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Implementation of Multi Level Traffic Controlling System using IoT

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Abstract: ***In civic areas, traffic system is one of the significant pointers to show the growth and progress of a megacity and it also influences the quality of life of people living in metropolitan metropolises. In recent times, there's a significant increase in operation of road vehicles which is getting challenge for existing transportation system. The presently stationed traffic system isn't grounded on the traffic position and a predefined time is allocated for traffic signals at every road crossing which results in traffic congestion and situation becomes worst in the peak business hours. When traffic demand is great enough that the commerce between vehicles slows the speed of the traffic sluice, this results in some traffic. This high position business traffic contributes in the pollution by the emigration of CO 2 and several other adulterants in air. Also, it also causes tripling of the energy consumption and accordingly put adverse effects on the economy as well. To address the above problem, this paper presents the development of congestion level based dynamic traffic control system using IoT. It regulates the traffic lights duration grounded on the real time position of the traffic measured at the road crossings by using IR detectors. The development of this design is divided in three phases i.e., simulation and sense/logic development, development of IoT grounded system and eventually hardware implementation. In first phase the simulations are done in Proteus and results are presented in four cases i.e., normal routine, low position traffic, medium position traffic and high position traffic. In alternate phase the IoT grounded system is developed by making the communication link between the end bumps and the gateway over the internet. Eventually, the real- time prototype is enforced. In addition we're adding the features like Emergency Vehicle Traffic Clearance i.e., Ambulance or VIP Vehicles, Air Pollution discovery, Theft Vehicle Identification Point and Automatic parking.***
Keywords: Arduino Uno, IR sensor, LCD display, RF transmitter, Thing view App, RFID EM Module

I. INTRODUCTION

Business" traffic" refers to a condition in transport that's characterized by slower pets, longer trip times, and increased vehicular queueing. When congestion demand is great enough that the commerce between vehicles slows the speed of the business sluice, this results in some traffic.

While traffic is a possibility for any mode of transportation, this composition will concentrate on business traffic in metropolitan metropolises. Some of the problems faced due to traffic are Traffic Movement, Public Transport Crowding, and Difficulties for Climbers, Parking Difficulties, Environmental Impact, Business Noise, and Atmospheric Pollution. While civic transport has had a tremendous liberating impact, it has also posed a veritably serious problem to the civic impact in which it operates. Buchanan gave a warning in 1963 when he wrote Traffic in Towns, that “the motor vehicle has been responsible for important that negatively goods our physical girding.

Metropolises are locales having a high position of accumulation and attention of profitable conditioning. They're complex spatial structures supported by architectures, including transport systems. The larger a megacity, the lesser its complexity and the eventuality for dislocations, particularly when this complexity isn't effectively managed. Civic productivity is largely dependent on the effectiveness of its transport system to move labour, consumers, and freight between multiple origins and destinations. Also, transport outstations similar as anchorages, airfields, and railyards are located within civic areas, help anchor a megacity within a indigenous and global mobility system.

Still, they're also contributing to a specific array of challenges. Some challenges are ancient, like traffic (which agonized metropolises similar as Rome), while others are new like civic freight distribution or environmental impacts. Transport problems facing in civic areas are Traffic Movement and Traffic, Public Transport Crowding, Difficulties for Climbers, Parking Difficulties, Environmental Impact, and Business Noise

II. LITERATURE SURVEY

A. *Khaled Abdelghany , Hossein Hashemi, and Mohammad E. Khodayar ,* "A Decision Support System for Proactive-Robust Traffic Network Management" *vol no:, IEEE , 2018.*

Real- time business network operation systems are envisaged to give network drivers with decision support capabilities to palliate intermittent and non-recurrent traffic. These capabilities involve prognosticating the network traffic dynamics and easing the development of visionary business operation schemes that integrate business control and demand operation strategies. The objective is to develop robust traffic management schemes such that the network overall performance remains close to optimality under all possible future operational conditions.

B. *Steve Iatrou and Ioannis Stavrakakis,"A Dynamic Regulation and Scheduling Scheme for Real-Time Traffic Management", vol no: , IEEE,2000*

A secure result to the problem of guaranteeing the QoS of real- time operations will generally bear the reservation of the maximum quantum of demanded coffers. Real-time traffic is busty in its nature, and therefore guaranteeing QoS leads to severe network underutilization. These capabilities involve prognosticating the network traffic dynamics and easing the development of visionary business operation schemes that integrate business control and demand operation strategies.

