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INTELLIGENT AUTOMATED TRAFFIC MANAGEMENT SYSTEM

Dr Ramesh Cheripelli[1], Anu Challa [2], Srividya Sravya Chebolu [3], Annam Sthira Reddy [4]

[1]Assistant Professor Dept of IT, GNITS, chramesh23@gmail.com,T.S, India

[2,3,4]B.Tech Student Dept of IT, GNITS, Hyderabad, T.S, India

ABSTRACT.

In today's world, the traffic congestion is a major concern. The traffic congestion is mostly caused by signal delays and various other factors. The time deferment of each light is previously fixed in the traffic light and is independent of the actual traffic. The probability of traffic jams due to the traffic lights can be reduced by using this system. The developing software used for the system is established on microcontroller. It determines and updates the traffic light delays are constructed on the traffic density. Based on the density of traffic, the microcontroller designates particular ranges for the delays and updates subsequently. The recorded data sent is to the system for appropriate analysis via communication between arduino microcontroller and the CPU, and then the correct signal will be sent to the LED lights. This system can help notify people about the various traffic conditions in different places beforehand in the future. In this paper the survey is done on many methods and technologies used to perform the objectives. The literature focuses on the technologies which are being used presently to control the congestion and easy passage of ambulance through the traffic.

Keywords: *Traffic Management, IoT, Arduino Microcontroller, IR sensors, LED lights.*

1 INTRODUCTION

The existing traffic control signal has a huge disadvantage because of its fixed time method used. The traffic signal will not change based on the real time traffic on road near the intersection of two or more roads. Due to this the traffic congestion cannot be handled efficiently and the road utilization cannot be done to its maximum capacity. In country like India, the no of vehicles on road is increasing day by day, due

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to which congestion is a major problem. Traffic congestion leads to long waiting time, fuel loss and also the wastage of money. Congestion results in high pollution levels which affect the living. Indian traffic is non-lane based and chaotic, so better congestion control should be provided. Due to this congestion it is difficult for the emergency vehicles like ambulance and fire brigade to reach its destination on time which may cost the precious lives of people.

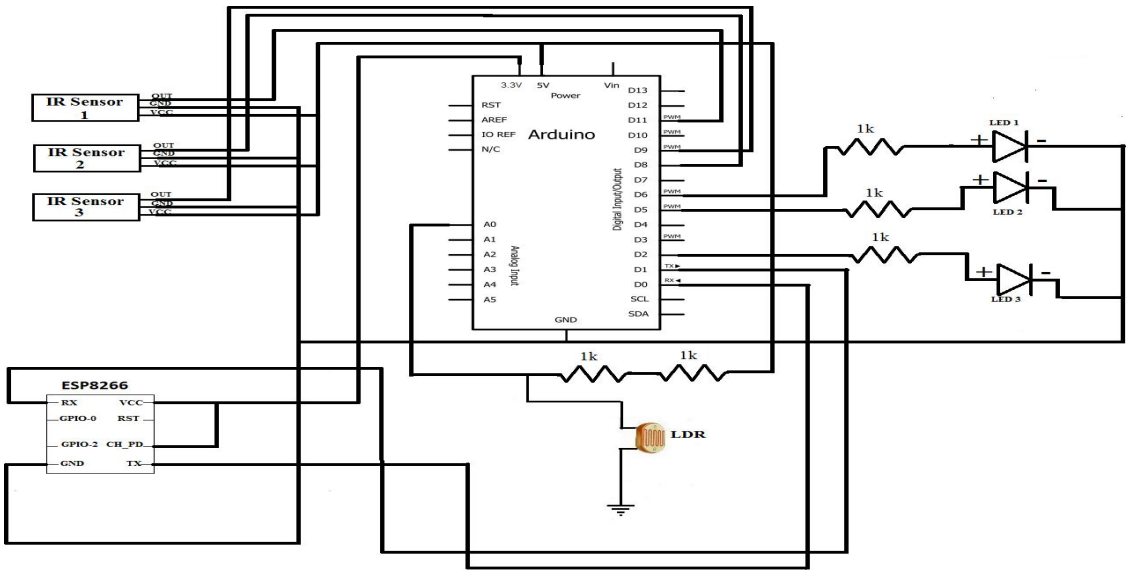

Fig. 1: Block Diagram

Fig. 2: Power Supply

2 Literature Survey

EXISTING APPROACHES

The exiting traffic system is generally controlled by the traffic police. The main drawback of this system controlled by the traffic police is that the system is not smart enough to deal with the traffic congestion.

