M.KUMARASAMY
COLLEGE OF ENGINEERING
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Thalavapalayam, Karur – 639 113.

A Minor Project Report on

INTELLIGENT TRAFFIC MONITORING SYSTEM USING IOT

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M.KUMARASAMY COLLEGE OF ENGINEERING

(An Autonomous Institution - Affiliated to Anna University, Chennai)

Karur - 639 113

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BONAFIDE CERTIFICATE

Certified that this Report titled "**INTELLIGENT TRAFFIC MONITORING SYSTEM USING IOT**" is the bonafide work of **ABIRAMI S (20BEE4002), MONIKA P (20BEE4049), NANDHAKUMAR M (20BEE4054)**, who carried out the work during the academic year (2022-2023).

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DECLARATION

We affirm that the Minor Project report titled "**INTELLIGENT TRAFFIC MONITORING SYSTEM USING IOT"** being submitted in partial fulfillment for the award of **Bachelor of Engineering in Electrical and Electronics Engineering**, is the original work carried out by us.

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VISION AND MISSION OF THE INSTITUTION

VISION

- ✓ To emerge as a leader among the top institutions in the field of technical education.

MISSION

- ✓ Produce smart technocrats with empirical knowledge who can surmount the global Challenges.
- ✓ Create a diverse, fully-engaged, learner - centric campus environment to provide Quality education to the students.
- ✓ Maintain mutually beneficial partnerships with our alumni, industry and Professional associations.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To produce smart and dynamic professionals with profound theoretical and practical knowledge comparable with the best in the field.

MISSION

- ✓ Produce hi-tech professionals in the field of Electrical and Electronics Engineering by inculcating core knowledge.
- ✓ Produce highly competent professionals with thrust on research.
- ✓ Provide personalized training to the students for enriching their skills.

PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

PEO1: Graduates will have flourishing career in the core areas of Electrical Engineering and allied disciplines.

PEO2: Graduates will pursue higher studies and succeed in academic/research careers.

PEO3: Graduates will be a successful entrepreneur in creating jobs related to Electrical and Electronics Engineering /allied disciplines.

PEO4: Graduates will practice ethics and have habit of continuous learning for their success in the chosen career.

PROGRAMME OUTCOMES(POs)

After the successful completion of the B.E. Electrical and Electronics Engineering degree program, the students will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of solutions:
Design solutions for Complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.

PO4: Conduct Investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning in formed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES(PSOs)

The following are the Program Specific Outcomes of Engineering Students:

PSO1: Apply the basic concepts of mathematics and science to analyse and design circuits, controls, Electrical machines and drives to solve complex problems.
PSO2: Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues & challenges.
PSO3: Design, Develop and implement methods and concepts to facilitate solutions for electrical and electronics engineering related real-world problems.

Abstract (Key Words)	Mapping of POs and PSOs
Emergency vehicle, RFID, Wireless Sensors, Traffic Management System.	PO1, PO2, PO3, PO4, PO5, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12, PSO1, PSO2, PSO3.

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LIST OF ABBREVIATION

S No	ABBREVIATION	EXPANSION
1	RFID	Radio Frequency Identification Device
2	LED	Light Emitting Diode
3	IOT	Internet Of Things

ABSTRACT

Traffic management system is a cornerstone of a Smart city. In the current problems of the world, urban mobility is one of the major problems, especially in metropolitan cities. Previous traffic management systems are not capable enough to tackle this growth of traffic on the road networks. The purpose of this paper is to propose a smart traffic management system using the Internet of Things and a decentralized approach to optimize traffic on the roads and intelligent algorithms to manage all traffic situations more accurately. This proposed system is overcoming the flaws of previous traffic management systems. The system takes traffic density as input from cameras which is abstracted from Digital Image Processing technique and sensors data, resultantly giving output as signals management. An algorithm is used to predicts the traffic density for future to minimize the traffic congestion. Besides this, RFIDs are also used to prioritize the emergency vehicles like ambulance, fire brigade etc. by implementing RFID tags in such vehicles. In the case of emergency situations, such as fire explosion or burning of something, fire and smoke sensors are also deployed on the road to detect such situations. Moreover, a mobile application is connected to a centralized server which intimates to nearby rescue department about fire explosion with the location to take further action.

Keywords : Radio Frequency Identification, Digital Image Processing technique, Internet Of Things, Decentralization.

