

TRAFFIC MANGEMENT SYSTEM

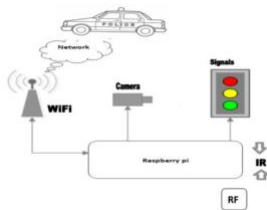
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Objective:

The Objective of the project is to make IOT based intelligent traffic management system.

Synopsis:

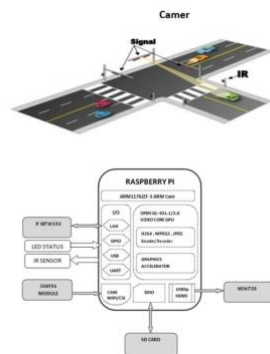
All metropolitan cities face traffic congestion problems especially in the downtown areas. Normal cities can be transformed into “smart cities” by exploiting the information and communication technologies (ICT). The paradigm of Internet of Thing (IOT) can play an important role in realization of smart cities. This paper proposes an IOT based traffic management solutions for smart cities and to coordinate with ambulance driver to find the signal status and choose the path where traffic flow can be dynamically controlled and traffic violations are been identified by onsite traffic officers through centrally monitored or controlled through Internet. However the scheme proposed is general and can be used in any Metropolitan city without the loss of generality. If any ambulance will come on a signal then it will shows the green path for that ambulance and rest of paths are red.



Existing System:

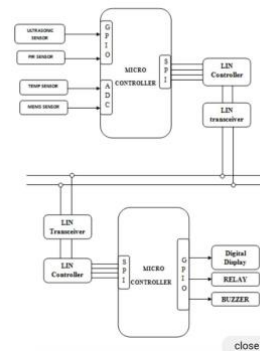
It is Difficult to identify the Traffic Violators.

There is no IOT based Traffic management System.

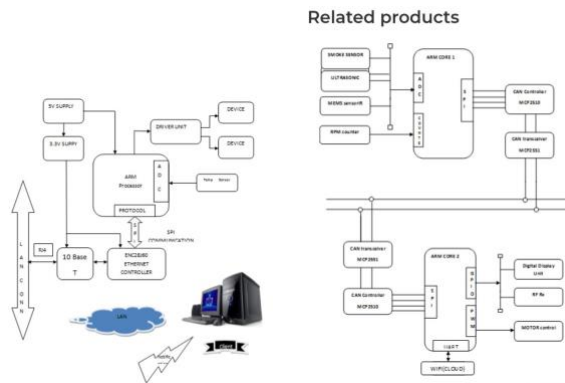


Proposed System:

IOT based traffic management



Easy to find the path for emergency condition in ambulance.



The Traffic violators are captured and send to Police.

Advantages:

Can be used anywhere

No need of human power to identify violators during night.

System Architecture

Role of IoT in Smart City Traffic Management

With cities worldwide experiencing ongoing population growth – it results in stressed municipal infrastructure. And the problem of traffic congestion across smart cities is continuously increasing. INRIX suggests that the average American driver lost 36 hours due to congestion, costing \$564 in wasted time. This increasing growth in cities leads to the demand to meet sustainability goals while evaluating traffic management strategies.

Integrating innovative traffic technology helps achieve phenomenal cost savings in smart cities' infrastructure expenses while improving system reliability. Juniper research suggests that smart traffic management systems could save cities \$277 billion. It is while reducing emissions and congestion by 2025.

With the pressing demand for advanced communication & network technologies, digitalization is the driving force that stimulates the implementation of smart traffic control using IoT capabilities.

It enables them to;

Expand the capacity of city streets without having to build new roads.

Optimize the traffic flow and keep the drivers safe. It would include cameras, sensors, and cellular technologies that automatically adjust traffic lights, expressway lanes, speed limits, and highway exit counters.

Transmit accurate information about available parking spaces to citizens in real-time

Collect data on congestion and improve traffic signaling to reduce blockages and optimize commute

Locate incidents and report them to emergency rooms immediately with road sensors and video surveillance

Employ real-time data feeds to ensure the streetlights turn dim or brighten up per the changing weather conditions and the onset of day and night

Advantages of a Smart Traffic Management System

Cleaner, greener, safer, and more accessible roads are a few benefits of implementing IoT and intelligent technology.

