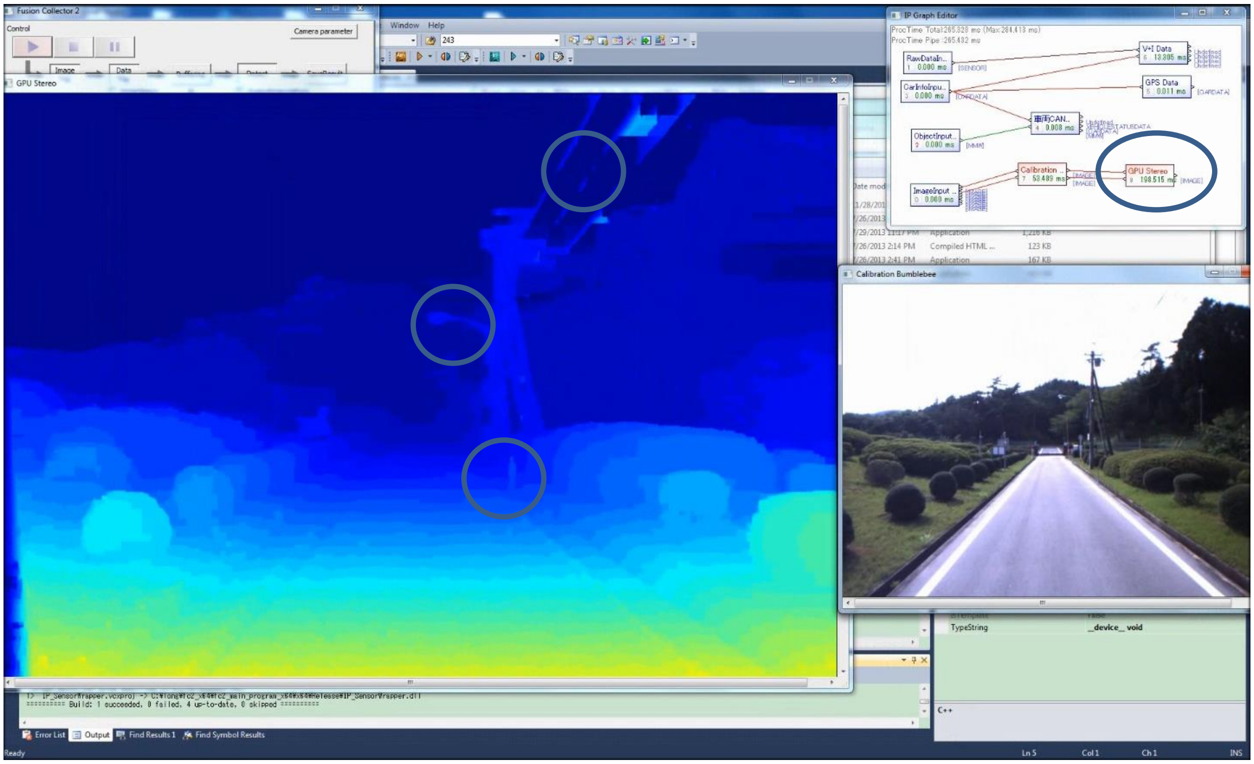
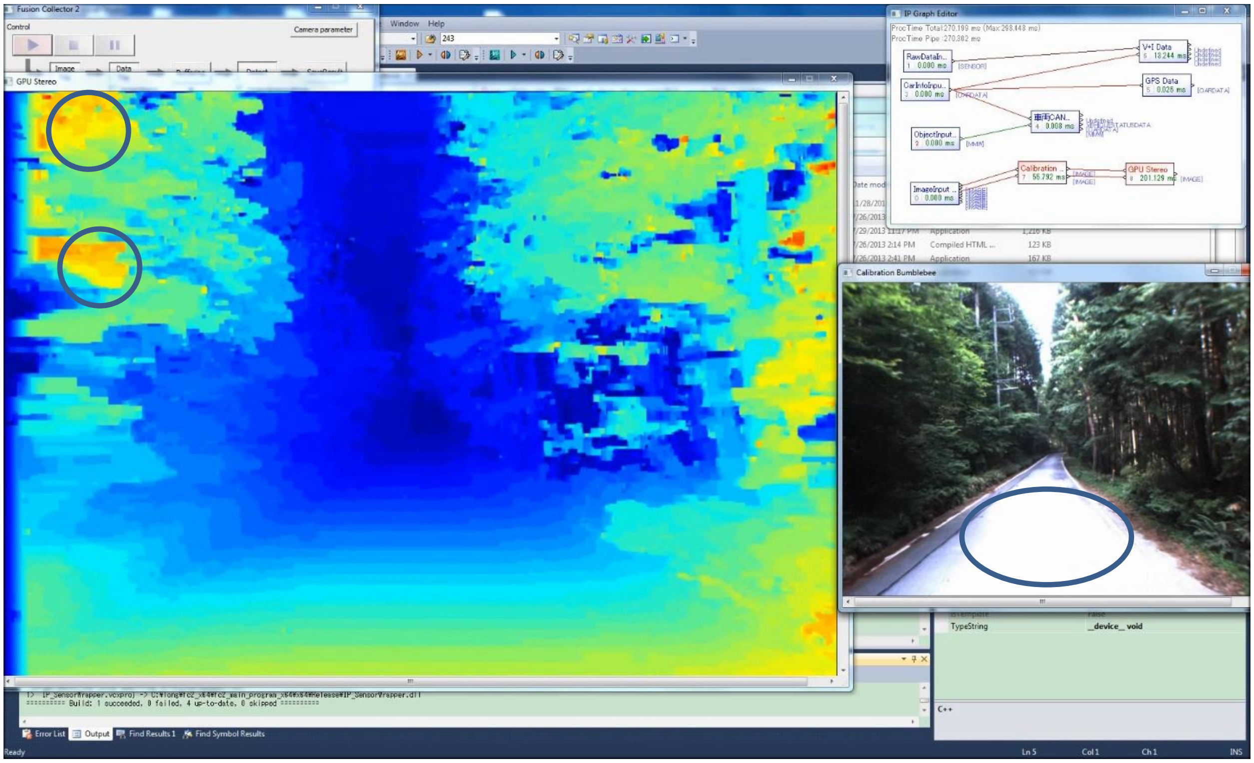
- Movie1.mp4



