Traffic management

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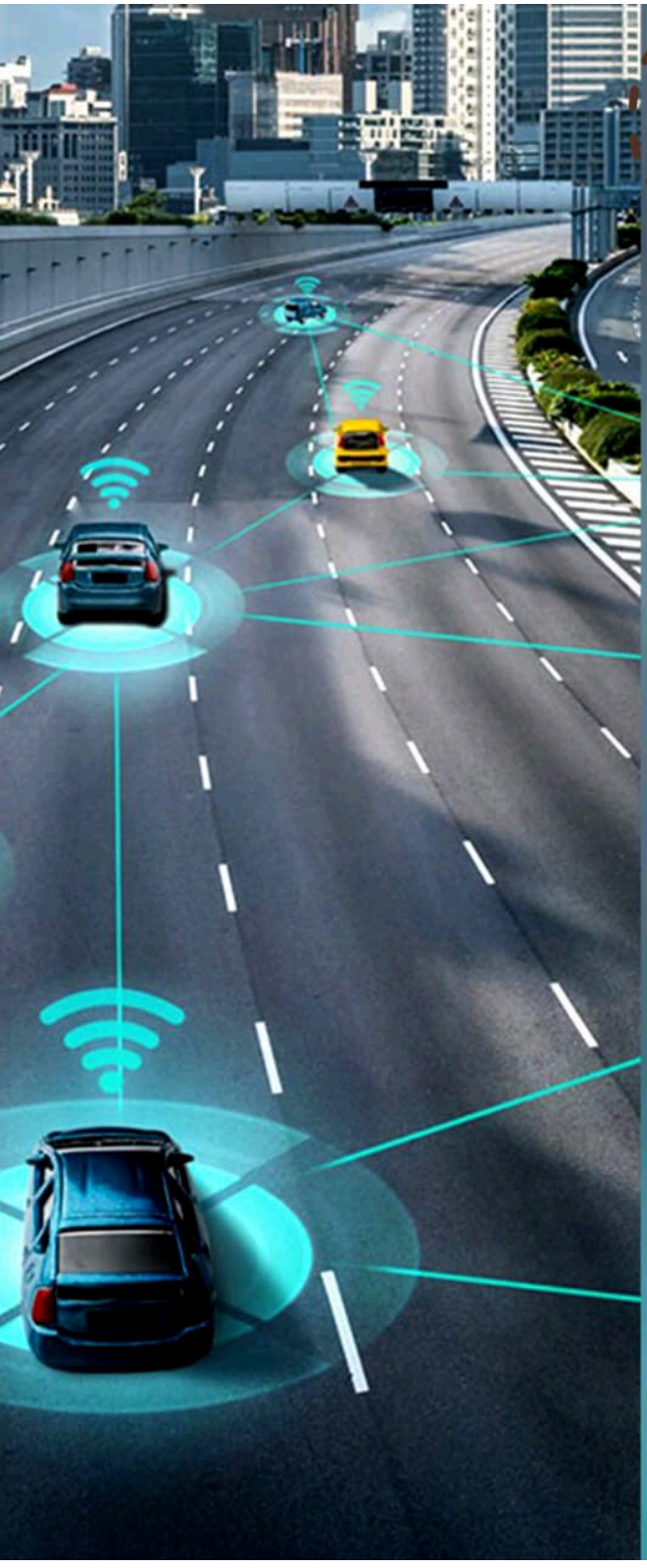

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Introduction Traffic management is the organisation, arrangement, guidance and control of both stationary and moving traffic, including pedestrians, bicyclists and all types of vehicles. Its aim is to provide for the safe, orderly and efficient movement of persons and goods, and to protect and, where possible, enhance the quality of the local environment on and adjacent to traffic facilities. This book is an introduction to traffic management, written in laypersons' language, and assuming no background knowledge of the subject. Various basic traffic characteristics relating to road users, vehicles and roads, and traffic regulation and control, are discussed, including some traffic volume and traffic flow considerations relevant to traffic management. For effective traffic management, it is essential that the practitioner works from factual information

What is IOT Transport management? An Internet of Things (IoT)-enabled intelligent traffic management system can solve pertinent issues by leveraging technologies like wireless connectivity & intelligent sensors. Considered a cornerstone of a smart city, they help improve the comfort and safety of drivers, passengers & pedestrians.