C. *Neetesh Kumar, Syed Shameerur Rahman, and Navin Dhakad, "Fuzzy Inference Enabled Deep Reinforcement Learning-Based Traffic Light Control for Intelligent Transportation System", vol no: ,IEEE,2020*

RAPID increase in number of vehicles, despite of limited transportation physical infrastructure, is a critical issue in development of smart cities. High density of the vehicles raises many environmental (air, noise pollution), health (stress, diseases), collision and economical (cost of fuel) issues, which cause time delay and fuel wastage because of chaotic road traffic situations. Traffic light control system plays an important role in vehicles movement and handling traffic congestion. In DITLCS, time duration for each phase of traffic light signal is calculated based on extracted information (traffic load, vehicles heterogeneity) from vehicular network. • Considering heterogeneous traffic load, an algorithm is proposed utilizing fuzzy inference system to choose one out of three modes: 1) Fair Mode (FM):-all vehicles have same weightage 2) Priority Mode (PM):- vehicle weights are differentiated based on priority 3) Emergency Mode (EM):-emergency vehicle routes are prioritized first.

III. EXISTING SYSTEM

To clear the emergency vehicles, present existing system implements the techniques like segmentation and fragmentation which is time taken for processing and more economical. Depending upon the number of vehicles, digitized traffic signals will signalized according to the density and gives the signal lights. Parking place is allocated manually by the help of physical present of a labour. Stolen vehicle is detected by using the technique RFID which is very easy to detect the vehicle.

IV. PROPOSED SYSTEM

By using RFID Technology and RF Transmitter & receiver module can produce better results compared with the existed system. By using Transmitter & Receiver , it gives the way to Emergency vehicle. Here RFID Technology is used to implement the features such as Stolen vehicle identification & Auto Parking. Dynamic allocation system is used to reduce the traffic crowd by using the sensors.

A. *Emergency Vehicle Clearance*

The transportation operation system is getting an inviting task across the globe due to Globalization and population growth. Increased business traffic poses several problems. The extended waiting time at business jam leading to air and noise pollution due to the amassed vehicle is a serious trouble to mortal health and the terrain. This situation aggravates the concurrence of any exigency vehicle performing in grave consequences for the case. A better control over the transportation system can be achieved through the Internet of Thing (IoT) grounded smart structure.

RF transmitter is present in emergency vehicles such as Ambulance , fire trucks, VIP Vehicles, police cars etc. And the receiver is present at traffic junction when these vehicles are nearer to junction then RF transmitter sends the signal to RF receiver. If RF receives the signals from transmitter then buzzer ON by giving the beep sound. It indicates the people that the emergency vehicles are coming towards the junction and people get alert and manage themselves to give the way to the vehicles.

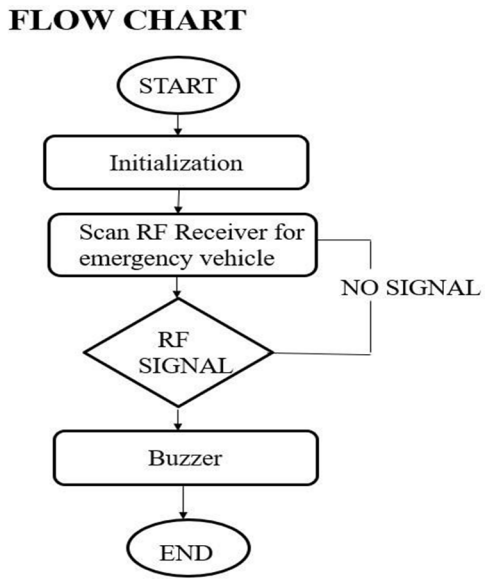

Fig. 1. Flow chart for Emergency Vehicle Clearance

B. Dynamic allocation of time and Air pollution detection

Here we use infrared sensor for dynamic allocation of time. IR Sensor is used to sense the traffic density in four directions i.e., north , south ,east west, which helps to dynamic allocation of time. So, that we can control the traffic and save the time.

