

Fig. 1

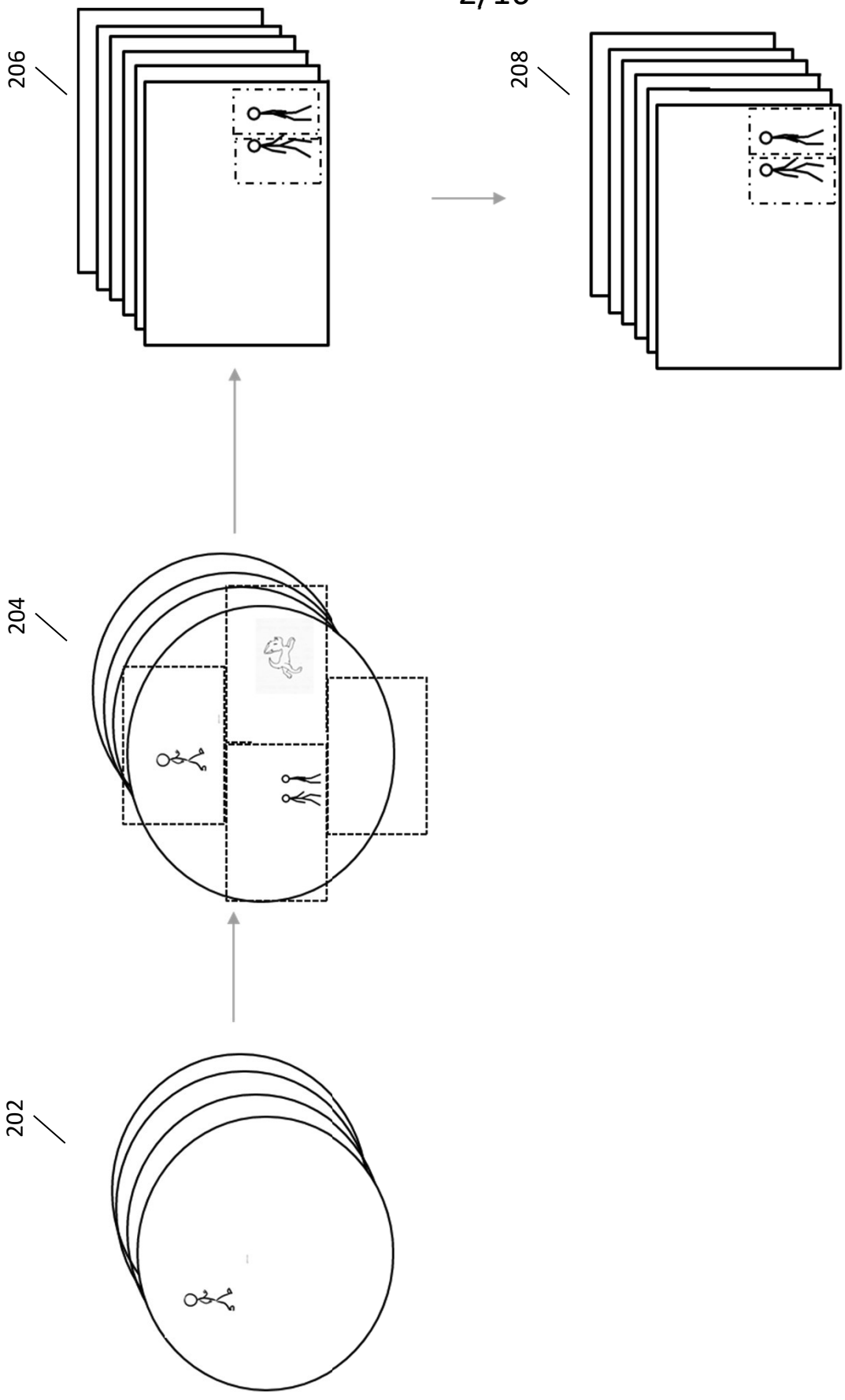


Fig. 2

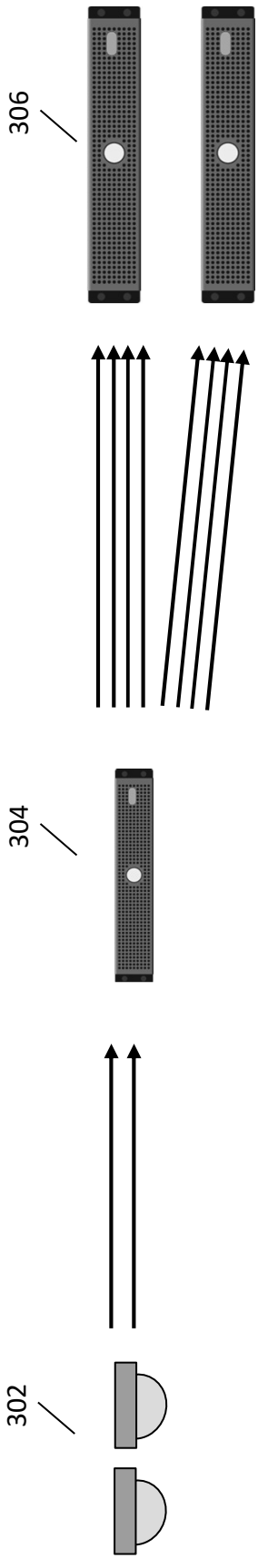


Fig. 3

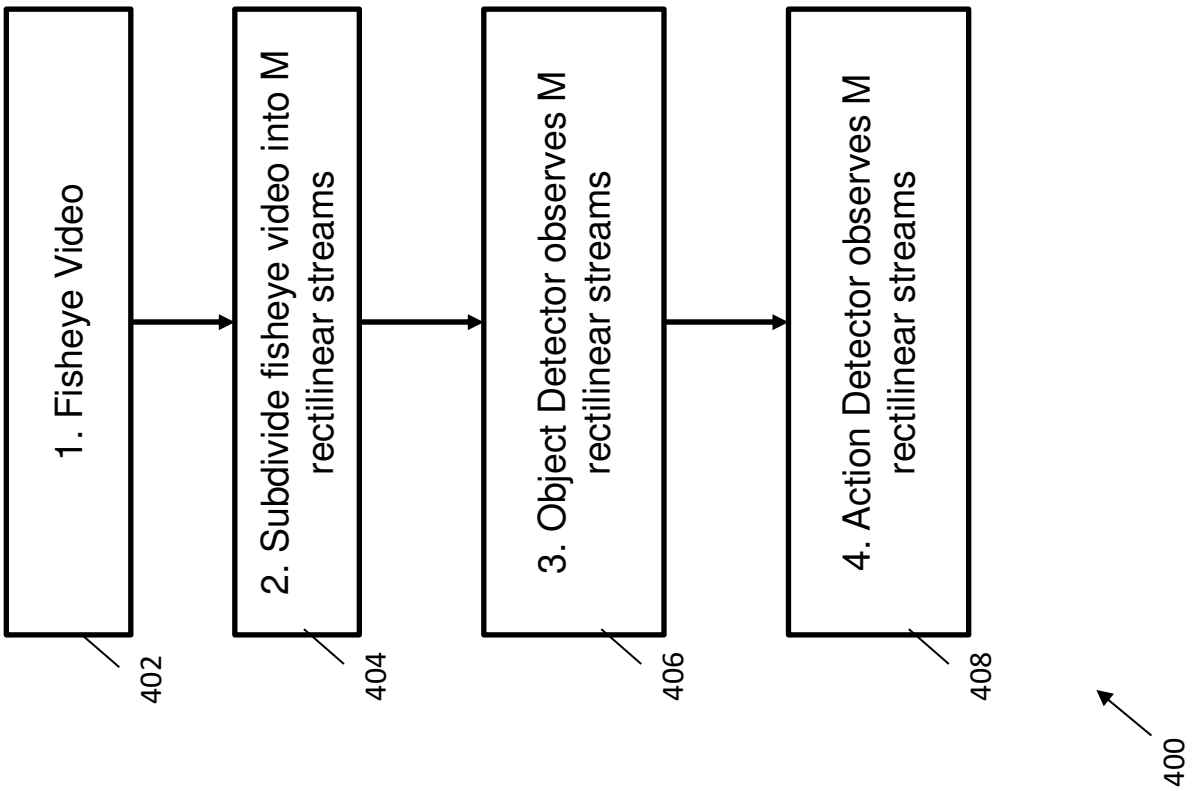

1. Fisheye Video
2. Subdivide fisheye video into M rectilinear streams
3. Object Detector observes M rectilinear streams
4. Action Detector observes M rectilinear streams
402
404
406
408
400

