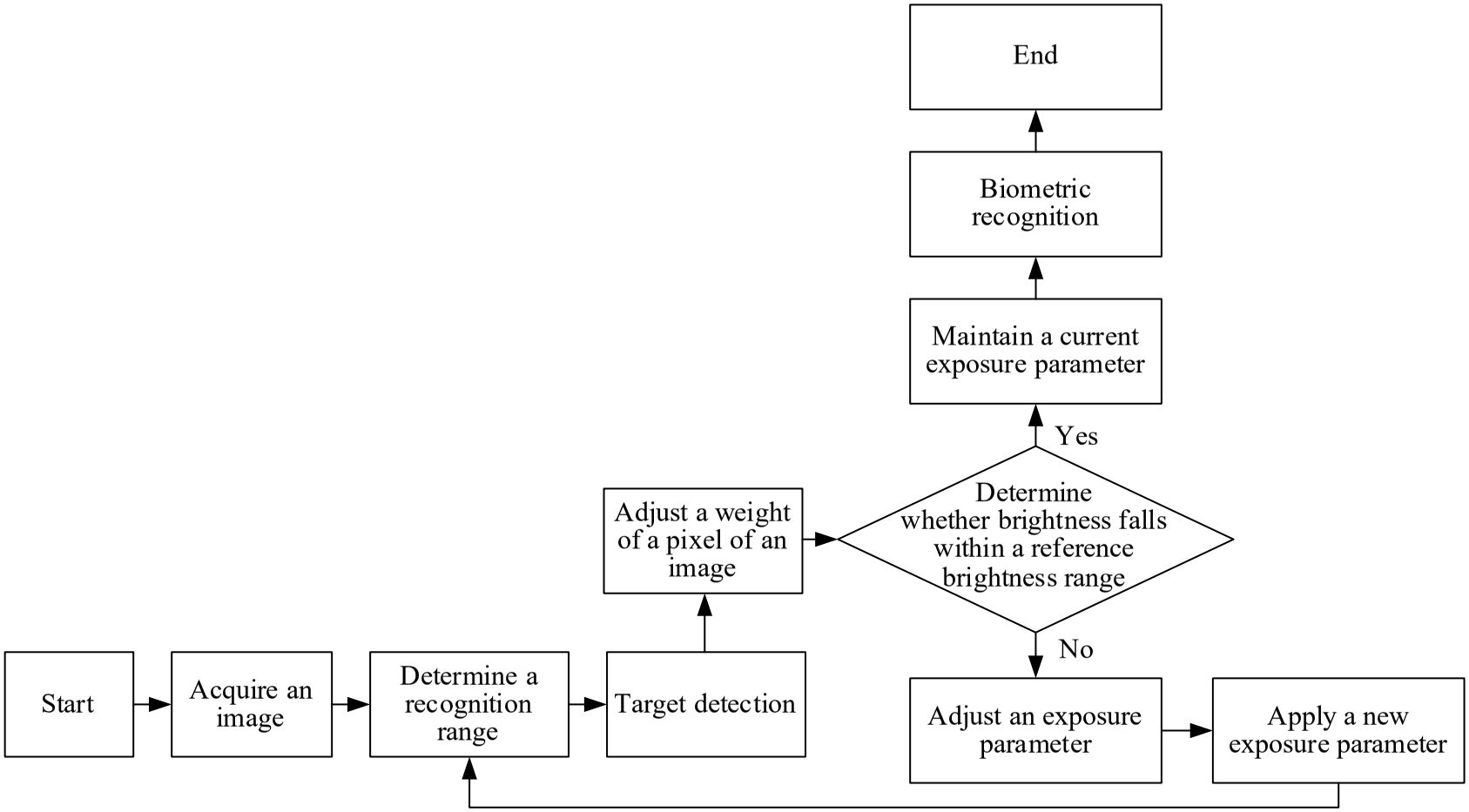

End
Biometric recognition
Maintain a current exposure parameter
Yes
Determine whether brightness falls within a reference brightness range
Adjust a weight of a pixel of an image
No
Start
Acquire an image
Determine a recognition range
Target detection
Adjust an exposure parameter
Apply a new exposure parameter

