

Development of a System of Traffic Control Using Digital Cameras

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ABSTRACT

This study aims at the development of a system for the visual monitoring of traffic and the determination of the actual speeds of moving vehicles. This system employs several modern technologies including those of photography via digital video cameras and analysis of photos. The goal of the system is to establish an alternative technology that should replace the current radar technology, thanks to the several merits enjoyed by the new technology such as precision and efficiency of operation and possibility for a multitude of utilizations. The basic goal of the system is the assessment of speeds of moving vehicles through the analysis of successive video photos, as well as the recording of events for future display when the need arises. The system allows for great flexibility in its application. It can be used in monitoring roads, controlling the flow of traffic, taking snapshots or photographs for traffic accidents as well as criminal activities, and monitoring and recording entry and exit of vehicles from important sites.

The system is adaptable for work under various atmospheric conditions and has a continuous availability for 24 hours per day. The system is remotely controlled from control and command rooms (operation rooms), within cities, wherein photos are either directly transmitted via the Internet or temporarily stored at the camera's site. To achieve this, the system employs the most modern types of digital cameras and links these cameras with the main servers. As a result, the system can help in detecting traffic and criminal violations, and in identifying those who commit such violations. The system might contribute to organizing traffic flow and spotting crowded roads and squares that jam and obstruct traffic resulting in prohibitively lengthy queues. The system has a role in reducing the size of security personnel to be deployed into city and inter-city roads.

To achieve this, it is necessary to have central control rooms that supervise and make appropriate decisions for these roads. The system offers a means for documenting and retrieving pertinent information for all types of accidents by recording such information and storing it in high-capacity storage media. The applications necessary for implementing the system were designed and written in terms of the programming language: Microsoft visual C#.net. The results and outputs were saved within the database of the MS SQL Server. We have also studied the various characteristics and features of digital cameras and methods for operating them. After implementing the system, we have executed several field samples, and recorded the results after analyzing and manipulating them. Thereupon, we extracted the statistics and indices for the system effectiveness.