CHAPTER 1

INTRODUCTION

1.1 Introduction

All metropolitan cities face traffic congestion problems especially in the downtown areas. 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. In this day & age, the conventional systems to manage urban mobility are proving incompetent. And there's a growing need for an efficient traffic management system. Cities big and small are in dire need of technology-led digital solutions to manage & monitor traffic. They can help regulate heavy traffic, road blockages at signals & congested networks. 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. It will explore the role of IoT in traffic management, the challenges it can solve & essential technologies to develop an intelligent system. We'll also explain how a city government can implement it to offer a good citizen experience. 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 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.

1.2 Necessity

Strong economic growth, intelligent traffic systems were designed to provide traffic managers with real-time and predictive insights about traffic flow speeds and traffic congestion/incidents. In practice, however, the success of such projects strongly depends on a city's ability to place a virtual management layer on top of physical traffic infrastructure. The need for transportation won't abate any time soon But even in that unlikely scenario, someone will have to transport and install the portals around town. More realistically, the latest prognosis on population growth suggests that urban areas will become even denser and span into megacities with population counts of 20 million in the next 50 years. And all those people will want to have multimodal transportation options. McKinsey estimates that between now and 2040, approximately $2 trillion in transport infrastructure investments will be needed every year. These investments will go into, Expansion and modernization of physical road infrastructure road connectivity projects, electric charging infrastructure development, and maintenance. Public transportation sector de-carbonization and improvement, paired with urban mobility as a service solutions. Logistics and freight route improvements and better solutions for the booming last-mile delivery sector. Smart city traffic management solutions to battle congestion and pollution on the streets. The pilot system we designed aggregates data from in-car sensors, road cameras, public traffic feeds, and user devices. After being processed locally on the edge device, this information is dispatched to the cloud system for further analysis. Then it is made available to road users and regional traffic management centers as real-time updates on traffic conditions. Arguably, the best part about building out such edge data processing capabilities (paired with live video) is that you can reuse the collected data for other intelligent traffic analytics use cases. These include, Multimodal traffic counts to understand the most-used modalities in the area and their average cruising speeds. Road safety analytics — using pattern detection, your systems can flag inappropriate driver and pedestrian behaviour in different areas. Programmatic alerting of response units (police, ambulance, tow trucks/maintenance teams) after detecting an incident. Public transport detection across the city to monitor on-time performance and implement adaptive controls. Origin–destinations traffic analysis to develop better traffic management plans and update controls in line with the most common journeys.

1.3 Scope of the work

Traffic Flow Management, can be defined as the range of influence or impact for a particular TMI (delay program, ground stop, etc). Here, this traffic monitoring system is designed at low cost. It is constructed from resistors, capacitors, and Transformer, LED, Oscillator. This puts forth a traffic signal monitoring and controller system that can be operated remotely over the internet from anywhere with manual override ability. An IoT solution consists of sensors/devices which “talk” to the cloud through some kind of connectivity. Once the data gets to the cloud, software processes it and then might decide to perform an action, such as sending an alert or automatically adjusting the sensors/devices without the need for the user. But if the user input is needed or if the user simply wants to check in, a user interface allows them to do so. Any adjustments or actions that the user makes are then sent in the opposite direction through the solution: from the user interface, to the cloud, and back to the sensors/devices to make some kind of change. he internet of Things, or “IoT” for short, is about extending the power of the internet beyond computers and smartphones to a whole of other things, processes and environments. Those “connected” things are used to gather information, send information back, or both. IoT provides businesses and people with better control over the 99% of objects and environments that remain beyond the reach of the internet. IoT allows businesses and people to be more connected to the world around them, and to do more meaningful, higher-level work. A complete IoT solution integrates four distinct components. IoT provides businesses and people with better control over the 99% of objects and environments that remain beyond the reach of the internet. IoT allows businesses and people to be more connected to the world around them, and to do more meaningful, higher-level work. A complete IoT solution integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface.

CHAPTER 2
LITERATURE SURVEY

[1] P. Attri, F. Rafiqui and N. Rawal, "Traffic Signal Preemption (TSP) system for ordinary vehicles in case of emergency based on Internet of Things ecosystem," 2016 3rd International Conference on Computing for Sustainable Global Development (INDIACom), New Delhi, 2012.