Fig. 4

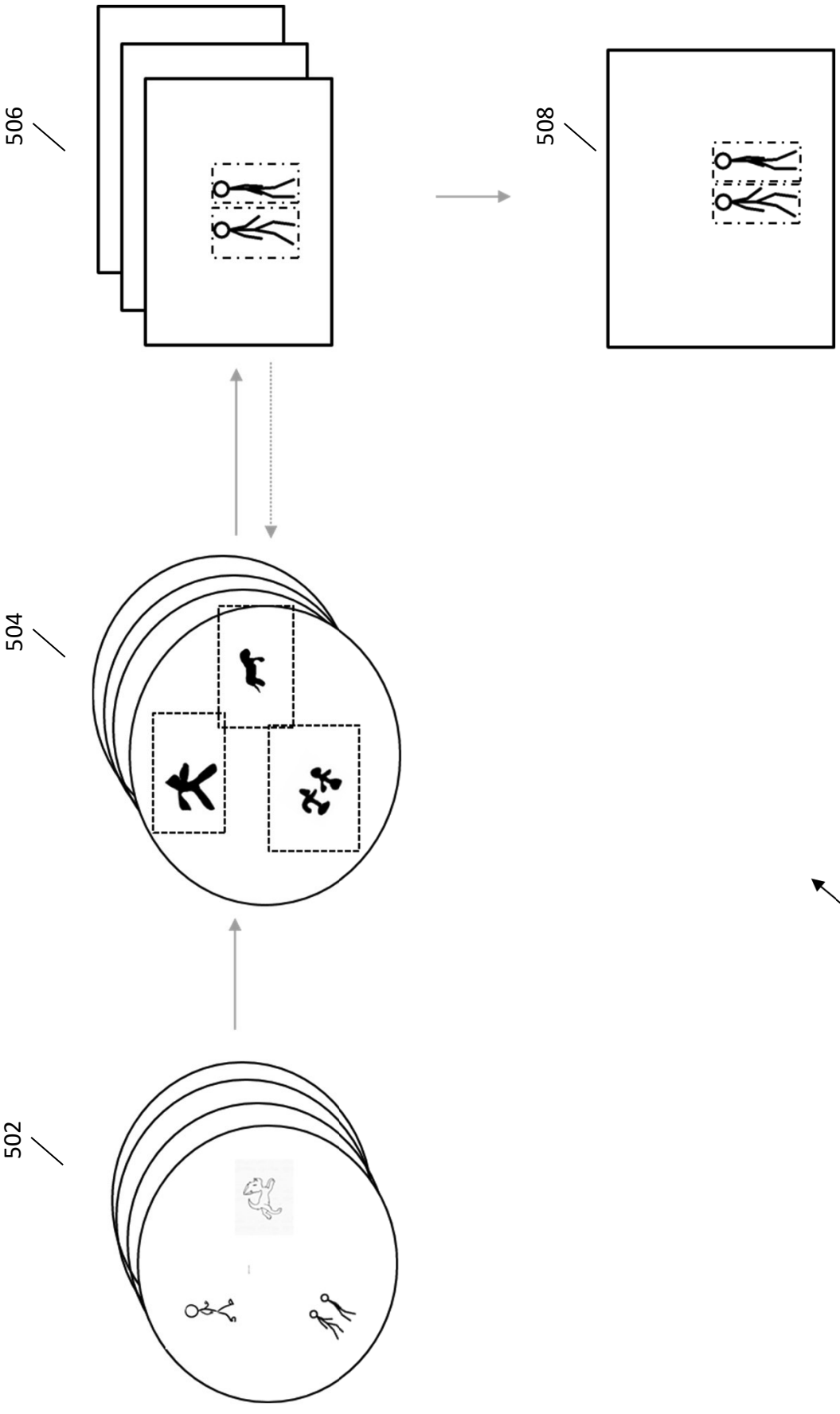


Fig. 5

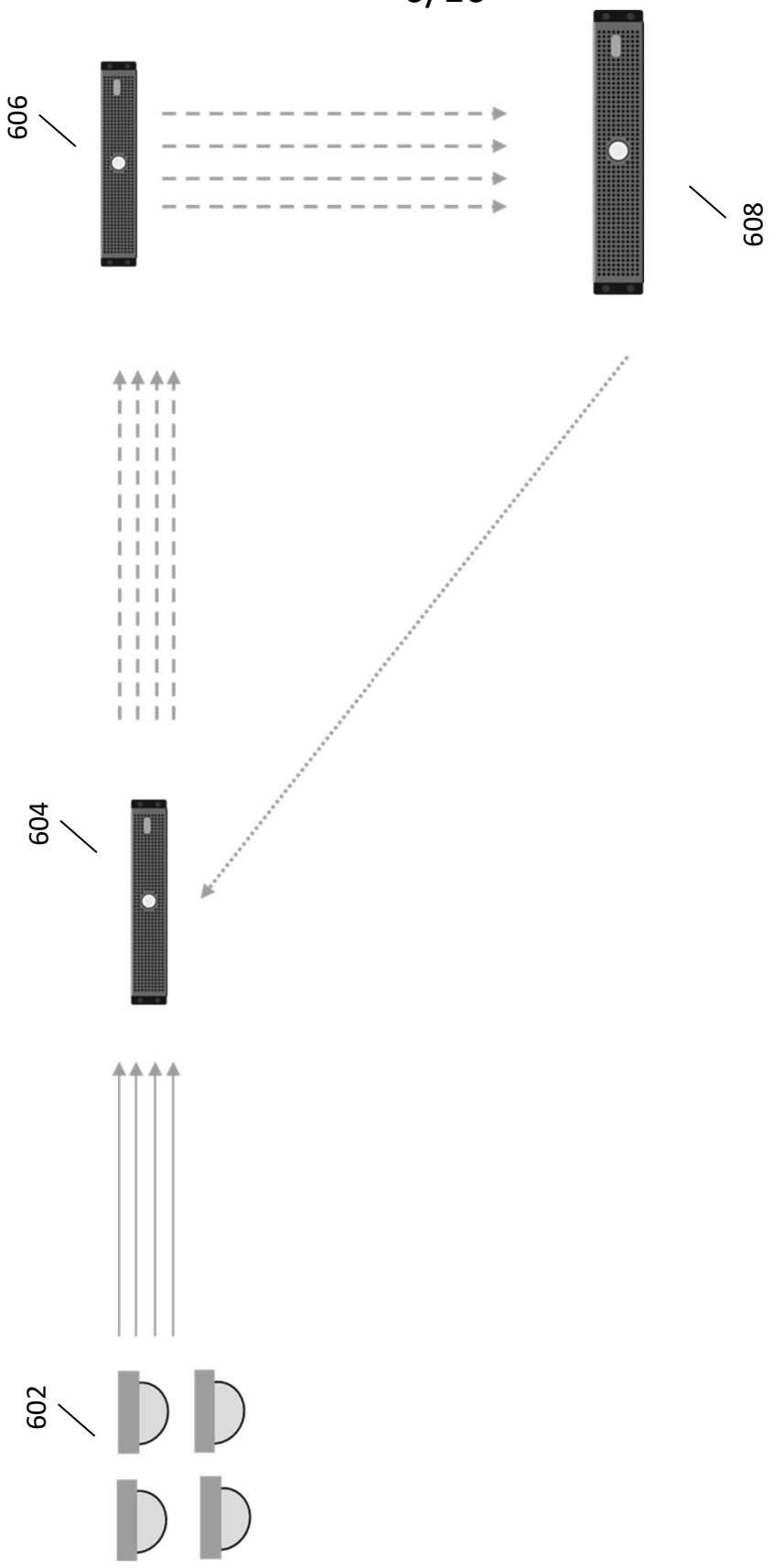


Fig. 6

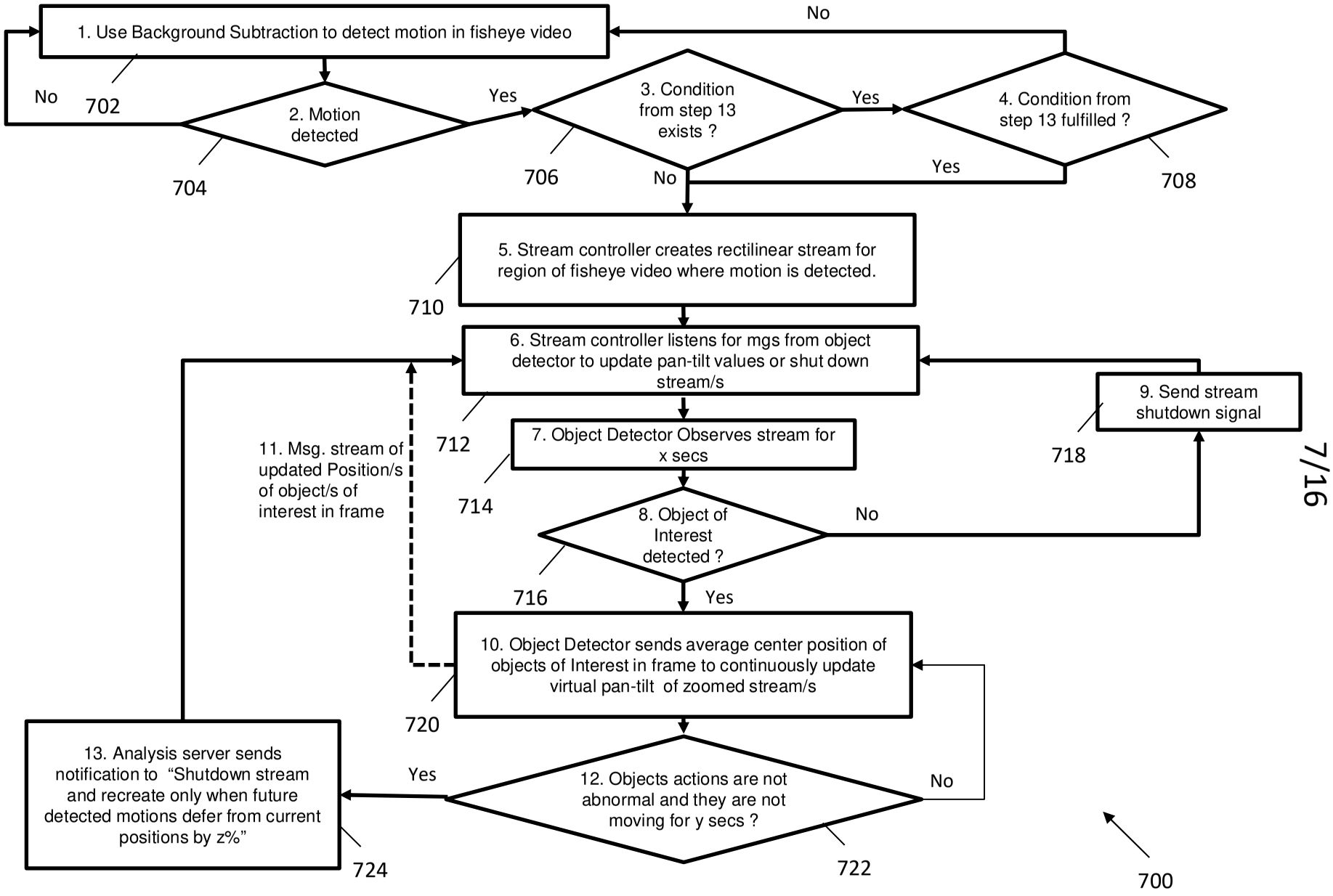

1. Use Background Subtraction to detect motion in fisheye video
No
No
702
2. Motion detected
Yes
704
3. Condition from step 13 exists ?
Yes
706
4. Condition from step 13 fulfilled ?
Yes
No
708
5. Stream controller creates rectilinear stream for region of fisheye video where motion is detected.
710
6. Stream controller listens for mgs from object detector to update pan-tilt values or shut down stream/s
712
9. Send stream shutdown signal
718
11. Msg. stream of updated Position/s of object/s of interest in frame
7. Object Detector Observes stream for x secs
714
8. Object of Interest detected ?
No
716
Yes
10. Object Detector sends average center position of objects of Interest in frame to continuously update virtual pan-tilt of zoomed stream/s
720
13. Analysis server sends notification to "Shutdown stream and recreate only when future detected motions defer from current positions by z%"
724
Yes
12. Objects actions are not abnormal and they are not moving for y secs ?
No
722
700
7/16