Problem definition

This intelligent system comprises several components, including wireless sensors, RFID tags, and BLE beacons installed at the traffic signals to monitor the movement of vehicles. A real-time data analytics tool connects the Geographic Information System (GIS-enabled) digital roadmap with control rooms for real-time traffic monitoring.

Traffic Lights and IoT Control Systems: Smart traffic signals may look like a typical stoplight, yet they utilize an array of sensors to monitor real-time traffic. Usually, the goal is to help cars reduce the amount of time spent idle.

Parking Enabled through IoT: Smart meters and mobile apps make on-street parking spaces easily accessible with instant notifications. Drivers receive alerts whenever a parking spot is available to reserve it instantly. The app gives easy directions to the parking spot with a convenient online payment option.

Emergency Assistance through IoT: A traffic monitoring system using IoT technology enables emergency responders to speed up the care mechanism in case of accidents late at night or in isolated locations. The sensors on the road detect any accident, and the problem is immediately reported to the traffic management system. This request is passed on to relevant authorities to take corrective action.

Commute Assistance: With every vehicle acting as an IoT sensor, a dedicated app can make suggestions, determine optimal routes & provide advance notice of accidents or traffic jams.

Traffic Jam Detection: With cloud connectivity, sensors, and CCTV cameras tracking intersections 24×7, technicians can remotely monitor all the streets in real-time from the city's traffic control room.

Connected Vehicles: A smart traffic system using IoT technology can connect with roadside tracking devices to enable direct communication between intelligent vehicles & intersections.

Modular Control: Real-time detection of congestion triggers dynamic adjustments in the systems meant for controlling traffic lights, express lanes, and entry alarms.

Emergency Navigation: A system with edge data processing & programmatic alerting capabilities can alert response units (police, ambulance & tow trucks) in case of a car crash or collision. It reduces the crucial time an injured driver or passenger remains unattended.

Digital Payments: Commercial traffic management systems enable quick and convenient electronic transactions in real time while ensuring financial data safety.

Design thinking

1 Related on IOT Applications

More than 98% of respondents have encountered ambulances on public roads in Dearborn Heights, but 82.9% of the respondents had at least one experience of failing to respond appropriately when emergency vehicles (EV) approached [6]. The paper pointed out that, in the United States between 2004 and 2008, there were 3708 accidents involving emergency vehicles.

2 Smart traffic control system

The architecture of the proposed STSC system is shown in, and it is composed by three subsystems including an RSU, an OBU, and a cloud center. The RSU controller, connected to traffic signal control system, is the key component in STSC.

3 EVSP Process

four components are interacted in the EVSP sequence diagram, which are OBU, RSU controller, traffic signal controller, and CMS. The interaction messages sequence can be divided into two phases, before and after the EV passed through the intersection, which are mapping to the seven stages illustrated in The RSU controller collects the EV message, decides if it should be responsible for the EV (host RSU), controls the signal control, and displays messages on the CMS. After EV passes through the intersection, the RSU controller switches back the signal, CMS, and starts traffic compensation as discuss

4 Traffic signal control

After the host RSU check, the RSU starts the EV signal preemption control process, where the control algorithm of this process is presented in RSU reads the current signal plan from the traffic signal controller, determining whether to extend the green period or cut off the red period to facilitate the EV passing through the intersection.

5 Traffic signal switching and compensation mode

After the EV has passed through the intersection, the RSU switches back to original signal phase and starts the traffic flow compensation. The purpose of the compensation mechanism is to improve the vehicle's continuation rate and reduce the unnecessary stagnation. Two compensation modes including positive compensation and negative compensation are designed

6 Multiple Emergency request

A conflict requests handling mechanism is designed to deal with the case when multiple prioritized vehicle requests are received at the same time.