

**Abstract:**

While blind spots around a vehicle may not be the consequential factor that causes car mishaps, those areas take up a great deal of driver's attention while driving. In this talk, an approach to generating orthographic-view surround images of a vehicle using multiple fisheye video cameras mounted around the vehicle is presented.

The proposed approach is divided into two stages: an off-line and an on-line stage. There are six steps involved in the off-line stage: fisheye camera calibration, shape distortion recovery, vignetting compensation, top-view transformation, view integration, and table generation. Each step estimates a number of parameters, whose values are finally combined in a table, called the orthographic-view generation (OVG) table.

The on-line stage consists of three steps: orthographic-view image generation, image blending and 3D reconstruction. In the orthographic-view image generation step, images acquired by the fisheye cameras are integrated into a single image surrounding the vehicle simply by way of OVG table look-up. In the image blending step, the differences in both intensity and color among constituting images are compensated for one another. The spatial structures of the scene are finally recovered in the 3D reconstruction step. Extensive experiments with a robotic vehicle demonstrated that the proposed approach can effectively generate the sequence of orthographic-view surround images of a vehicle in real time.

As to the automatic parking system of a vehicle based on its orthographic-view surround images, I will demonstrate some experimental results but leave its details to a future talk if possible.