

A Vehicle Detection and Speed Measurement Algorithm Based on Magnetic Sensors

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Abstract : Cooperative intelligent transport systems (C-ITS) can greatly improve safety and efficiency in road transport by enabling communication, not only between vehicles themselves but also between vehicles and infrastructure. For that reason, traffic surveillance systems on the road are of great importance. This paper focuses on the development of an on-road unit comprising several magnetic sensors for real-time vehicle detection, movement direction, and speed measurement calculations. Magnetic sensors can feel and measure changes in the earth's magnetic field. Vehicles are composed of many parts with ferromagnetic properties. Depending on sensors' sensitivity, changes in the earth's magnetic field caused by passing vehicles can be detected and analyzed in order to extract information on the properties of moving vehicles. In this paper, we present a prototype algorithm for real-time, high-accuracy, vehicle detection, and speed measurement, which can be implemented as a portable, low-cost, and non-invasive to existing infrastructure solution with the potential to replace existing high-cost implementations. The paper describes the algorithm and presents results from its preliminary lab testing in a close to real condition environment. Acknowledgments: Work presented in this paper was co-financed by the European Regional Development Fund of the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship, and Innovation (call RESEARCH-CREATE-INNOVATE) under contract no. T1EDK-03081 (project ODOS2020).

Keywords : magnetic sensors, vehicle detection, speed measurement, traffic surveillance system

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