FIG. 13

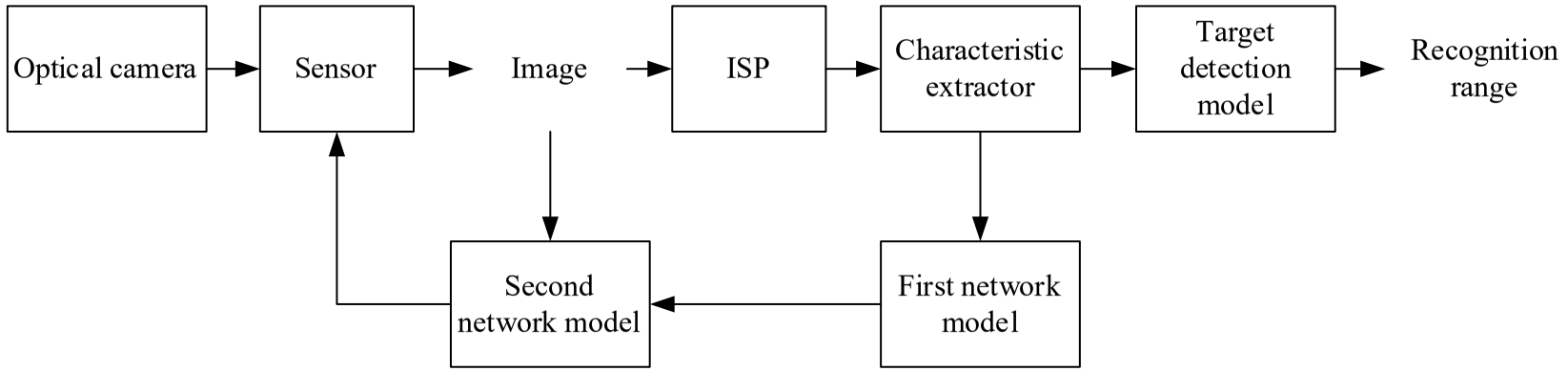

Optical camera
Sensor
Image
ISP
Characteristic extractor
Target detection model
Recognition range
Second network model
First network model

FIG. 14

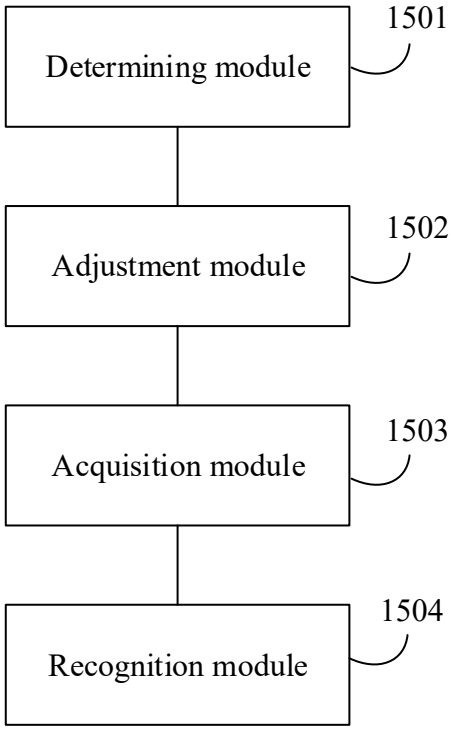

Determining module
1501
Adjustment module
1502
Acquisition module
1503
Recognition module
1504