Road infrastructure has seen consistent improvement in the last few years. Connectivity has improved and road transportation has become a focus of rapid development. Roads are providing better access to services, ease of transportation and freedom of movement to people. But in metropolitan cities traffic congestion is increasing rapidly, it results in chronic situation in dense downtown areas. Traffic signals play a significant role in the urban transportation system. They control the movement of traffic on urban streets by determining the appropriate signal timing settings. Adaptive traffic signal controllers as the principle part of intelligent transportation systems has a primary role to effectively reduce traffic congestion by making a real time adaptation in response to the changing traffic network dynamics. Many methods used for traffic signal timing optimization under different criteria's. In this paper different methods are proposed by reviewing different research papers for traffic signal control, which gives best adaptability & optimization ideas in traffic signal control. To overcome such circumstances in present scenario, smart traffic management system can be initiated and we are in study to find a solution to make traffic free city. This system helps in monitoring the traffic signals and flow of vehicles by means of image processing with CCTV cameras. As we face rapid growth of our country's population, smart traffic management system provides people to have smooth transportation network.

[2] Y. Desai, Y. Rungta and P. Reshamwala, "Automatic Traffic Management and Surveillance System," 2020 International Conference on Smart Innovations in Design, Environment, Management, Planning and Computing (ICSIDEMPC), AURANGABAD, 2020.

Traffic congestion could be a condition in transport where it has huge crowds, slows the speed of vehicles and even it increases the vehicular lengths. Traffic congestion on city road networks has increased rapidly, since the 1950s. When the traffic demand is great then the interaction between the vehicles reduces the speed of the traffic and finally results in traffic congestion. To overcome such circumstances in present scenario, smart traffic management system can be initiated and we are in study to find a solution to make traffic free city. This system helps in monitoring the traffic signals and flow of vehicles by means of image processing with CCTV cameras. As we face rapid growth of our country's population, smart traffic management system provides people to have smooth transportation network. It counts number of vehicles that passes on a particular path during a specified duration. It also determines the network congestion, and hence the green light duration for that path. If the RFID-tag-read belongs to the stolen vehicle, then a RTO update the id on database. Also, when an ambulance is approaching the junction, it will communicate to the traffic controller in the junction to turn on the green light. With the growing number of individuals and vehicles within the populated area, traffic jam has become a serious problem and a challenge in big cities. Slow cars not only drive trips, but even have an impression on the environment by polluting the air, the economy by wasting working hours and fuel, and private health by increasing the extent of stress. It also can be life-threatening when emergency vehicles attempt to undergo traffic jams.

[3] S. V. Raut, S. A. Jangam and B. Rajpathak, "Improving Vehicular Traffic Efficiency by Infrared Sensors," 2020 IEEE First International Conference on Smart Technologies for Power, Energy and Control (STPEC), Nagpur, 2019.

This paper presents an intelligent based traffic management system to pass emergency vehicles smoothly. Currently, number of vehicles has been increased and traditional systems of traffic controlling couldn't be able to meet the needs that cause to emergence of Intelligent Traffic Controlling Systems. Each individual vehicle is equipped with special RFID tag, which makes it impossible to remove or destroy. We use RFID reader for read the RFID tags attached to the vehicle. It counts number of vehicles that passes on a particular path during a specified duration. It also determines the network congestion, and hence the green light duration for that path. If the RFID-tag-read belongs to the stolen vehicle, then a RTO update the id on database. The system is developed to handle the situation, which performs execution based on density of vehicles in the each path. Based on number of vehicle the signals will be allotted for a particular side. For processing this scenario sensors and Arduino is used as a microcontroller which provides the signal timing based on the traffic density. Also, when an ambulance is approaching the junction, it will communicate to the traffic controller in the junction to turn on the green light. With the growing number of individuals and vehicles within the populated area, traffic jam has become a serious problem and a challenge in big cities. Slow cars not only drive trips, but even have an impression on the environment by polluting the air, the economy by wasting working hours and fuel, and private health by increasing the extent of stress. It also can be life-threatening when emergency vehicles attempt to undergo traffic jams. Slow cars not only drive trips, but even have an impression on the environment by polluting the air, the economy by wasting working hours and fuel, and private health by increasing the extent of stress. It also can be life-threatening when emergency vehicles attempt to undergo traffic jams.

[4] N. Bagheri, S. Yousefi and G. Ferrari, "Software-defined Control of Emergency Vehicles in Smart Cities," 2020 10th International Conference on Computer and Knowledge Engineering (ICCKE), Mashhad, Iran, 2020.