For Air Pollution Detection we use Mq 2135 Gas sensor. The sensor is used to sense the gases present in surrounding area. The amount of pollution is display on LCD.

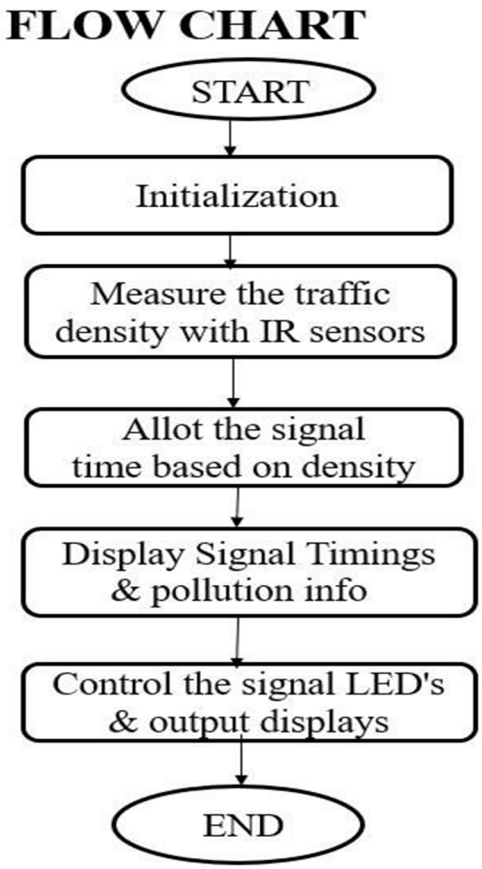

Fig. 2. Flow chart for Dynamic allocation of time.

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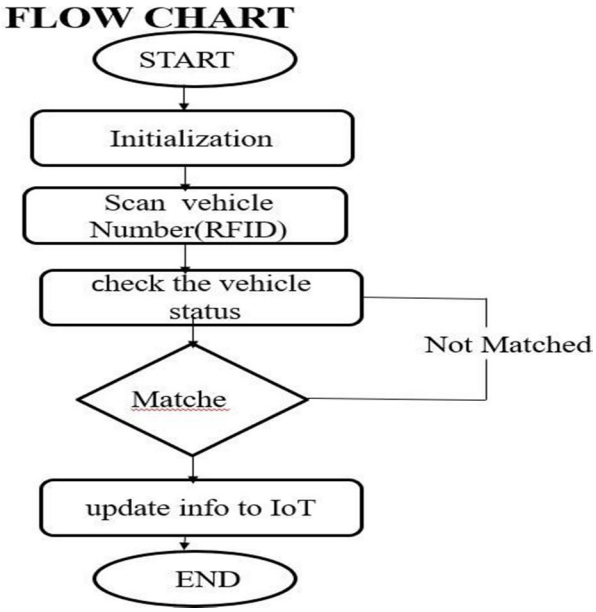
C. Stolen Vehicle detection

RFID has a unique id number like mobile number for every individual. These ID is linked up with the vehicle during the registration process of the vehicle. For suppose if a person lost his/her vehicle then they complaint about it in police station . These data will uploaded in the database using IOT and the data will be stored in data base. Whenever the vehicle cross through the junction , the RFID fixed at the junction immediately scan the vehicle and gives the information that the vehicle is detected and passed through particular direction.



Flow chart for Stolen Vehicle Detection

D. Auto Parking

Now a days we troubling to park the vehicle in these busy and heavy traffic. RFID has a unique id number like mobile number for every individual .These ID is linked up with the bank account of individual person. Whenever we need to park the vehicle RFID scanner scans the ID number of the particular vehicle. when it comes near to the RFID scanner ,then it automatically allocates a parking slot to vehicle and amount their charged to park the vehicle in particular slot is debit through their bank account directly.

