

An Internet of Things-based Distributed Intelligent System with Self-Optimization for Controlling Traffic-Light Intersections

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Abstract—The rapid increase in vehicle fleet size and consequently in traffic volume is not always followed by an increase in road space. As a result, traffic congestion occurs, especially in large urban areas. Therefore, in order to avoid traffic jams, immediate solutions have to be found. Various technologies have been used to design and develop such solutions in the past. While some developers have used classic technologies, others have integrated various emerging technologies in the systems they built in order to make roadways safer. Acting both inside the vehicle and along the roadways the new designed systems are able to inform drivers about traffic conditions and possible hazards. This paper proposes an Internet of Things-based approach to solve some of the problems that traffic congestion raises. Furthermore, this approach provides the means to monitor a set of environmental parameters, including air quality, and to raise early warnings and alarms when critical levels are reached. This approach offers a solution to increasing traffic-related pollution (which has a negative impact on the environment and on people's health), to economic losses and to other issues caused by traffic congestions. In order to reduce accident risks when various intervention vehicles enter the crossroads, we also propose a solution based on radio frequency identification (RFID) technology.