Fig. 7

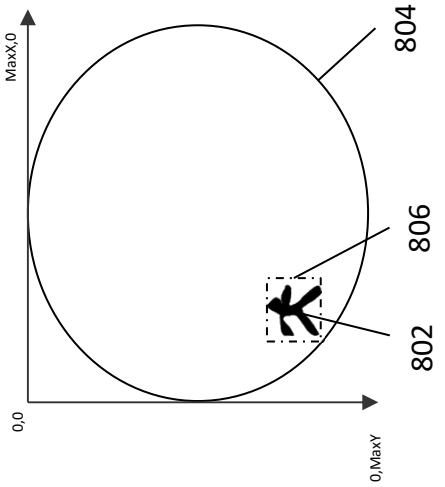


Fig. 8A

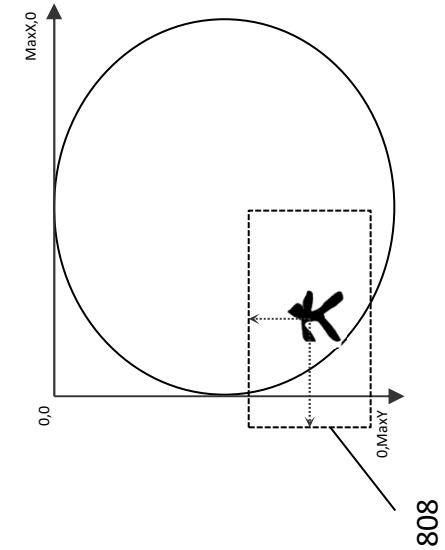


Fig. 8B

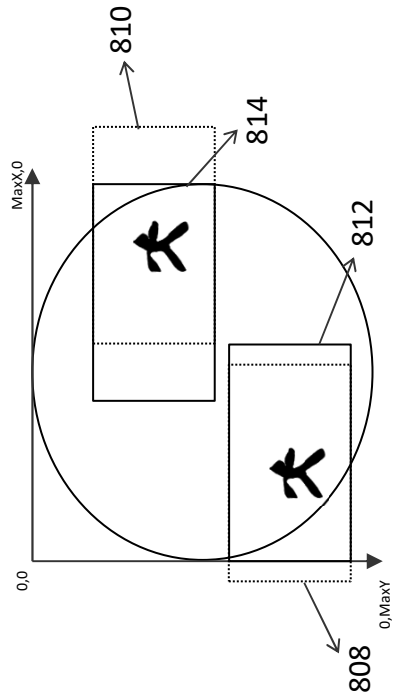


Fig. 8C

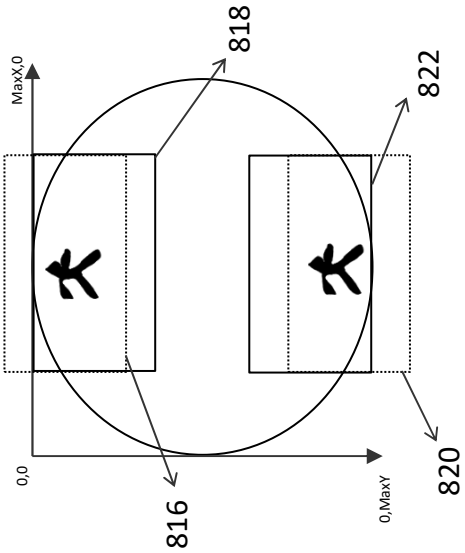


Fig. 8D

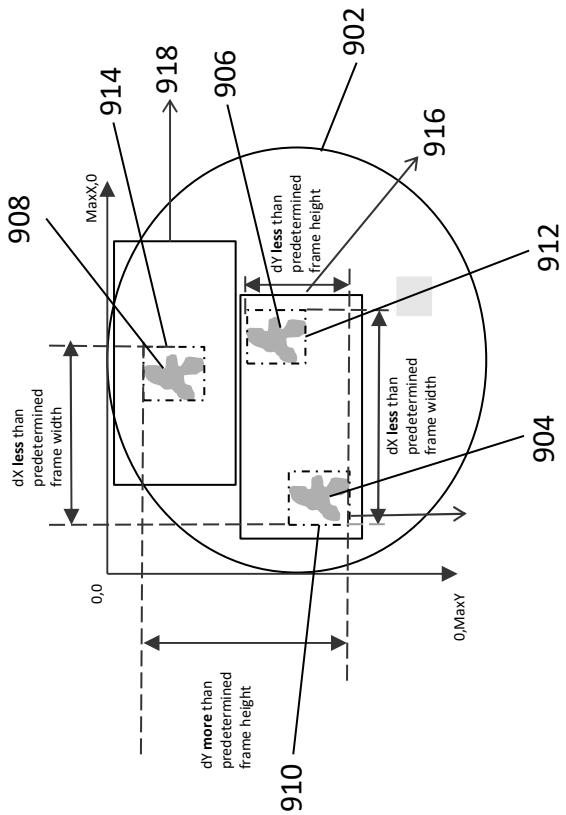

902
914
918
906
916
908
912
904
910
MaxX,0
0,0
0,MaxY
dY less than predetermined frame height
dX less than predetermined frame width
dX less than predetermined frame width
dY more than predetermined frame height
900