This paper describes different methods used to detect an emergency vehicles and normal vehicles. It also covers different methods to tackle the traffic for normal and traffic at the time of passing of an emergency vehicle. By time-to-time new methods are developed to overcome the congestion issues at traffic junctions. In this survey paper, we describe and compare many techniques of identification through table and figures. With the growing number of individuals and vehicles within the populated area, traffic jam has become a serious problem and a challenge in big cities. Slow cars not only drive trips, but even have an impression on the environment by polluting the air, the economy by wasting working hours and fuel, and private health by increasing the extent of stress. It also can be life-threatening when emergency vehicles attempt to undergo traffic jams. It counts number of vehicles that passes on a particular path during a specified duration. It also determines the network congestion, and hence the green light duration for that path. If the RFID-tag-read belongs to the stolen vehicle, then a RTO update the id on database. The system is developed to handle the situation, which performs execution based on density of vehicles in the each path. Based on number of vehicle the signals will be allotted for a particular side. For processing this scenario sensors and Arduino is used as a microcontroller which provides the signal timing based on the traffic density.Also, when an ambulance is approaching the junction, it will communicate to the traffic controller in the junction to turn on the green light.

CHAPTER 3

EXISTING SYSTEM

3.1 Introduction

Existing system has unnecessary waiting time even though there is less number of traffic in the road and there is no facility to handle emergency vehicles in the traffic. The system is developed to handle the situation, which performs execution based on density of vehicles in the each path. Based on number of vehicle the signals will be allotted for a particular side. The present day increase in vehicle traffic is one of the liabilities for this highly growing and competitive world. The existing systems of vehicle traffic monitors have been successful in coping up with the various factors that affect daily life and has helped to overcome he difficulties of common man to travel better despite raising traffic. Thinking of the developing innovations and improvement in the Internet of Things, the implementation of a vehicle traffic monitoring system using IoT would provide a faster, efficient and yet accurate results. With the rising population spending most of their time travelling, stuck amongst traffic, finding a way to reduce this time will make it fruitful for everyone. This system hence shows a method using IoT devices to get a control of vehicle traffic and has introduced a system to avoid congestion and facilitate better travel experience. The project aims in processing and monitoring data sent by IoT connected vehicles and then use this data to resolve various problems faced by passengers. This helps the passenger to avoid highly crowded routes and find the suitable paths of their choice. The system utilizes new and simple technologies for real-time collection, organization and transmission of information to provide an efficient and accurate estimation of traffic density in any specific area. For processing this scenario sensors and Arduino is used as a microcontroller which provides the signal timing based on the traffic density.