Even if traffic lights are used the time interval for which the vehicles will be showed

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green or red signal is fixed. Therefore, it may not be able to solve the problem of traffic congestion.

DRAWBACKS IN EXISTING SYSTEM

i) Traffic congestion
ii) No means to detect traffic congestion
iii) Number of accidents are more
iv) It cannot be remotely controlled
v) It requires more manpower
vi) It is less economical

1. **IoT based dynamic road traffic management for smart cities (IEEE,2015)**

   Author: Syed Misbahuddin .

All metropolitan cities face traffic congestion problems especially in the downtown areas. By utilizing information and communication technologies, ordinary cities can be turned into "smart cities" (ICT). The Internet of Things (IoT) paradigm has the potential to play a significant role in thedevelopment of smart cities. This study provides IoT-based traffic management solutions for smart cities, in which traffic flow can be dynamically regulated by onsite traffic cops via their smart phones, or can be monitored and controlled centrally over the Cyber Sever. We utilized the holy city of Makkah in Saudi Arabia as an example, where traffic behavior alters dynamically due to constant pilgrim visits throughout the 12 month. As a result, in addition to the existing traffic control systems, Makkah city requires special trafficcontrol algorithms. However, the proposed approach is generic and can be implemented in any Metropolitan city without losing its generality.

2. **IOT Based Network traffic prediction(IEEE,2019)**

   Author: Ali R Abdellah

Internet of Things (IoT) is a network of interconnected devices, such as sensors and Smart gadgets with processing, sensing, and communication capabilities, as well as the ability to transfer data to each other and a central console through the Internet.

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For any data network, network traffic prediction is a critical operational and management function. In today's increasingly complex and diversified networks, it plays a critical function. For IoT networksto deliver dependable connectivity, network traffic prediction is also more crucial. The artificial neural network (ANN) has been used to predict traffic with great success. In this paper, we use Time Series NARX Feedback Neural Networks to anticipate IoT traffic time series using a multistep ahead prediction method. The estimation error of a prediction approach has been evaluated using the performance functions MSE, SSE, and MAE, besides, another measure of prediction accuracy the mean absolute percent of error.

3. **Integrated Smart Transportation using IOT at Jakarta(IEEE,2019)**

Author: Septia Redisa Sriratnasari

Summary: reviewed incorporated visitors control in Jakarta Various strategic techniques had been explored and carried out, inclusive of odd-even registration code visitors coverage in Jakarta. Its carried out earlier than Asian Games 2018 and prolonged since January 2nd,2019. The end result for the primary 3 months after the implementation became given wonderful tousle public transportation. The use of public transportation enhancement is one approach to create Jakarta as a clever town. Smart town improvement may be supported with the aid of using growing a clever transportation gadget. The time period clever town is a city improvement primarily based totally on statistics era thru involvement with the aid of using citizen and stakeholder. Other addition, clever towns are city regions which have incorporated statistics and communique era in every day governance, with the purpose of improving efficiency, enhancing public services, and enhancing people's welfare.

Rani et al. proposed that IOT devices need to capture the road traffic conditions like speed, flow, and density for a particular section of road.

K Pangbourne, D Stead, M Mladenović in 2018 analyzing the recent concept of smart mobility referred to as Mobility as a Service (MaaS). MaaSsignifies a hybrid innovation technology which combined with a business model for conveying cohesive access to transport services for better road traffic management

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Schimbinschi et al. used the loop detectors for the analysis of traffic data using visual exploratory analysis technique. Though, with the help of loop detectors, it is not fully possible to develop moving vehicles trajectories as such sensors only detect vehicle movement but not summarize the individually recognizing vehicles capabilities

Djahel et al. proposed adaptive TMS emergency scenarios of three levels. They used a set of controllers, sensors and connected vehicle system for the changes in traffic policy system. On the basis of related work, the studyis summarize as traffic flow control usingIoT is the most prominent field for research now a days, the road traffic conditions, smart mobility service for better traffic management, loop detectors for vehicles trajectories, analysis of vehicle trajectory using GPS data, visual analysis system approaches are used to analyze the urban traffic, and adaptive TMS to analyze emergencies in road traffic etc

3. PROPOSED SYSTEM

The current framework is based on a pre-set "time," in which each active signal in the framework is given a specific amount of time. The lights work in every junction, as indicated by that particular "period." However, when all vehicles are passed in one lane (L1) but vehicles are still stuck in another lane (L2) because time is not up, the signal turns red. These frameworks are incredibly wasteful because they are incapable of dealing with a variety of simple situations that arise throughout the day. A significant disadvantage is that time is wasted. The proposed framework aims to prevent the potential outcomes of roads turning into parking lots as a result of the light signal, in part by defraying the vehicles on the street with the highest vehicle density. In which fewer vehicles are held up and tediousness is reduced. Furthermore, our system gives us the flexibility to prioritise emergency vehicles if they appear. For example, a fire emergency, a rescue vehicle emergency, and so on.