It helps with the following:

Reducing traffic jams and accidents on the streets

Ensuring immediate clearance for emergency vehicles

Facilitating safer and shorter commute times

Reducing congestion & energy consumption at intersections

Offering significant productivity benefits with real-time monitoring of crucial infrastructures

Reducing operating costs with efficient traffic management processes

Ensuring compliance with the regulations for reducing the carbon footprint

Saving billions of gallons of fuel wasted every year

Accurate tracking & quick recovery of lost and stolen vehicles

Functioning of Traffic Monitoring System Using IoT Capabilities

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.

The smart traffic management system captures the images of vehicles at the signals using the digital image processing technique. This data is then transferred to the control room via wireless sensors. The system also leverages BLE beacons or RFID tags to track the movement of vehicles and keep traffic congestion in control, track down stolen vehicles and even clear the road for emergency vehicles that are installed with RFID readers.

Application of IoT in Traffic Management

City governments can improve their operations & infrastructure by placing IoT sensors and tracking devices on roads and highways for recording, analyzing, and sharing data in real-time.

Uses of IoT in Traffic Management

An intelligent traffic monitoring system using IoT capabilities has so many factors & use cases, including;

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. And IoT technology enables the various signals to communicate with each other. This is while adapting to changing traffic conditions in real time. The outcome is less time spent in traffic jams and even reduced carbon emissions.

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. Emergency response personnel would include medical technicians, police officers, and fire departments for enhanced responsiveness and timely intervention.

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. Further, it can even suggest the best time to leave. It is all because of a robust algorithm that helps reduce driving time with intelligent traffic lights.

Key Features of a Smart Traffic Management System

The key features are listed below depending on the city's size and the scope of the governmental policies. It can be integrated into an intelligent traffic management system. They include:

Traffic Jam Detection: With cloud connectivity, sensors, and CCTV cameras tracking intersections 24x7, 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.

Road Safety Analytics: Systems with pattern detection capabilities can immediately flag high cruising speeds and reckless driver or inappropriate pedestrian behavior.

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

Rishabh's Role in IoT based Smart Traffic Management

IoT in traffic management can help municipal & transport offices to save time, money, and resources. It is while making the roads and transportation safer.

Our focused IoT app development services at Rishabh Software can help you custom-develop applications that suit your city infrastructure's eco-system. We help you determine the right fit based on your budget, infrastructure needs & more.

Here's a use case of how we are making connectivity simpler. This case is about how we helped a UK-based city municipal office modernize its legacy ticketing system with IoT capabilities.

Case Study: IoT-based Litter Fine Ticket Mobile App

Our client is a prominent service provider of cleaning & hygiene supplies. To ensure a clean & greener community, they cover all littering offenses. They turned to us to modernize their existing littering violation system with a fine-ticket mobile app.

Challenges:

Poor visibility into operations with the Fixed Penalty Notice being issued based on employee number, location & details of the offender

No mechanism for issuing receipts on the move for field officers

No encryption in the payment gateway

Our Approach:

Our team designed an Android app that allows officials to record, submit & manage offenses

It integrates the payment gateway and allows corrections on a unified system

We optimized the user interface for their online portal and enabled online and offline synchronization

We helped optimize & secure employee logins & authentication for extracting the details of offenses & penalties

Benefits Delivered:

Data-driven analytics for on-demand reporting

End-to-end encryption of data

Easy access to online & offline data

Technologies Used:

Android, Microsoft .NET, SQLite, Bluetooth 4.0

Moving Ahead

Traffic management plays a vital role in determining a city's livability. By using the tracking devices and data effectively – a city government can seamlessly regulate traffic & manage it without expanding the infrastructure. IoT in traffic management can save smart cities a significant chunk of their time, money & resources while making public transport safer and more convenient. Yet IoT will continue to gain momentum in the development & integration of infrastructure and services for future cities.