Fig. 9

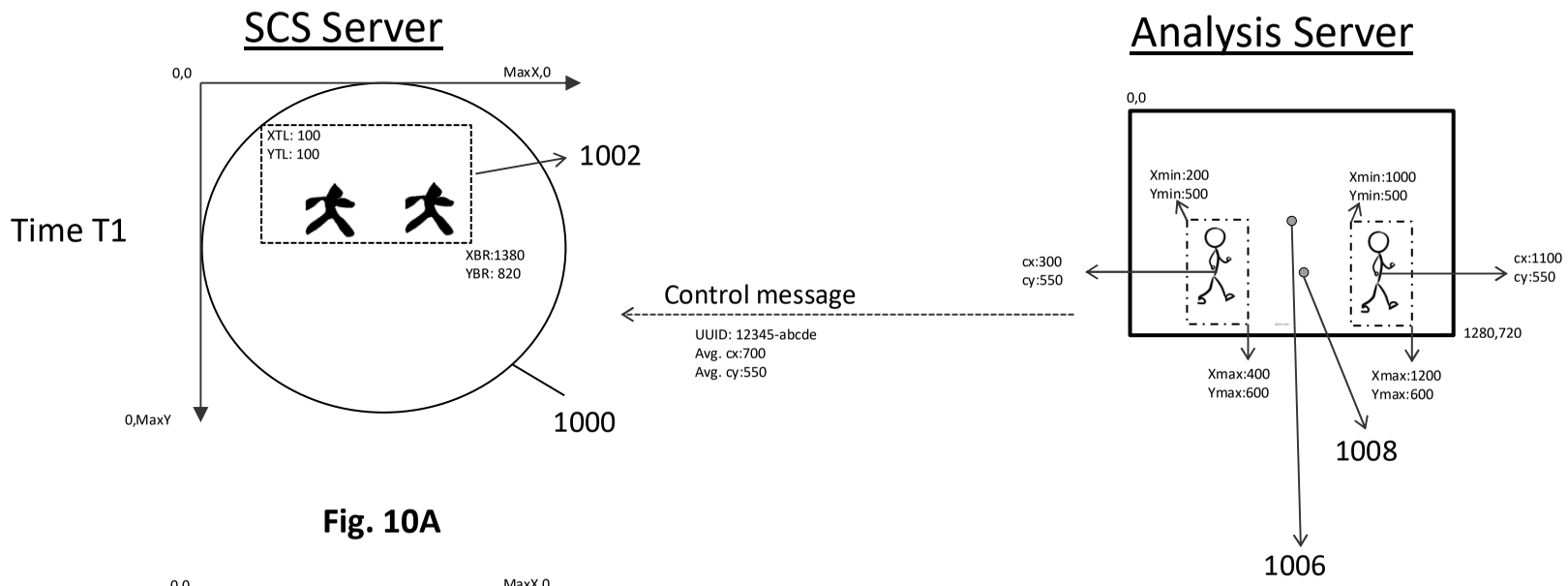


Fig. 10A

Fig. 10B

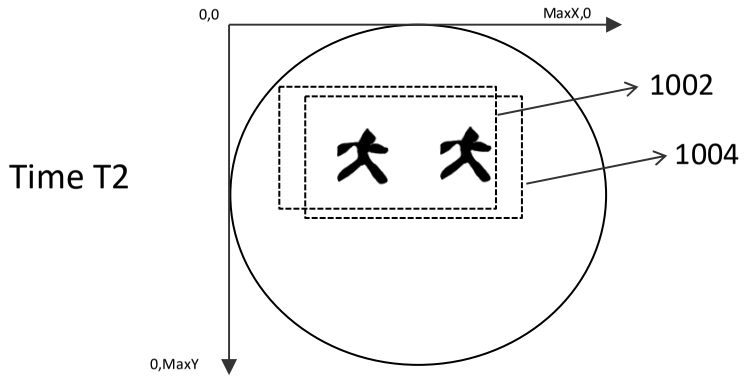


Fig. 10C

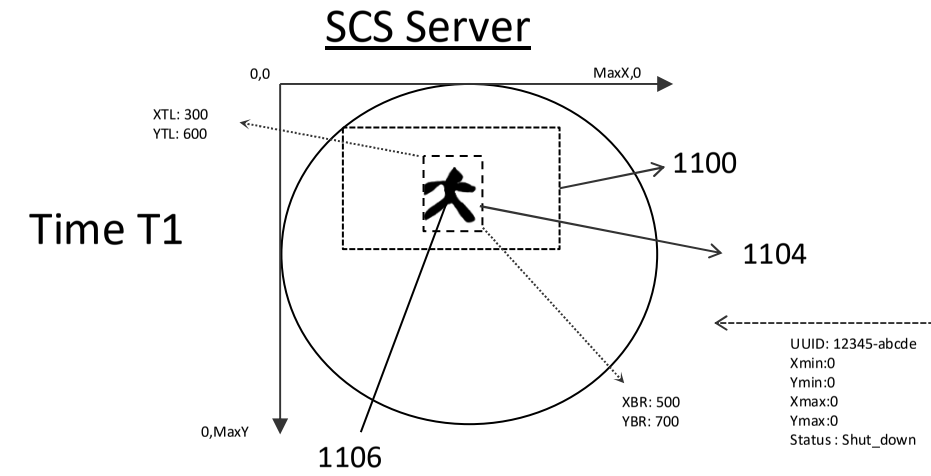


Fig. 11A

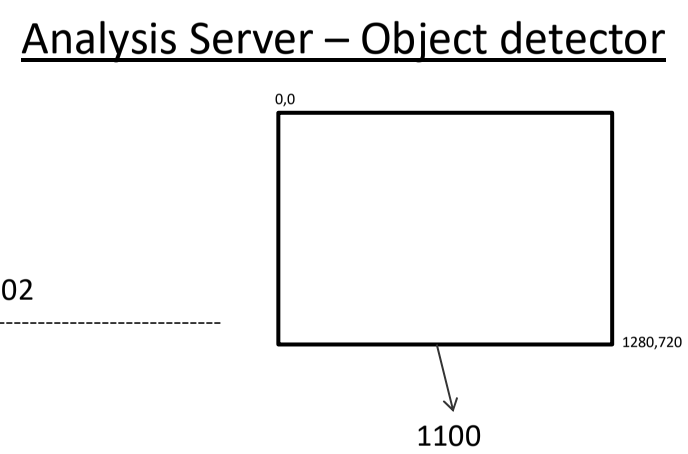


Fig. 11B