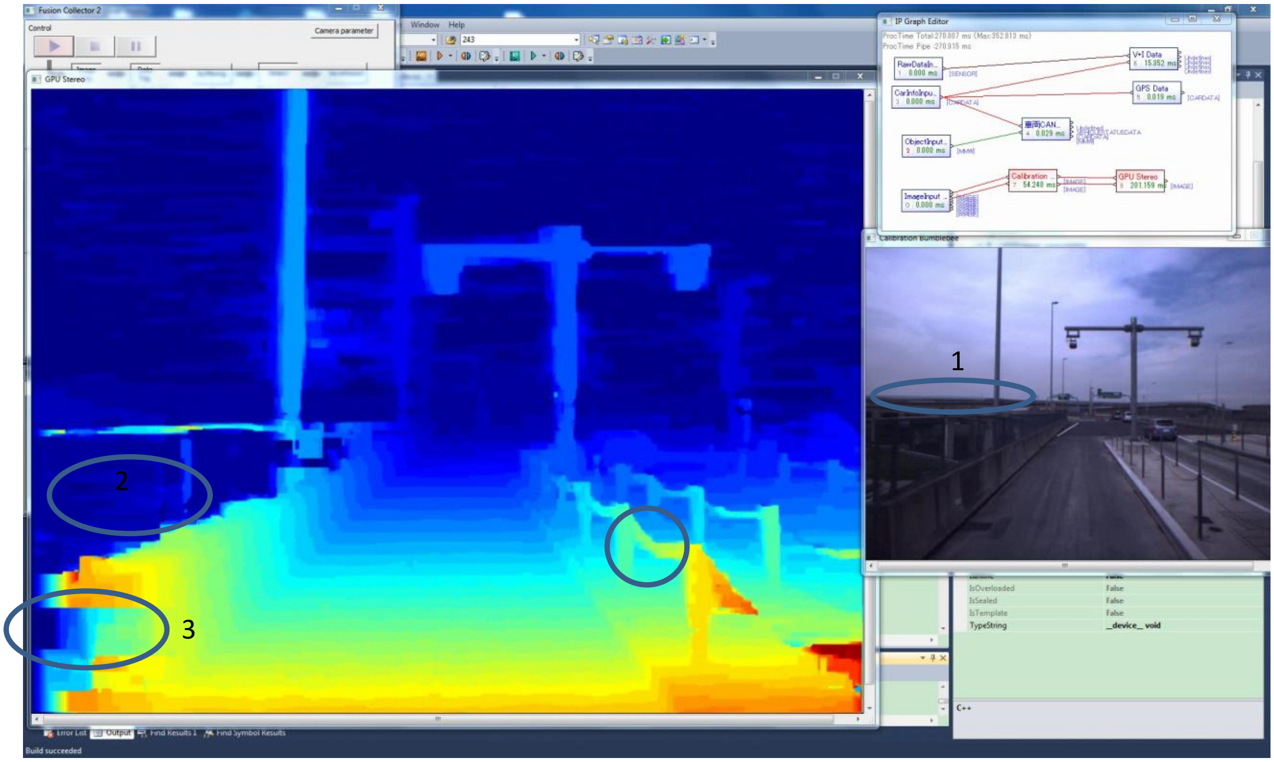
In the movie, the disparity map shows clear edge of objects in the scene. The circled objects in scene are hard for other stereo matching algorithms. Our algorithm can generate correct results for these small objects because Viterbi process is sensitive to edge in disparity map and the merging process can keep this sensitivity. The eclipse shows the running time of stereo matching module is 198.5ms, which include the algorithm's 196ms and the module's several milliseconds for data synchronization and process scheduling.