The following steps can be used to categorise the Intelligent Automated Traffic Management System:

1. LED Lights: A single stack often has three lights: a green light at the bottom to indicate traffic may proceed, yellow light in the middle to notify vehicles

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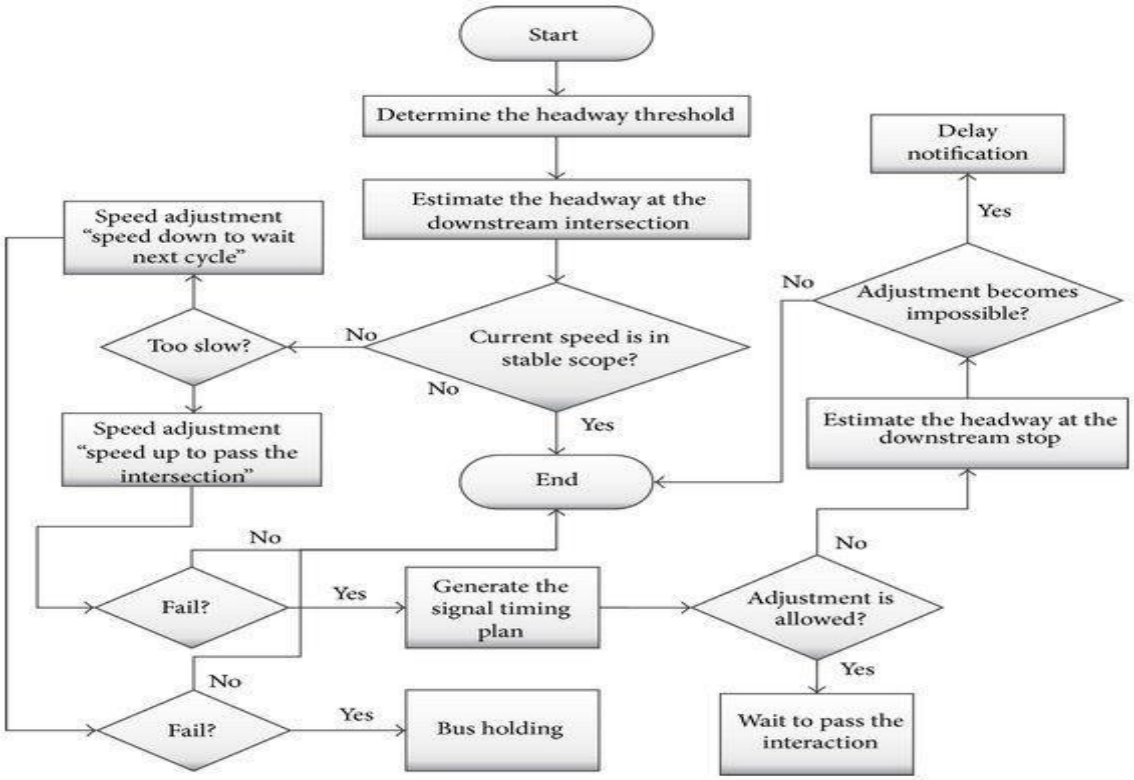
to slowdown and prepare to stop, and a red light at the top to indicate traffic must stop. LED lights are utilised to display these lights.

2. IR Sensor: IR sensors are being used as motion detectors and vehicle detectors. Near every lane, alongside the traffic lights, IR sensors are installed. The time delay in the traffic is based on the density of vehicles on the roads.
3. Arduino: Arduino is an open-source electronics platform that uses simple hardware and software to make things easy to use. Arduino boards can read inputs, such as light from a sensor, and convert them to outputs, such as turning on an LED in this case. The Arduino Integrated Development Environment (IDE) has been written in embedded C and is used to programme your Arduino.

Advantages of Proposed System

1. Minimizes number of accidents.
2. Reduces fuel cost and saves time.
3. Low budget.
4. Easy implementation and maintenance.
5. Remotely controllable.