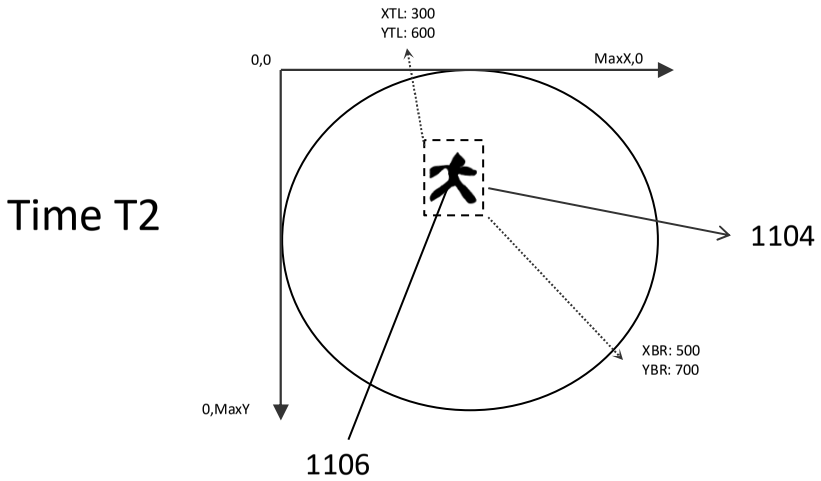


Fig. 11C

SCS Server

Time T1

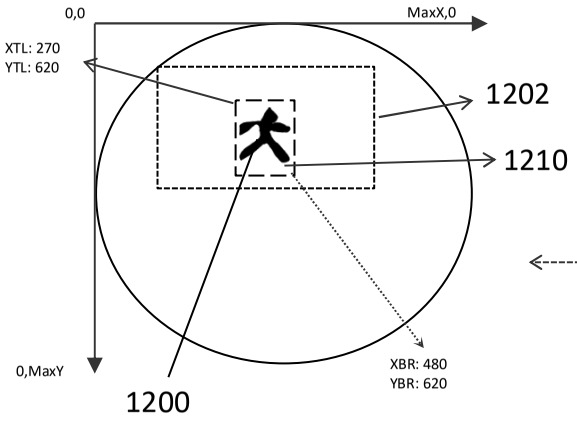


Fig. 12A

1206

UUID: 12345-abcde
Xmin:200
Ymin:500
Xmax:400
Ymax:600
Status : Shut_down
Start_up_overlap_min:10%
Start_up_overlap_max:50%