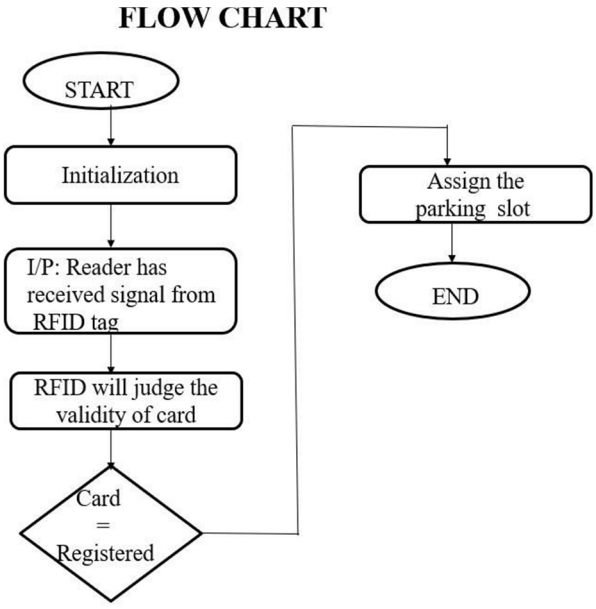


Fig. 3. Flow chart for auto parking

E. Thing view app Description

Thing View app is an open source software app is used to show the graphical representation of traffic density levels in each direction. It is also used to indicate the level of pollution in air and it is used to report the stolen vehicle direction. Here the thing view app is designed only to show the level of density and the air pollution levels and the direction of stolen vehicle. The mobile app is designed to know about the density of traffic levels in all direction from any place so, that we can choose the traffic free available route. It will gives the air pollution levels in all directions after knowing it we can choose the less pollution level direction. For the vehicles which were stolen it indicates the direction of the vehicle so, that we can easily detect the stolen vehicles from any place.

V. RESULTS

Fig. 4. Hardware kit

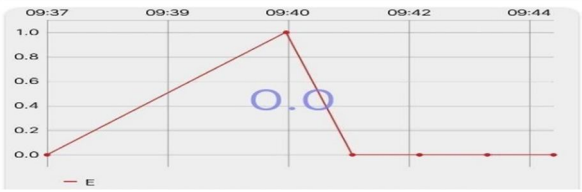


Fig. 5. Density report at east direction

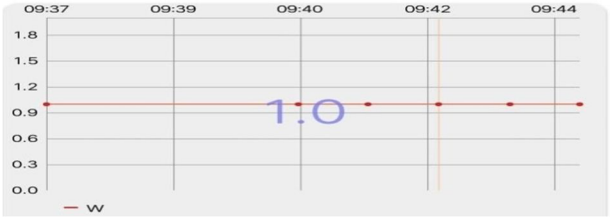


Fig. 6. Density report at west direction

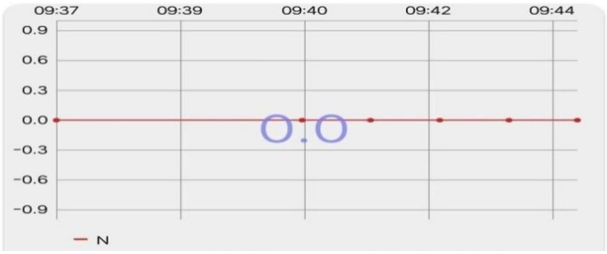


Fig. 7. Density report at North direction

Fig. 8. Density report at South direction

Fig. 9. LCD displays amount of air pollution

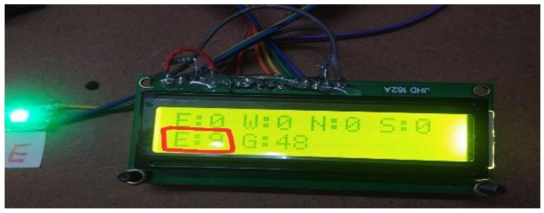


Fig. 10. LCD displays highest density direction

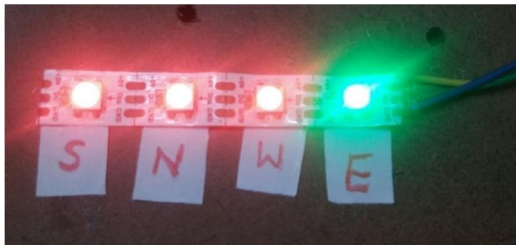


Fig. 11. LED displays green at east direction

VI. FUTURESCOPE

We can extend this by integrating real time traffic information update on traffic department website and Automatic generation of E-challan. Automatic tracking of traffic law defaulters also can be added to this module. Implementation of above system at night and using thermal cameras detection of other emergency vehicles.

