Description

Title of the Invention: System and Method of Adaptive Synchronization between Sensors

In this patent, a method of adaptive synchronization between radar and camera with a varying frame rate is devised. The method includes the following processing steps. In the first step, the image is processed by image segmentation to classify dynamic or in motion targets and static or stationary targets. In the second step, the point cloud of radar is processed by point cloud segmentation system to classify dynamic targets and static targets. This is achieved by applying the Doppler fitting based on the target information of Doppler and direction of arrival. In the third step, given a radar frame-k, required sets of image frames from k-L to k+L will be used to overlap with the radar point cloud. Since radar point cloud and image have different formats, firstly the radar point cloud is converted into 2D image in this case. For each radar-camera frame pair, the overlapped radar and camera images is assessed by the metric of rate of overlay (ROO). ROO evaluates the number of dynamic points in the point cloud that are overlapped with dynamic targets in the image. Based on the maximum ROO, the synchronization is determined.

Claims

Claim 1: An adaptive system synchronizing radar and camera with varying frame rate is developed.

Claim 2: A subsystem of image processing from claim 1 that segments the image into dynamic and static targets.

Claim 3: A subsystem of point cloud processing from claim 1 that segments the radar point cloud into dynamic and static targets.

Claim 4: A claim 1's subsystem of overlapping the radar point cloud with images and evaluating the rate of overlay.

Claim 5: In claim 4's system, radar point cloud is converted into 2D (two/2 dimensional) or ND (nth dimensional) image and then overlapped with the respective image.

Claim 6: In claim 4's system, for the evaluation of the rate of overlay, the dynamic targets are used.

Claim 7: In the final step the synchronization is determined based on the frame of image which has the maximum rate of overlay with the radar point cloud.