

Multiple Object Recognition and Scene Interpretation for Autonomous Road Vehicle Guidance

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Abstract

The seeing car VaMoRs-P is the next step of development in computer vision for autonomous road vehicle guidance at the 'Universität der Bundeswehr Munich' (UBM). As one of the key functions, the module 'obstacle detection and tracking (ODT)' has been developed since 1991; with several thousand kilometers of autonomous test driving a state of high reliability has been reached. For vehicles in the own lane the well known extraction of the left and right object boundaries using fast contour analysis is performed [1]. Additionally, a new approach for recognition of vehicles in the neighboring lanes and those approaching from the rear is being developed. The lower object boundary detection using a knowledge based edge chaining algorithm and a special edge detector is presented.

VaMoRs-P is equipped with four miniature CCD-cameras with different focal lengths mounted on two platforms viewing to the front and rear of the own car. For obstacle detection a range of 6 up to 120 meters distance in the own and the neighboring left and right lane is achieved. For collision avoidance and autonomous overtaking of slower driving road users a minimum number of 4 or 5 objects must be tracked in parallel. For this task ODT comprises about 15 transputers for image processing and state estimation.