FIG. 15

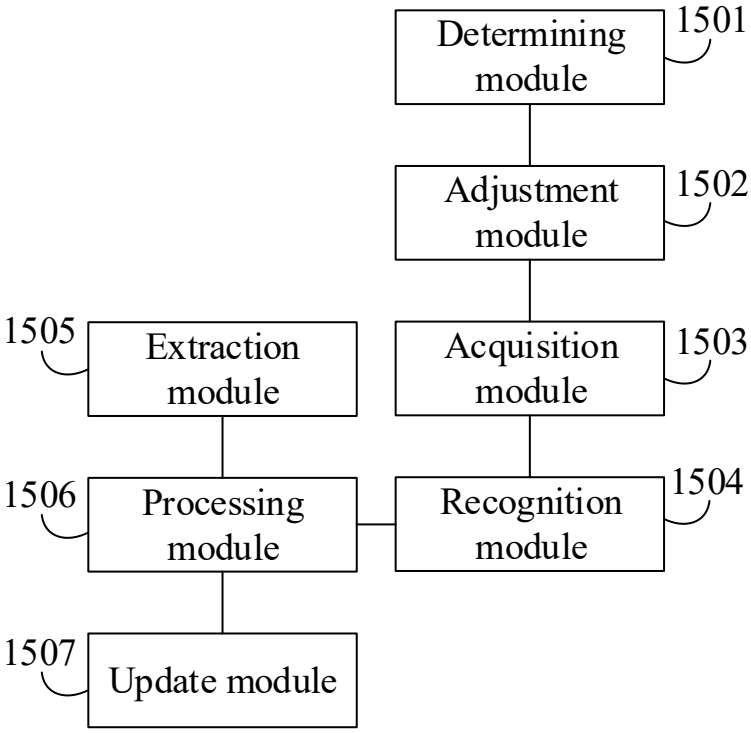

Determining module
1501
Adjustment module
1502
Acquisition module
1503
Recognition module
1504
Processing module
1506
Extraction module
1505
Update module
1507

FIG. 16

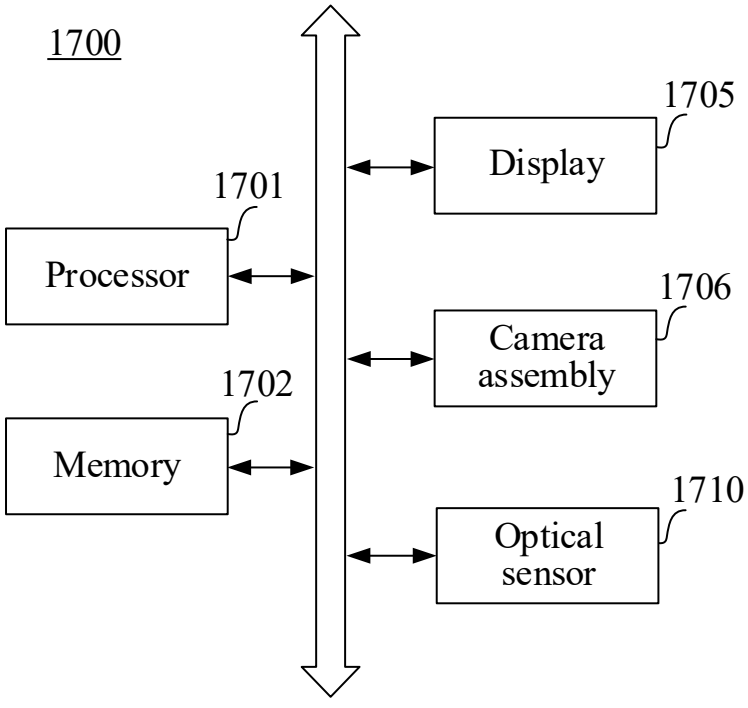

1700
Display
1705
Processor
1701
Camera assembly
1706
Memory
1702
Optical sensor
1710

FIG. 17

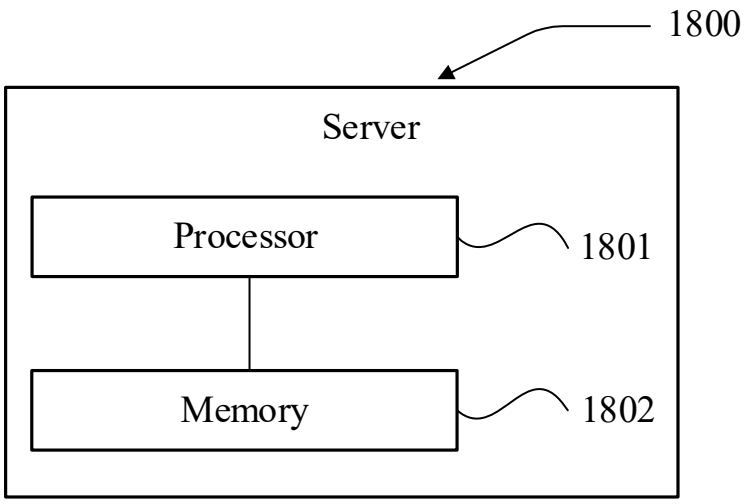


FIG. 18