3.2 Block diagram

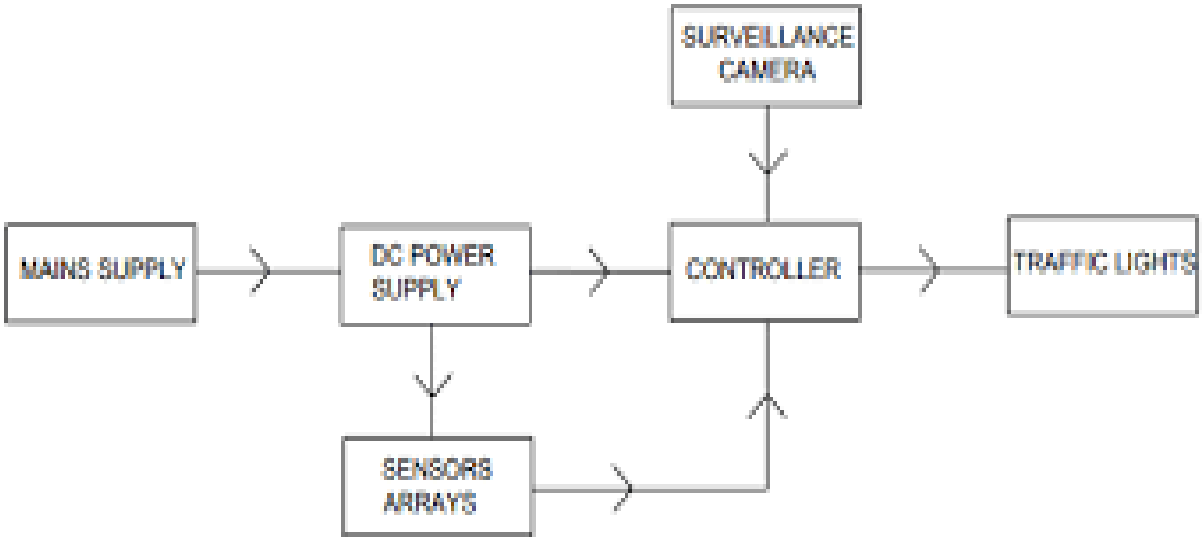

Figure 3.1 Existing Block diagram

Figure 3.1 explains about the existing system of Traffic monitoring system,in that system A traffic monitoring system automatically and continuously monitors vehicles in moving traffic. Sensors that are installed in or near the road are used to record, aggregate, evaluate and visualize a wide variety of parameters from vehicles, infrastructure and the environment. the main supply provides 230V AC power which is converted to 5V DC (VDD) by the DC power supply used to power the sensor arrays, the controller, the surveillance camera and traffic lights. The sensors provide input to the controller which then performs some logical operations to power the traffic lights as output used for controlling traffic at road intersections. Additionally for the proposed surveillance system, the camera is interfaced with the controller to capture license number plates of traffic defaulters for storage and law enforcement purposes.

3.3 Problem Statement

The major traffic problem in the recent scenario is the traffic congestion and the road rash case which is increasing in a blink of an eye. In the context of Kathmandu, which is the capital city of Nepal, people have to go through traffic congestion every single day. A proper system should be adopted in order to control this problem. By exploring various papers related to the subject matter, the problems are stated, The existing traffic is controlled manually by traffic policeman. The complexity of road networks is increased to service the growing demand for road users. The dependency on the manual service of the traffic policeman communicating to the people which are not good in terms of efficiency and safety.

Over several decades, traffic congestion has become a serious problem in the major cities. Congestion is particularly associated with motorization and the diffusion of the automobile, which has increased the demand for transportation infrastructure. However, the supply of the transportation infrastructure has often not been able to keep up with the growth of mobility. Traffic congestion problems consist of incremental delay, vehicle operating costs such as fuel consumption, pollution emissions and stress that result from interference among vehicles in the traffic stream, particularly as traffic volumes approach a road's capacity. Across cities more people are spending more time sitting in traffic jams than ever before Traffic congestion occurs when the demand is greater than the available road capacity. There are many reasons that cause congestion; most of them reduce the capacity of the road at a given point or over a certain length, for example people parking on the roads or increase in the number of vehicles. Traffic congestion also occurs due to traffic signal. At traffic signal when road traffic density is low signal still shows the same traffic time due to which other lane traffic increases which result in traffic congestion. Sometimes due this problem the ambulance, police vans, fire-fighting vehicle are not reaching at their destination on time.

CHAPTER 4

PROPOSED SYTEM

4.1 Introduction

The system uses arduino based circuit system to monitor traffic signal densities and transmits this data online over internet to the controllers. Traffic Flow Management, can be defined as the range of influence or impact for a particular TMI (delay program, ground stop, etc). Here, this traffic monitoring system is designed at low cost. It is constructed from resistors, capacitors, and LED, LCD. This puts forth a traffic signal monitoring and controller system that can be operated remotely over the internet from anywhere with manual override ability. The project aims in processing and monitoring data sent by IoT connected vehicles and then use this data to resolve various problems faced by passengers. This helps the passenger to avoid highly crowded routes and find the suitable paths of their choice. The system utilizes new and simple technologies for real-time collection, organization and transmission of information to provide an efficient and accurate estimation of traffic density in any specific area. For processing this scenario sensors and Arduino is used as a microcontroller which provides the signal timing based on the traffic density. The existing systems of vehicle traffic monitors have been successful in coping up with the various factors that affect daily life and has helped to overcome he difficulties of common man to travel better despite raising traffic. IoT provides businesses and people with better control over the 99% of objects and environments that remain beyond the reach of the internet. IoT allows businesses and people to be more connected to the world around them, and to do more meaningful, higher-level work. A complete IoT solution integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface. Thinking of the developing innovations and improvement in the Internet of Things, the implementation of a vehicle traffic monitoring system using IoT would provide a faster, efficient and yet accurate results. With the rising population spending most of their time travelling, stuck amongst traffic, finding a way to reduce this time will make it fruitful for everyone.

