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ROBUST SIGNBOARD RECOGNITON IN THE PRESENCE OF OCCLUSION AND REFLECTION

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Abstract. *Recognizing objects for visual information in outdoor scenes is very useful but challenging. This paper presents a new framework to recognize signboards with uniform color regions in the presence of occlusion and reflection. The framework is composed of three stages: (i) extraction of uniform color regions by adaptive rank filter and piece-wise linear approximation, (ii) recognition by template matching, and (iii) verification by relative color polygons. In the experiments, we used 300 images taken under a great variety of adverse conditions including occlusion, reflection, specular highlights, and so on. The proposed system achieved 98% recognition rate for images taken under such bad conditions. Moreover, it can be extended for vision-based car and pedestrian navigation systems to provide up-to-date information to the users and potentially be embedded in a driver assistance system.*

Keywords: Uniform color region, Occlusion and reflection removal, Adaptive rank filter, Piece-wise linear approximation, Template matching

1. **Introduction.** Until now, object recognition in outdoor scenes has been one of challenging tasks, and widely taken up in many applications. Large amounts of visual information are embedded in natural scenes. In this paper, we focus on a recognition system of planar objects in outdoor scenes. Signboards are good examples of planar objects. Our proposed recognition system can be extended for vision-based car and pedestrian navigation systems by providing up-to-date information in line with user's requirements such as convenience store, parking conditions, road construction, gasoline-price, and so on. The important thing is the fact that almost all images of these target objects are composed of Uniform Color Regions (UCRs).

Most recognition systems typically involve the extraction of target features such as parts [1], components [2], and fragments [3] at the first step and their combination at the next step. H. Wersing and E. Korner [4] proposed the method using hierarchical processing for