Analysis Server – Object Detector

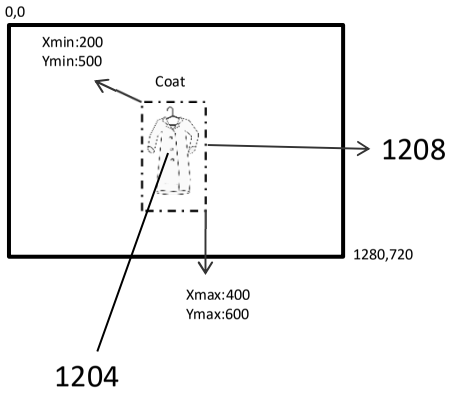


Fig. 12B

Time T2

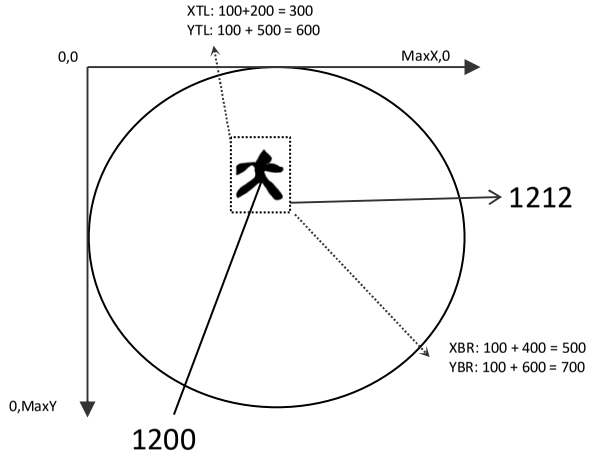


Fig. 12C

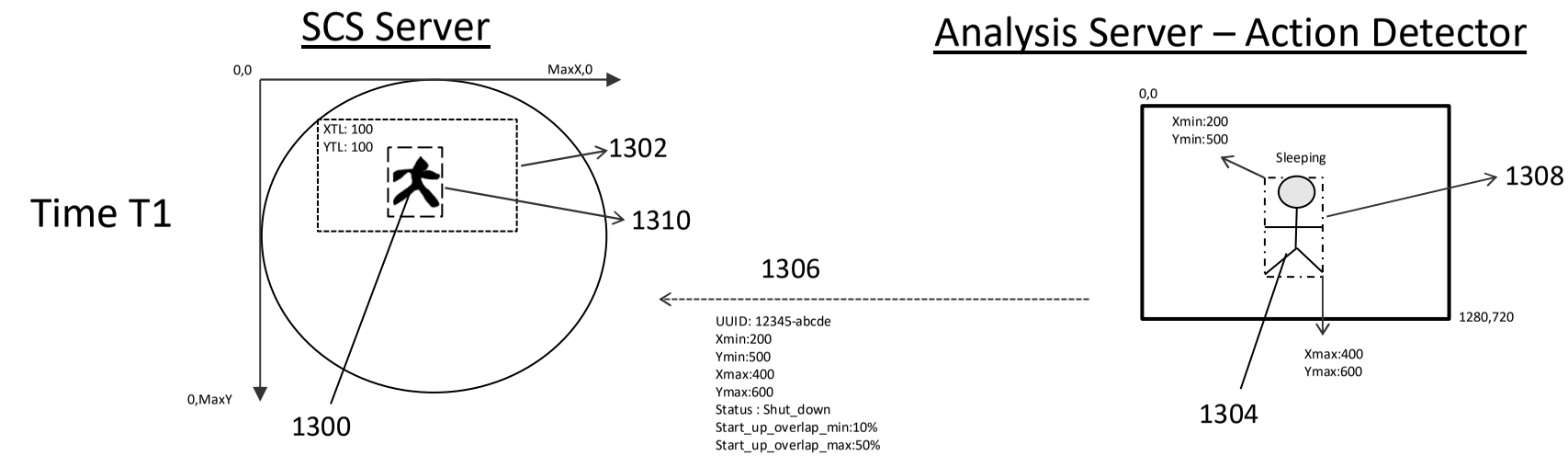


Fig. 13A

Fig. 13B

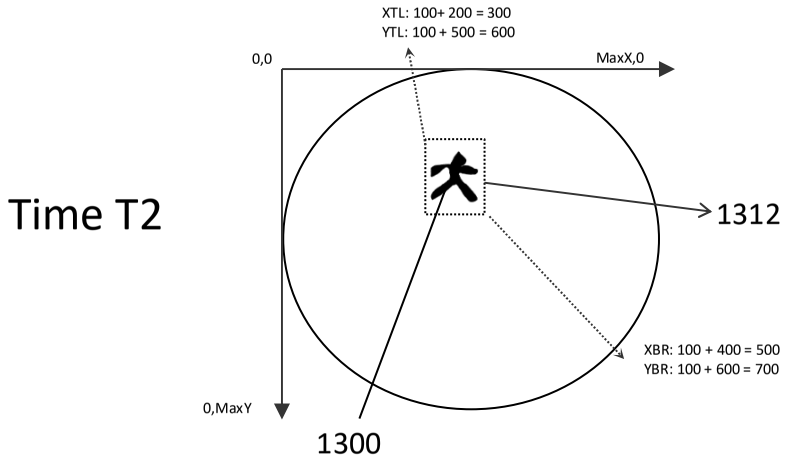


Fig. 13C

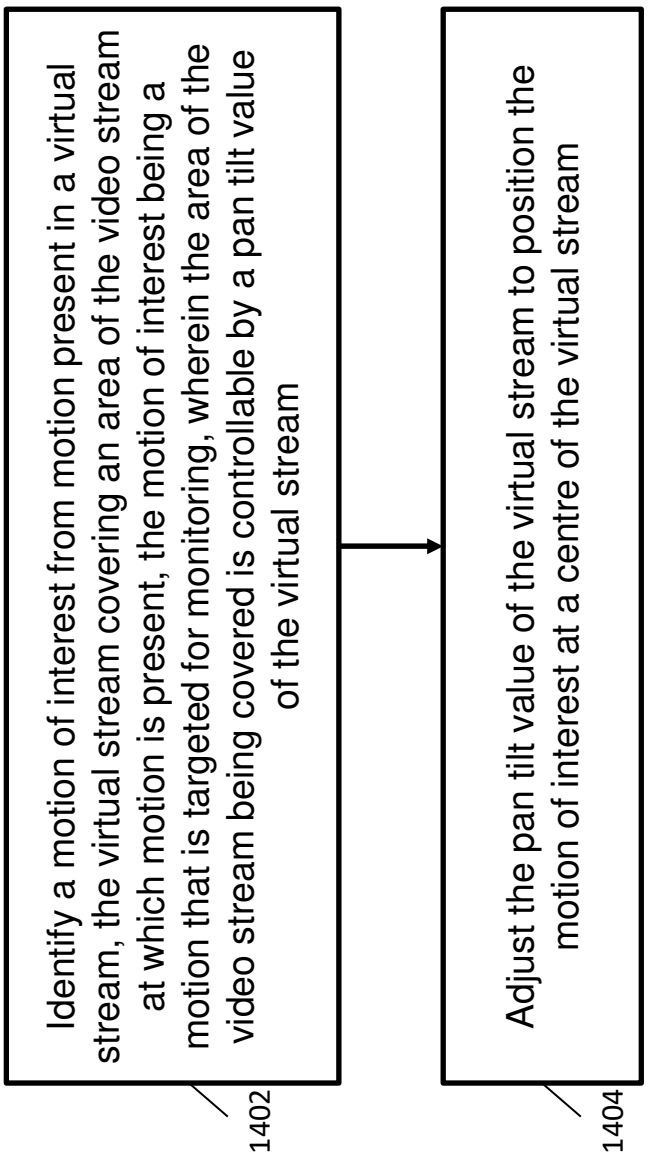

Identify a motion of interest from motion present in a virtual stream, the virtual stream covering an area of the video stream at which motion is present, the motion of interest being a motion that is targeted for monitoring, wherein the area of the video stream being covered is controllable by a pan tilt value of the virtual stream
1402
Adjust the pan tilt value of the virtual stream to position the motion of interest at a centre of the virtual stream
1404
1400