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Ïig 3: ◧ïaffic Ïlow Contíol System Execution

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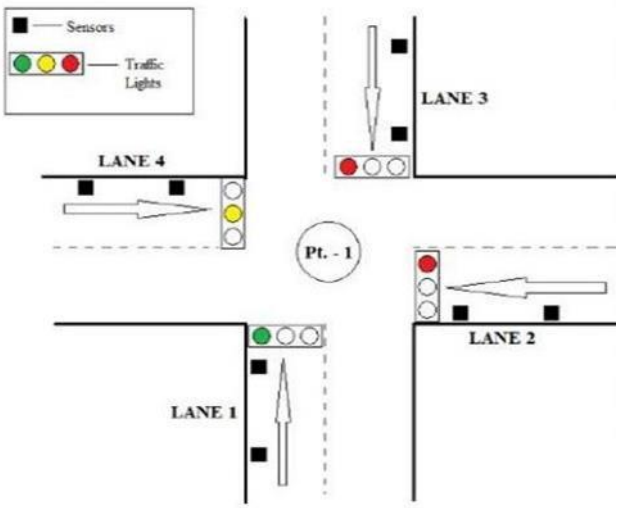

Fig 4: View of signals

4. Experimental Results

The proposed system helps in better time based monitoring and thus has certain advantages over the existing system like minimizing number of accidents, reducing fuel cost and is remotely controllable etc. The proposed system is designed in such a way that it will be ableto control the traffic congestion.

Smart traffic management system has given the best results to with waiting & travelling time of a passenger has been reduced and emergency vehicles can move without obstacles or barriers. The pollution rate can be reduced by implementing this smart traffic management system in all prime locations.

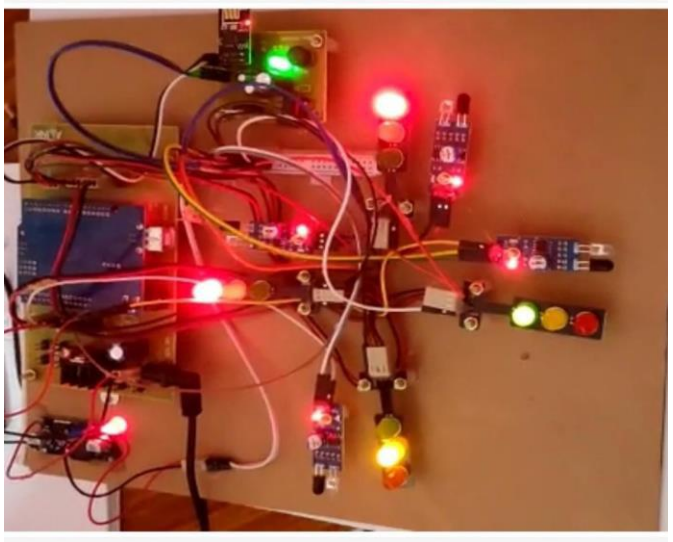

Fig. 4: Iot Device

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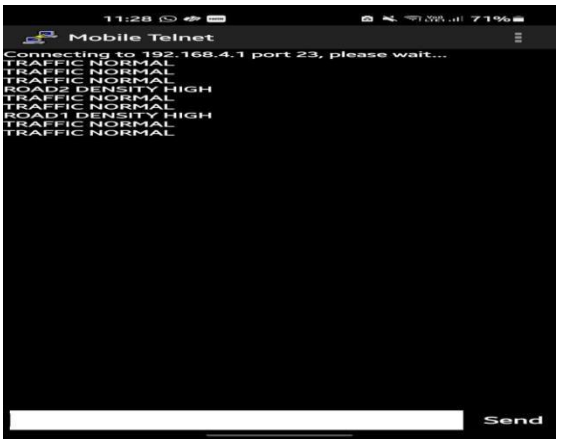

Fig. 5: Output

5. CONCLUSION

Autoamted Traffic Management System has been developed by using multiple features of hardware components in IoT. Traffic optimization is achieved using IoT platform for efficient utilizing allocating varying time to all traffic signal according to available vehicles count in road path. Smart Traffic Management System is implemented to deal efficiently with problemof congestion and perform re-routing at intersections on a road. This research presents an effective solution for rapid growth of traffic flow particularly in big cities which is increasing day by day and traditional systems have some limitations as they fail to manage current traffic effectively. Keeping in view the state of the art approach for traffic management systems, a smart traffic management system is proposed to control road traffic situations more efficiently and effectively. It changes the signal timing intelligently according to traffic density on the particular roadside and regulates traffic flow by communicating with local server more effectively than ever before. The decentralized approach makes it optimized and effective as the system works even if a local server or centralized server has crashed. The system also provides useful information to higher authorities that can be used in road planning which helps in optimal usage of resources. The suggested traffic management system can be implemented in all metropolitan cities as it is most suitable and reliable for the day.

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