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IOT based Online Traffic Congestion Monitoring and Management System

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Abstract: ***In today's world, traffic jams during rush hours is one of the major concerns. During rush hours, emergency vehicles like Ambulances, Police cars and Fire Brigade trucks get stuck in jams which leads to loss of many human lives. So we have done a project on IoT based online traffic congestion monitoring and management system ,which provides clearance to any emergency vehicle.***

Keywords: RFID tag, PIC micro controller, LED, LCD, Traffic Congestion, Tracking, IoT, Embedded C, Emergency vehicle, etc.,

I. INTRODUCTION

Internet of things or IoT was first introduced by Kevin Ashton. IoT refers to system that involves all the physical objects around us and their communication with each other over the internet. The data that is communicated can be analyzed to generate meaningful analytical results. The main motive of IoT is to simplify the day to day life of human beings. Intelligent IoT related to traffic can be divided into three layers – Application, Network and Acquisition. Acquisition Layer comprises of sensors like RFID, IR etc. Network layer includes Wi-Fi, cellular mobile network, Zigbee, Bluetooth etc. Application layer makes use of information collection and analysis, intelligent traffic and driver management Traffic congestion has become the newly generated conundrum in metropolitan cities of India. Traffic congestion on roads is the slower speed or halt of vehicles causing longer trip times and increased queues. Traffic congestion is said to occur when the number of vehicles on road is greater than the capacity of the road.

The idea to make the traffic signaling system adaptive depending upon vehicle density on the road was introduced first in USA in 1982. Many researchers have come up with a model to deal with traffic congestion in a real-time scenario. Kok Mun Ng et al. have emphasized on control and intelligent systems to address traffic congestion. Wen has proposed model in which the number of vehicles and their speeds are provided by sensors to a backend server to alter the traffic signal pattern as a traffic decongestion strategy. Syed has come up with a strategy to provide traffic signal control to onsite traffic police officer with the help of smart phone as a traffic response strategy. Traffic management system is the only way one can address the problem of traffic congestion in Indian cities where the scope for augmenting road infrastructure is very minimal. IoT can help in altering traffic signal patterns, providing real-time traffic information and alerts to the drivers. This will ultimately save time and money of the driver.

II. LITERATURE SURVEY

Samya Muhuri, Debasree Das(2017)have presented an automated game theoretic approach for cooperative road traffic management in disaster which was proposed to regulate road traffic and minimize the waiting time of individual vehicles in any disaster situation.

N. B. Soni, Jaideep Saraswat(2017)have presented a review of IoT devices for Traffic management system in which internet of things can help in smooth implementation of traffic management system. There are different methods of traffic management – video analysis, wireless sensor network, adaptive traffic control system that are closely knit around IoT devices

Wu Xiping, Yang Hongyu,Yang Bo, Yu Jing(2016) have presented a research on collaborative strategic air traffic flow management based on BDI agent**,** the desire is the goal to achieve or event to handle, the Intention is a set of plans to realize the predefined goal or react to a specific situation, and the Belief is the knowledge about the agent itself and the varying environment.

Weihai Chen, Zheng Zhao(2017)have presented a novel assistive on-ramp merging control system for dense traffic management .The objective of this paper is to design an assistive ramp-merging control (ARMCON) system. It utilizes knowledge about professional driver behavior and the dynamical relationship among the on-ramp vehicles, to produce timely information so as to guide the on-ramp drivers when merging with the main traffic flow Ramkumar Eswaraprasad , Linesh Raja(2017) have presented transport improved intelligent system for reliable traffic control management by adapting Internet of Things. IoT can monitor the vehicle periodically and track their location by sending periodic information to the server. This is focused in the proposed research framework by collecting and analyzing the traffic information so that traffic can be controlled very effectively.

A. Existing System

1) In existing method, automatic traffic management based upon vehicle type is difficult

2) There is no wireless technology is available for monitoring.

Drawbacks of existing system:

a) Difficult to find the theft vehicle

B. Proposed System

1) In our proposed system we are going to monitor the traffic system, emergency and theft vehicles easier by using cloud database.

Advantages of proposed system

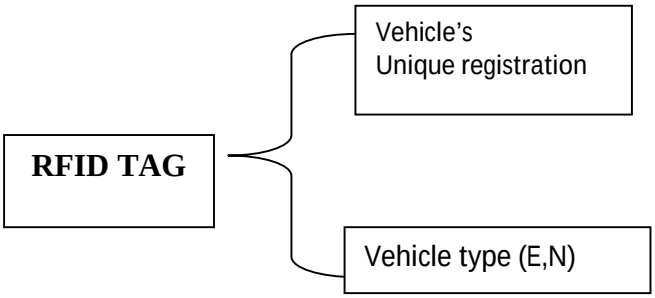
a) Fast response

b) Theft vehicle is detected.