4.2 Block Diagram of Intelligent traffic monitoring system using IOT.

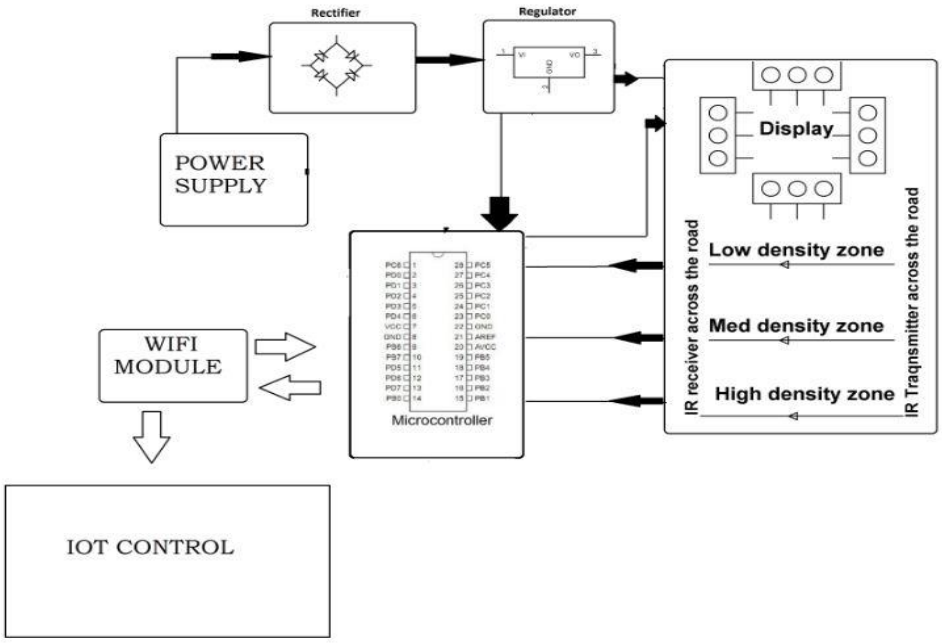

Figure.4.1 Proposed model of Intelligent traffic monitoring system using IOT.

Figure 4.1 explains about the proposed system of Traffic monitoring system using IOT,in this model , Here we propose an IOT based automated traffic signal monitoring as well as controller system that automates complete traffic signaling system automation and also allows for manual override over internet. The system uses arduino based circuit system to monitor traffic signal densities and transmits this data online over internet to the controllers. We use IOT Gecko in order to develop the online GUI based system to monitor the traffic densities.The system shows current densities to help monitor traffic conditions on roads. Also the system provides an option to the controllers to override any signal and make it green in case of any ambulance or important vehicles to pass through while keeping other signals red.

4.3 Description of Various blocks

4.3.1 Controller:

The figure 4.2 shows about the Traffic signal controllers alternate service between conflicting traffic movements. This requires assignment of green time to one movement, then to another. If left turns have separate controls, and at complex intersections, there may be more than two conflicting movements. Traffic light control systems are widely used to monitor and control the flow of automobiles through the junction of many roads. They aim to realize smooth motion of cars in the transportation routes.

Figure.4.2 Controller

4.3.2 Traffic lights:

The figure 4.3 explains about the inter-communication in the centralized control unit sets the timer of the traffic light and synchronizes with the traffic density in real-time for smooth mobility of vehicles with less delay. Traffic signals are designed to ensure an orderly flow of traffic, provide an opportunity for pedestrians or vehicles to cross an intersection and help reduce the number of conflicts between vehicles entering intersections from different directions.

Figure.4.3 Traffic Lights

4.3.3 Sensor arrays:

The figure 4.4 explains about the detect vehicles travelling in a particular direction using a change in frequency according to the speed of the vehicle. IoT sensors provide the backbone of data that intelligent transportation management systems analyze to increase actionable insights. Smart traffic management systems use integrated sensors like Radio frequency identification (RFID) tags.

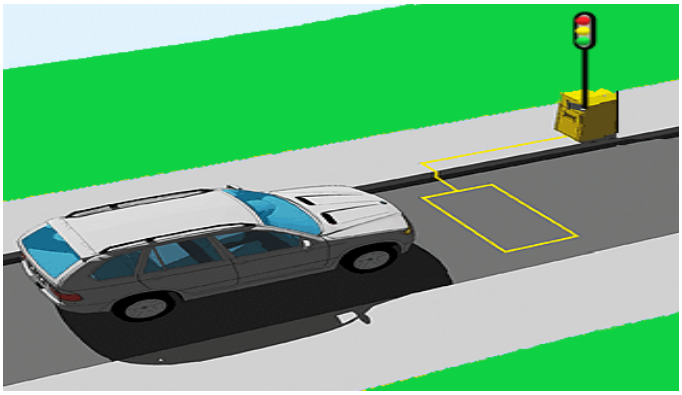

Figure.4.4 Sensor arrays

4.3.4 Surveillance camera:

The figure 4.5 explains about the traffic surveillance works in three main stages. First, magnetic sensor nodes detect vehicles on the surface of roads and gates and send the gathered data to the nearest base-station. To be more precise, magnetic sensors detects vehicles based on magnetic field variation of earth caused by moving vehicles**.** Also, the sensor-based system offers energy-efficient operation, reliable data transmission, and accurate operations.