VII. CONCLUSION

The Traffic Congestion problem intersection has becomes more serious of the potential growth of vehicles. In this paper, inspired of advanced vehicle technologies we introduce a new approach for real time operation the traffic inflow grounded on “Dynamic time ooperation approach”. In this regards , when there was more density which shows the direction to move forward. we also proposed a new algorithm to detect the stolen vehicles, emergency vehicle clearance and auto parking. The results show that our approach can reduce the waiting time of vehicles when there pass in to the intersection.

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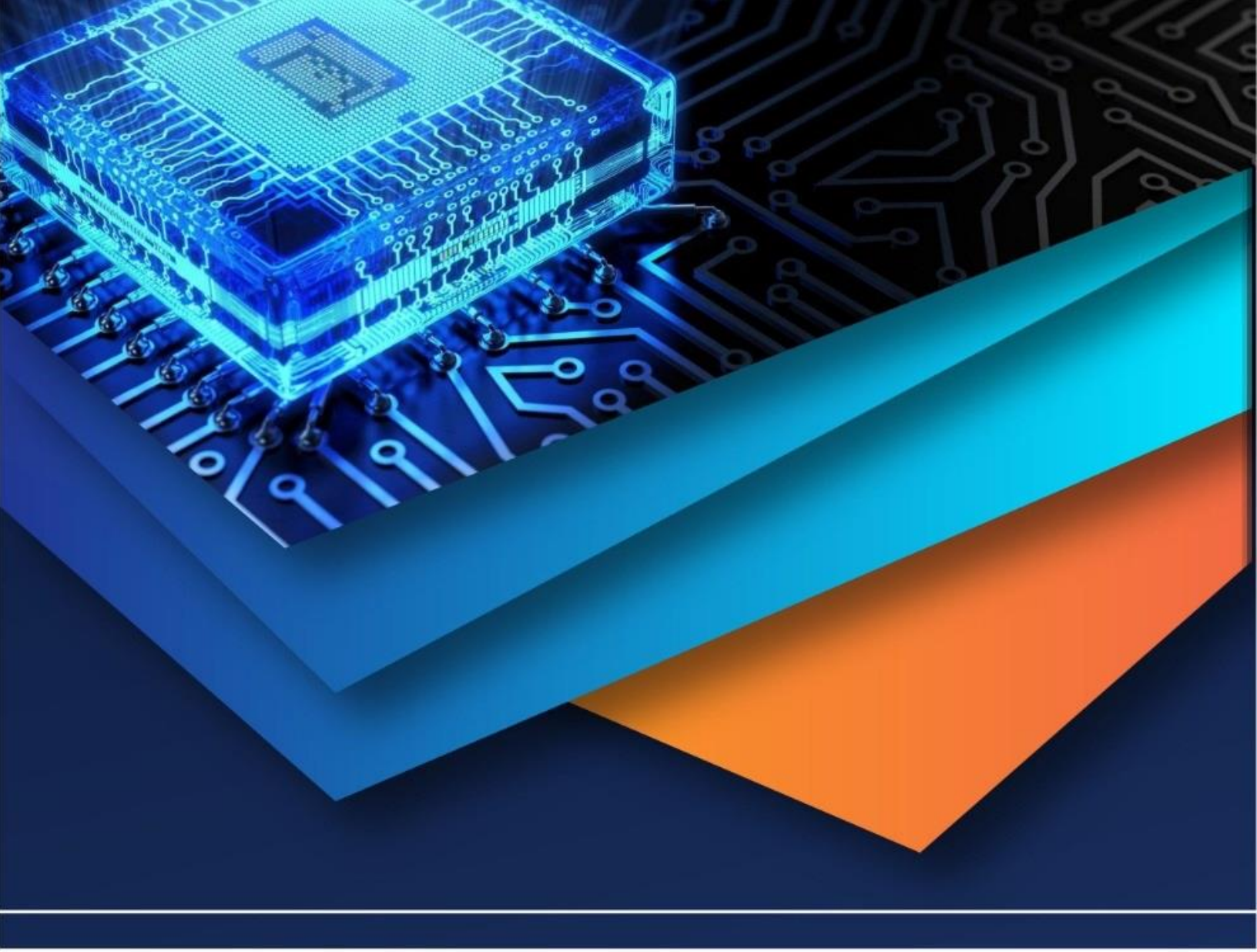

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