c) One time installation

C. Diagram

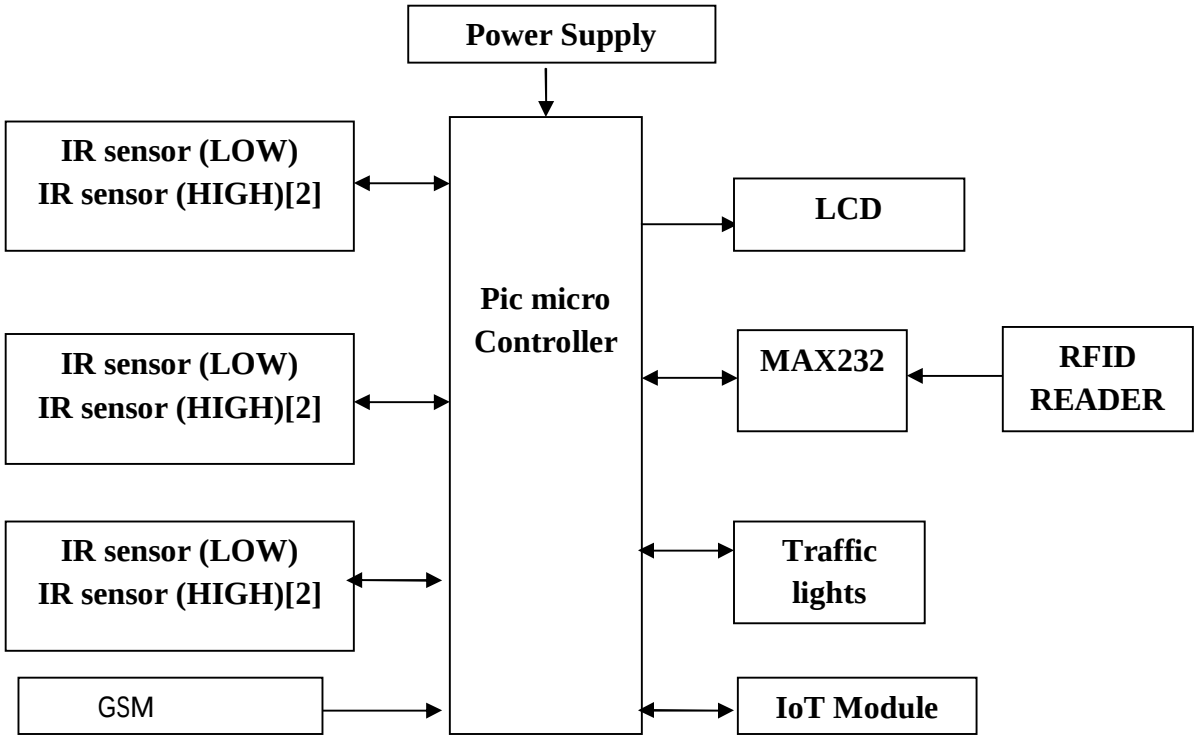
Vehicle unit:



Vehicle's unique
Registration Number

Vehicle type [E, N]

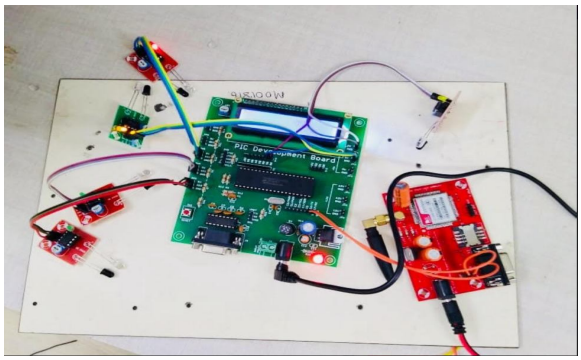
D. Traffic Signal Section



E. Working Principle

In the proposed system, an RFID tag is given to each vehicle when it is registered. The vehicle's unique registration number, its type, whether it is 'E' (emergency), 'N' (normal) or 'T' (theft), can be stored in this RFID tag. RFID readers will be placed in strategic locations along the road. These readers can communicate with a Traffic Control Unit. When a RFID reader located a few hundred meters in front of a traffic signal reads an 'E' type RFID tag, the Traffic Control Unit recognizes an emergency vehicle moving and changes the traffic signal in that direction to green, so that the emergency vehicle doesn't have to wait at the traffic signal. In case a vehicle is stolen, the type of vehicle stored in the RFID tag, can be remotely changed from 'N' to 'T' via IoT. When an RFID reader reads a tag with type 'T', the Traffic Control Unit can instantly alert the police, so that they can know in which road the stolen vehicle is, and it can be intercepted.

