Generation of Roadside Panoramic Images without Obstacles

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1. INTRODUCTION
This paper presents the method for generating panoramic
image(s) from plural in-vehicle camera images. Our real-
world map system employing the proposed method has the
following features: 1) it puts the generated panoramic im-
gees of the real-world to an existing web map, e.g., GoogleMaps,
2) partial regions in the images are classified according to the
depth from the camera by tracking each partial region em-
ploying the SIFT feature, so that 3) it can obtain panoramic
background images that exclude obstacles, e.g., parked vehi-
cles. Our updatable real-world map system can offer up-to-
date information to map-based systems, e.g., car navigation
system or web interface any time.

2. DEPTH-BASED CLASSIFICATION
A monocular video camera is mounted in the center of the
left side window of a test vehicle and faced towards the left
side of the car. The in-vehicle camera captures the scenery of
the road side while driving. A GPS receiver is also mounted
in the vehicle and each captured image is annotated by its
location information. Figure 1 shows sample images of every
5 frames. Two pickup trucks are parked on the roadside and
occludes the background buildings as shown in Figure 1.

Our idea is to cluster feature points into similar depth re-
gions according to their movement speed between frames.

The distance of corresponding feature points between two
frame images reflects the depth to the region they belong to, i.e., a feature point moves faster if it is nearer to the
camera. We can classify the projected objects in the cap-
tured images into similar depth regions by grouping feature
points according to their movement speed. We employ the
SIFT feature extraction method to correctly associate cor-
responding feature points between frames.

Figure 2 shows the panoramic image of the background
buildings generated by unifying the slowest regions accord-
ing to the amount of movement of feature points. The uni-
fication is overall successful, although the system could not
recover the region where the obstacles fully occluded. Also
some part of the background was misclassified as vehicle
region and some of the vehicle as the background mainly
around the border of the regions.

3. FUTURE WORKS
This paper presented the method for generating panoramic
image by classifying regions in frame images according to the
amount of movement. The method is simple and was over-
all successful. However, it is necessary to accurately divide
regions on the border of the subjects. Also to update the
generated images by following the change of the real-world,
the system should detect the changes of the background.