

A New Design for a Motorway Surveillance System Using a Wireless Ad-Hoc Camera Network to Improve Safety

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Abstract:

This paper proposes a new design for acquisition and broadcasting of images for motorway surveillance systems (MSSs). The new design enables the motorway users to access data of images taken by wireless cameras placed along the motorway. This has the potential to provide improved safety awareness by allowing the motorway users to know the actual or imminent traffic and road conditions. This paper presents a proposal and analysis of a new MSS using modified Wireless Local Area Network, which we have named the system as wireless ad-hoc camera network (WAHCN). The research investigates and analyzes the impacts of network topology, channel capacity, packet size, and packet rate on the performance of the network of the proposed system to find suitable network parameters. Moreover, this paper presents the design for a new protocol that we have named the selecting and finding position protocol. This protocol was developed to effectively manage the operations of selecting and finding desired cameras which is selected by the driver of the vehicle. The protocol design was evaluated with respect to the required time to establish connection between the vehicle and a specific “desired camera” at different network conditions.