- Movie2.mp4



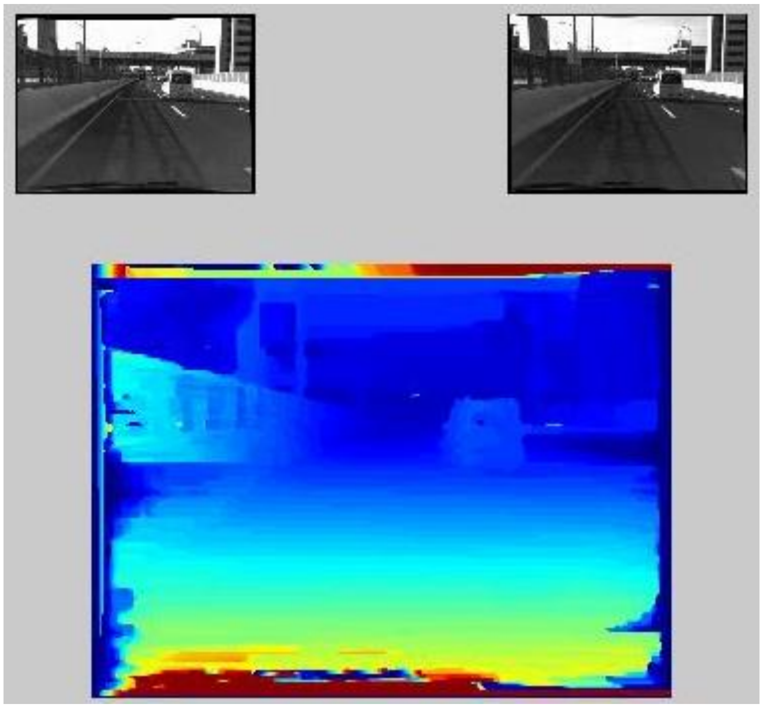
The eclipse area is saturated due to the strong sun shine. Normal stereo matching algorithm such as SGBM will generate a big “hole” for this area just as shown in Fig. 4(d) of the paper about ideal image experiments. Our algorithm performs well because of TV constraint. The circle areas show the edge of branches of a tree generated by our algorithm. These parts are hard due to complicate shape, variable luminance and strong motion blur. Our algorithm can handle these problems because SSIM is robust to these factors.