F. Results



III. CONCLUSION

The RFID tags and Internet of Things can work together to create a very efficient traffic management system. This proposed system can tremendously alleviate delay of emergency vehicles in such a way that once this started, it will be hard to imagine not having this system. Tracking and intercepting stolen vehicles and vehicles involved in crime, will become very efficient.

One disadvantage of this system will be that even when the emergency type vehicle is not currently in an emergency, the system will create a green wave for it which can be very inconvenient. To correct this, just like turning on the siren and flashing lights, the emergency vehicle should have a way to switch the vehicle type between 'E' type and 'N' type based on whether it is currently in an emergency. Another disadvantage is that the criminal will try to remove or tamper with the RFID tag of the stolen vehicle. To avoid this, the RFID tag must be installed in a place which cannot be accessed without dismantling the vehicle. Also, the communication between the RFID tag and the reader and the Control Unit, through the IoT, must be protected with a high-level encryption so that it cannot be hacked.

With these control measures in place, the proposed system can be a very efficient system to manage vehicular traffic.

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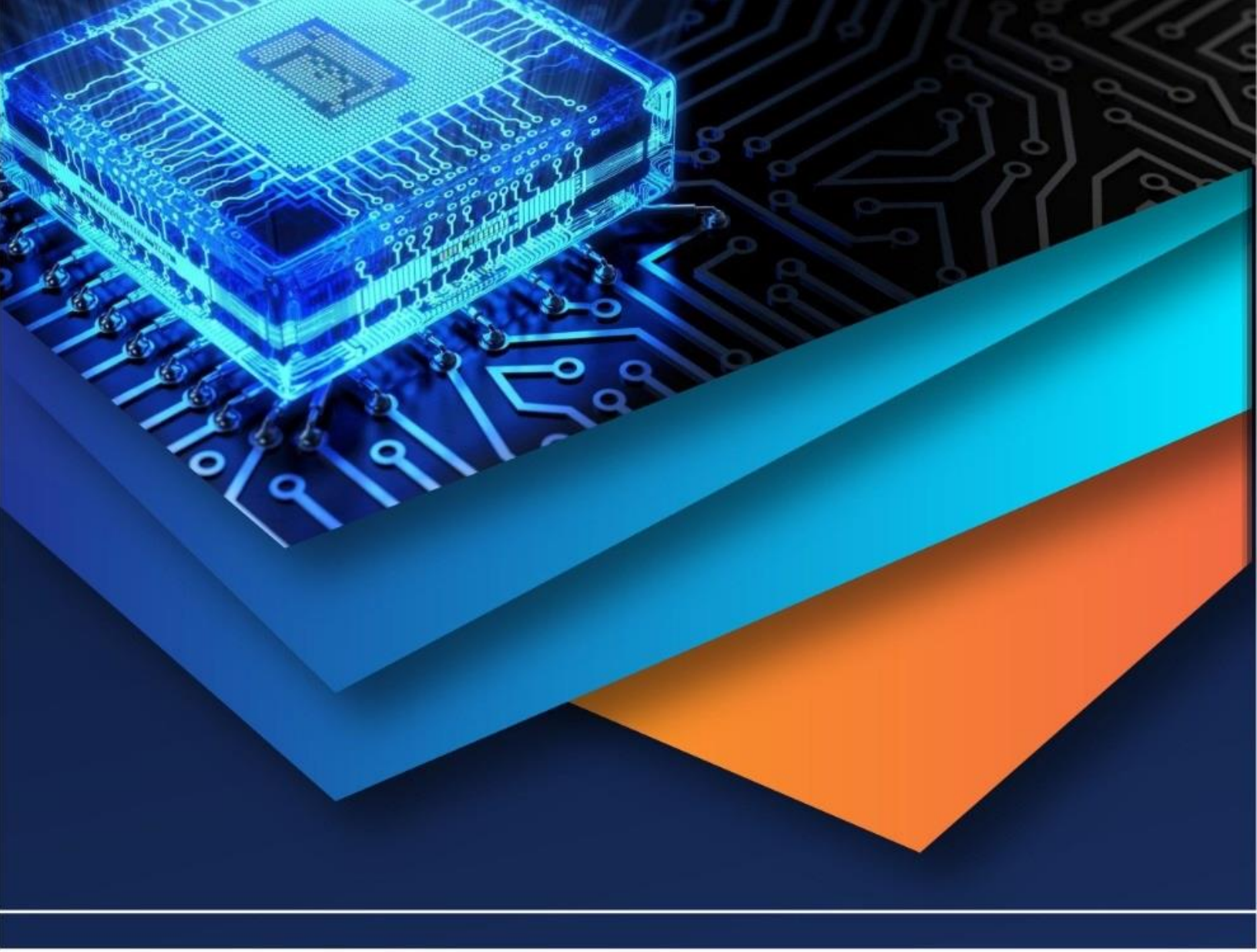

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