TRANSPARENT TECHNOLOGY

TRAFFIC COUNTER

DETECTION SYSTEM WITH MULTI-PURPOSE SENSORS

City traffic flows can give rise to issues of different kinds, in terms of traffic management, environmental problems and productivity. The technology currently used in this field includes predictive models and costly sensors that identify macro flows but naturally cannot offer information on unexpected situations like accidents or gridlocks. The rise in the use of common webcams and broadband, and the internet of things paradigm, can contribute to the solutions currently available by supplying detailed data that can be extrapolated using modern algorithms to process images and video flows.

THE SOLUTION

Traffic Counter is a software solution that processes data on the intensity of traffic flows using common devices like webcams, which in this context are deployed as multi-purpose sensors.
The video flows captured along set stretches of road or at junctions - optical flows – are processed by the software.

Figure 1 – The various stages in the application of the algorithm

Developed in collaboration with the "Formal Methods" group of the Department of Automatic Technology and IT of the Turin Politecnico - http://fmgroup.polito.it -, the algorithm analyses video images over a certain period of time, constructing a model of the traffic flows based on saved data regarding vehicles in transit. The system distinguishes between different types of movement, so as not to include pedestrians in the count, or other moving elements in background that can modify the environment where the software performs the count. A tree moving in the wind, or a pedestrian crossing the road at an unofficial point could in fact give rise to errors in the count.
The smart algorithm used is however capable of distinguishing between any background movements and the trajectory of the vehicles, which is faster and more linear.

Figure 2 - Visual feedback on the images streamed by the webcam

TECHNICAL CHARACTERISTICS

The system is based on OpenCV libraries (made open source by Intel and written in C/C++), and applies different computer vision algorithms. It also offers visual feedback of the vehicles identified, because the result of the processing is noted on the image itself with a circle that follows the moving vehicle. This highlighting system follows the vehicle's movements, projecting it on the line that models the average trajectory of vehicle flows on the road.
Traffic counter captures video flows in WebM format but can be extended to other video formats and can also be customised to detect different types of traffic flow, for example flows approaching or leaving a roundabout, at a junction or on a single stretch of road, or identify different types of object like pedestrians or particular vehicle types.
The algorithm developed functions in such a way that it does not have specific image requirements, meaning that the counting function can be activated not only on a specific stretch of road or gateway but on the entire image which can present simultaneous several flows at the same time.

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