- Movie3.mp4

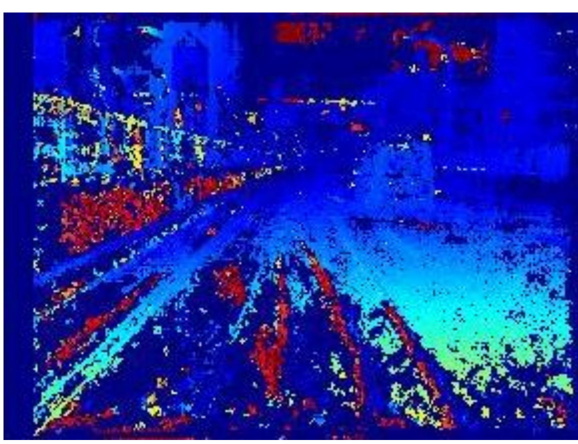


This movie shows a very complicate scenario and the luminance also changed significantly when our vehicle passed the traffic checkpoint. The circle area in the captured image shows that our algorithm can keep the small chain in disparity map, which is important for autonomous driving. Three eclipse areas show three main failure cases of our algorithm. The first one is the horizontal line which is parallel to the baseline of the stereo camera. The second one is the transparent glass. The third one is the big occluded area, which is the most left part of left image. There is no information of this area in the right image. The anther failure case is mirror or specular reflection area, which is not presented here. All these failure cases are also hard to other stereo matching algorithms.

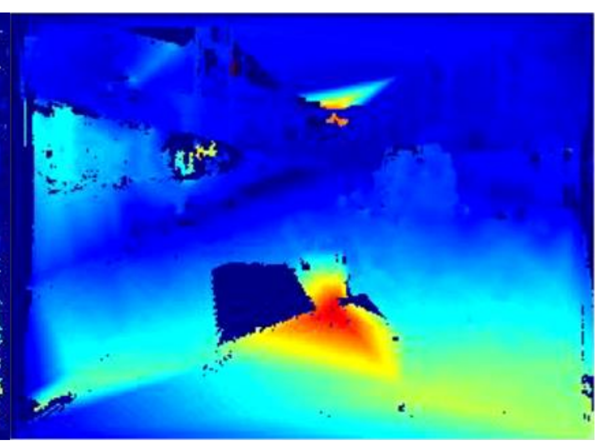
- Movie4.mp4



This movie is composed of three videos. The left and right images are captured by a stereo camera installed behind the vehicle windshield. There are significant nonlinear epipolar line distortions between image pairs caused by windshield and long time driving. The performance of our algorithm only degrade a little compared with the case when the stereo camera is installed ourside vehicle. It should be noted that the edge part in the disparity map is not real error, which is caused by uncropped curve part generated by camera calibration. SGBM and ELAS will keep generating errors for every frame at this situation as shown in the following figures.

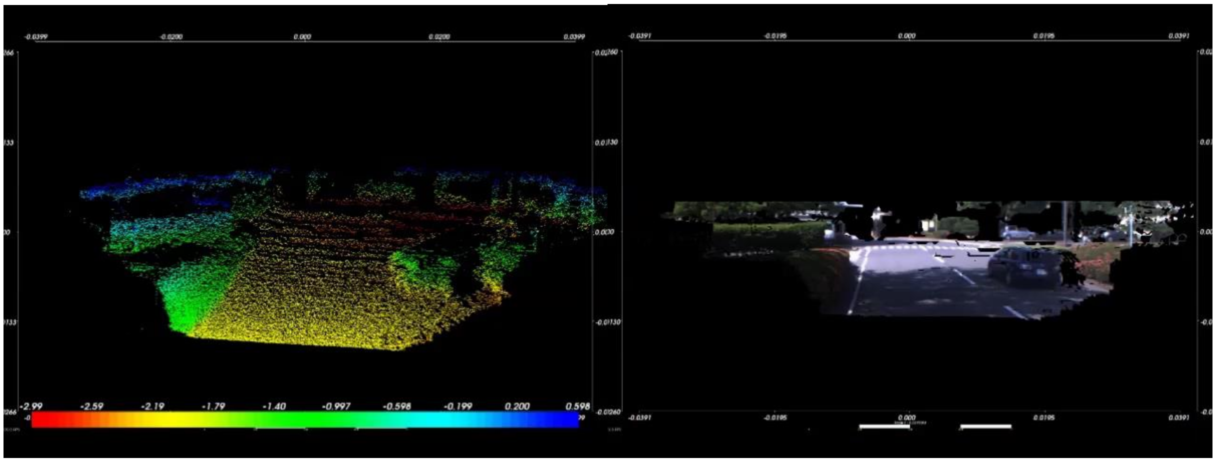


SGBM result



ELAS result

- Movie5.mp4



This movie is composed of two videos. The first video shows the 3D point cloud from the disparity map generated by our algorithm. The color of points in the video represents the physical height of corresponding 3D point. The second video shows the same 3D point cloud. However, the color of points in this video is mapped from the corresponding pixels in the original image.