Fig. 14

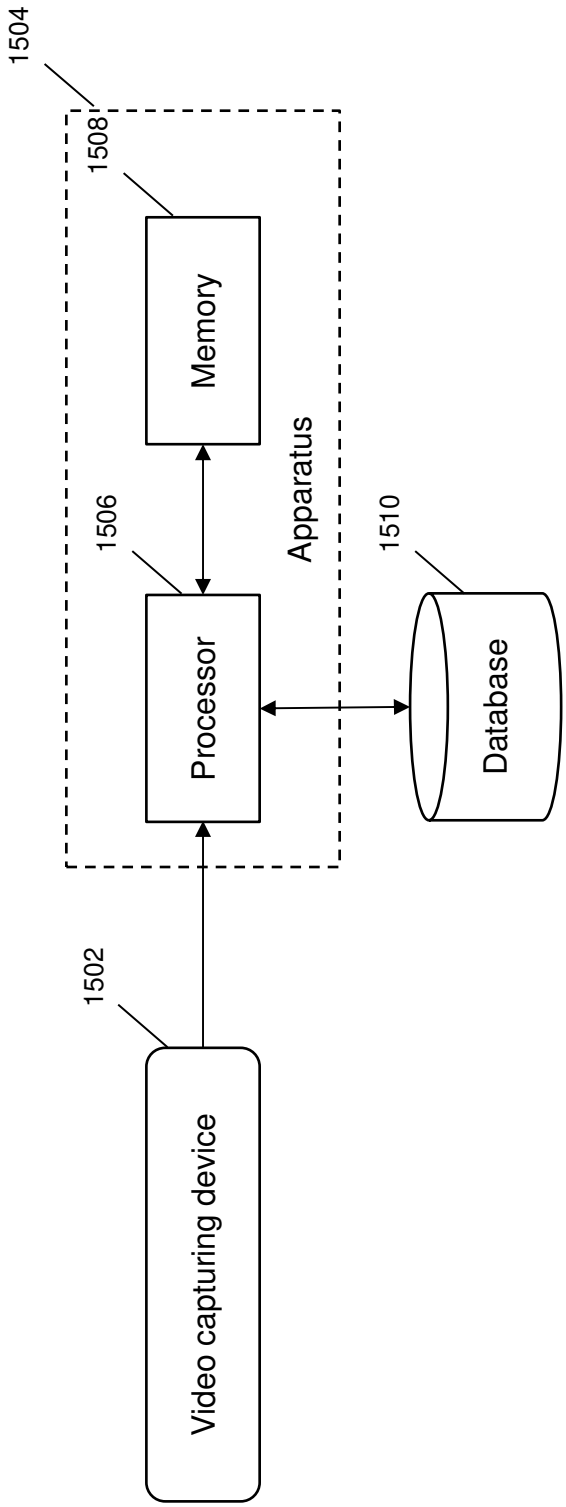

1504
1508
Memory
Apparatus
1506
1510
Processor
Database
1502
Video capturing device
1500

Fig. 15

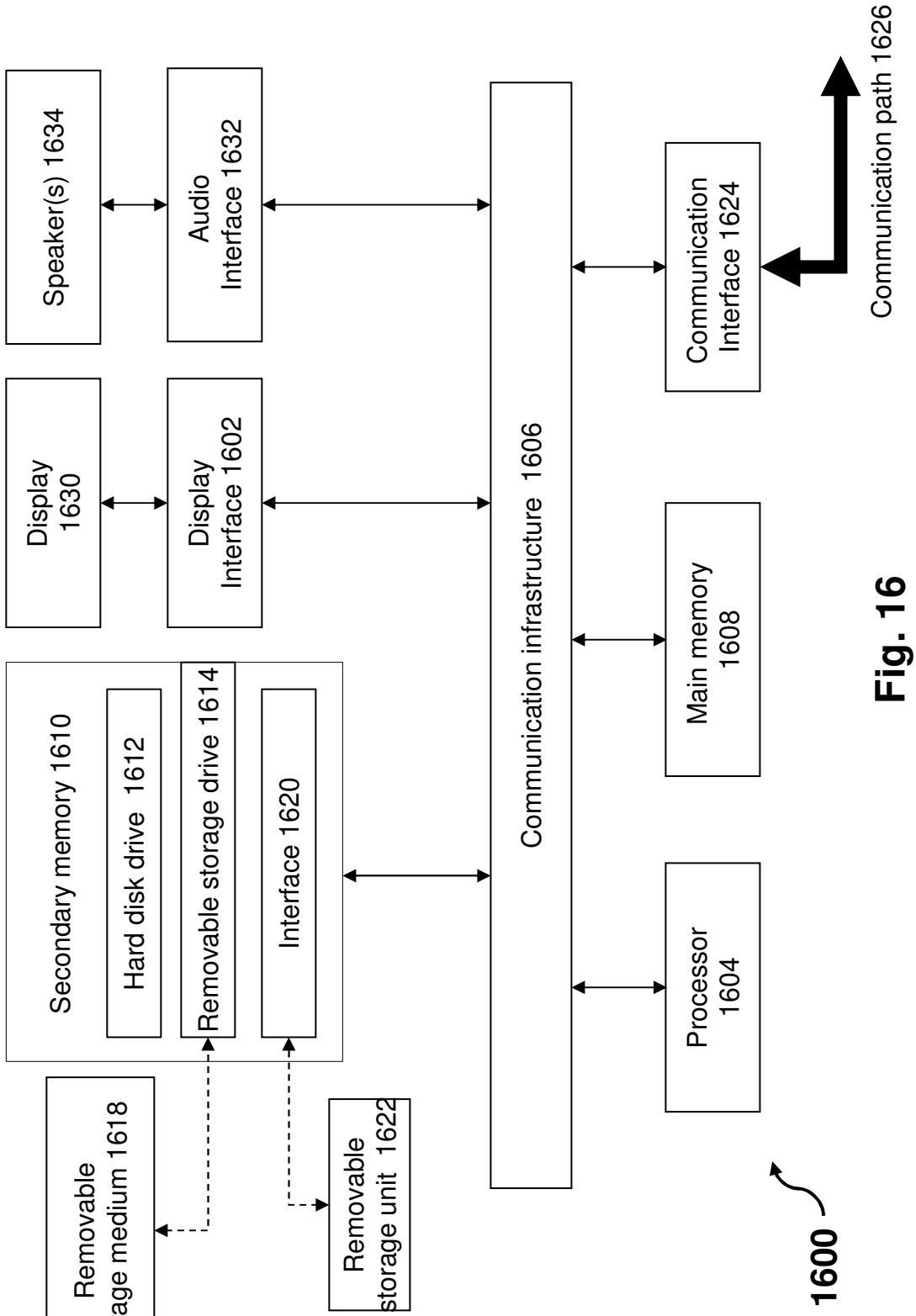

Speaker(s) 1634
Audio Interface 1632
Display 1630
Display Interface 1602
Secondary memory 1610
Hard disk drive 1612
Removable storage drive 1614
Interface 1620
Communication infrastructure 1606
Communication Interface 1624
Communication path 1626
Main memory 1608
Processor 1604
Removable storage medium 1618
Removable storage unit 1622
1600

Fig. 16