

An Intelligent Transportation System for Safety and Integrated Management of Railway Crossings

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Abstract : Railway crossings are complex entities whose optimal management cannot be addressed unless with the help of an intelligent transportation system integrating information both on train and vehicular flows. In this paper, we propose an integrated system named SIMPLE (Railway Safety and Infrastructure for Mobility applied at level crossings) that, while providing unparalleled safety in railway level crossings, collects data on rail and road traffic and provides value-added services to citizens and commuters. Such services include for example alerts, via variable message signs to drivers and suggestions for alternative routes, towards a more sustainable, eco-friendly and efficient urban mobility. To achieve these goals, SIMPLE is organized as a System of Systems (SoS), with a modular architecture whose components range from specially-designed radar sensors for obstacle detection to smart ETSI M2M-compliant camera networks for urban traffic monitoring. Computational unit for performing forecast according to adaptive models of train and vehicular traffic are also included. The proposed system has been tested and validated during an extensive trial held in the mid-sized Italian town of Montecatini, a paradigmatic case where the rail network is inextricably linked with the fabric of the city. Results of the tests are reported and discussed.

Keywords : Intelligent Transportation Systems (ITS), railway, railroad crossing, smart camera networks, radar obstacle detection, real-time traffic optimization, IoT, ETSI M2M, transport safety

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