

Design and Implementation of a Counting and Differentiation System for Vehicles through Video Processing

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Abstract : This paper presents a self-sustaining mobile system for counting and classification of vehicles through processing video. It proposes a counting and classification algorithm divided in four steps that can be executed multiple times in parallel in a SBC (Single Board Computer), like the Raspberry Pi 2, in such a way that it can be implemented in real time. The first step of the proposed algorithm limits the zone of the image that it will be processed. The second step performs the detection of the mobile objects using a BGS (Background Subtraction) algorithm based on the GMM (Gaussian Mixture Model), as well as a shadow removal algorithm using physical-based features, followed by morphological operations. In the first step the vehicle detection will be performed by using edge detection algorithms and the vehicle following through Kalman filters. The last step of the proposed algorithm registers the vehicle passing and performs their classification according to their areas. An auto-sustainable system is proposed, powered by batteries and photovoltaic solar panels, and the data transmission is done through GPRS (General Packet Radio Service) eliminating the need of using external cable, which will facilitate its deployment and translation to any location where it could operate. The self-sustaining trailer will allow the counting and classification of vehicles in specific zones with difficult access.

Keywords : intelligent transportation system, object detection, vehicle counting, vehicle classification, video processing

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