



Chapter IX

M-Traffic: Mobile Traffic Information and Monitoring System

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Abstract

Traffic information is crucial in metropolitan areas, where a high concentration of moving vehicles causes traffic congestion and blockage. Appropriate traffic information received at the proper time helps users to avoid unnecessary delays, choosing the fastest route that serves their purposes. This work presents Mobile Traffic (M-Traffic), a multiplatform online traffic information system, which provides real-time traffic information based on image processing, sensor's data, and traveller behaviour models. This system has a modular architecture that allows it to easily be adapted to new data sources and additional distribution platforms. In order to estimate route delay and feed the optimal routing algorithm, a traffic microscopic simulation model was developed, and simulation results are presented. This mobile

information service ubiquitously provides users with traffic information regarding their needs and preferences, according to an alert system, which allows a personalized pre-definition of warning messages.

Introduction

Current advances in mobile communications and positioning systems, as well as the broad use of mobile devices, with increasing functionalities in users' daily life represent new opportunities to extend traffic information systems beyond the traditional information delivered by radio, TV or the Web. Typically, this information is manually maintained by human operators and may not be appropriately updated. None of these information channels are permanently available to users at the moment and at the location they need them. Moreover, they do not provide quantitative data, only available by image or sensor data processing, and they only supply information regarding the current traffic situation; they do not predict traffic conditions for the future.

Mobile Traffic (M-Traffic) is a R&D project developed jointly by YDREAMS (www.ydreams.com), Universidade de Évora (<http://www.uevora.pt>), and Siemens AG (www.siemens.com), which proposes an advanced technological solution for providing street traffic information. M-Traffic focuses on providing traffic information where and when it is most necessary and making this information available on mobile devices. The proposed solution takes advantage of video cameras in places where traffic conditions are most difficult. Based on these images, the system will provide its functionalities, which go far beyond displaying video information in real-time. Images are processed in order to adapt to various types of devices, which in turn permit the extraction of quantitative and qualitative data about the traffic flow. All the information is geo-referenced in a geographical information system and can be visualised on different devices such as PCs, mobile phones, or PDAs.

Together with the streamed video, M-Traffic offers a set of functionalities suitable for different types of users and appropriate to diverse distribution devices. These functionalities rise from image processing, sensor data, and the use of traffic flow models, which simulate and predict traffic conditions. The purpose of traffic simulation models is twofold. First, it is to estimate the traffic flow and time delay in segments of street network which are not covered by sensors and second, to predict the evolution of traffic conditions. These estimates are the base to routing algorithm.

The system allows users to personalise the service, in order to easily access specific information and alerts. Users may create their own profile, which allows them to receive the information they need as soon as they enter the system.

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