Figure 4.5 Camera

4.3.5 Dc supply:

The figure 4.6 explains about the traffic Signal power supplies supply power to traffic signal cabinets while adhering to local utility company requirements. The traffic signal power supply is an electrical device in the control cabinet that converts AC to correct DC voltages for various devices in the traffic signal cabinet. The nominal voltage of the power supply is 24VDC. If the power supply cable travels underground, it is run in a separate RGS conduit from the detector, signal, and communications cables. If it travels overhead, it is usually run on a separate messenger cable above all other signal cables.

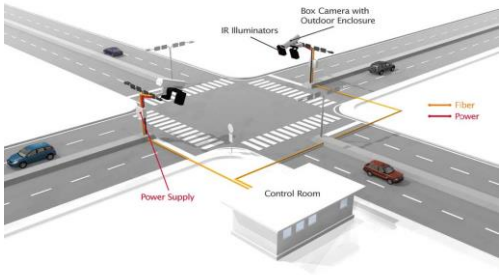

Figure 4.6 Dc supply

4.3.6 Capacitor:

The figure 4.7 explains about the capacitor is a device for storing electrical energy, consisting of two conductors in close proximity and insulated from each other. A simple example of such a storage device is the parallel-plate capacitor. A capacitor is a circuit component that temporarily stores electrical energy through distributing charged particles on (generally two) plates to create a potential difference. A capacitor can take a shorter time than a battery to charge up and it can release all the energy very quickly.

Figure 4.7 Capacitor

4.4 Hardware Components

S.NO	COMPONENTS	COST in Rs.
1	ATmega328P	100
2	IR sensor	900
3	Bluetooth module	200
4	Transformer	100
5	Arduino Development Board	1500
6	LEDs	60
7	Connecting Wires	140
	TOTAL COST	3000

Table 4.1 Hardware Components and its cost

4.5 Hardware Model

In this day & age, the conventional systems to manage urban mobility are proving incompetent. And there's a growing need for an efficient traffic management system. Cities big and small are in dire need of technology-led digital solutions to manage & monitor traffic. They can help regulate heavy traffic, road blockages at signals & congested networks. 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. Through this model we will explore the role of IoT in traffic management, the challenges it can solve & essential technologies to develop an intelligent system. Here we propose an IOT based automated traffic signal monitoring as well as controller system that automates complete traffic signaling system automation and also allows for manual override over internet. The system uses arduino based circuit system to monitor traffic signal densities and transmits this data online over internet to the controllers. We use IOT Gecko in order to develop the online GUI based system to monitor the traffic densities. The system shows current densities to help monitor traffic conditions on roads. Also the system provides an option to the controllers to override any signal and make it green in case of any ambulance or important vehicles to pass through while keeping other signals red. . A complete IoT solution integrates four distinct components: sensors/devices, connectivity, data processing, and a user interface. Thinking of the developing innovations and improvement in the Internet of Things, the implementation of a vehicle traffic monitoring system using IoT would provide a faster, efficient and yet accurate results. With the rising population spending most of their time travelling, stuck amongst traffic, finding a way to reduce this time will make it fruitful for everyone.

The figure 4.8 shows about the Hardware set up intelligent traffic monitoring system using IOT. In this model it have transformer, IR sensors, Wifi module, Arduino board and LEDs. It is an IOT based automated traffic signal monitoring as well as controller system that automates complete traffic signaling system automation and also allows for manual override over internet. The system uses arduino based circuit system to monitor traffic signal densities and transmits this data online over internet to the controllers. We use IOT Gecko in order to develop the online GUI based system to monitor the traffic densities. The system shows current densities to help monitor traffic conditions on roads. Also the system provides an option to the controllers to override any signal and make it green in case of any ambulance or important vehicles to pass through while keeping other signals red.

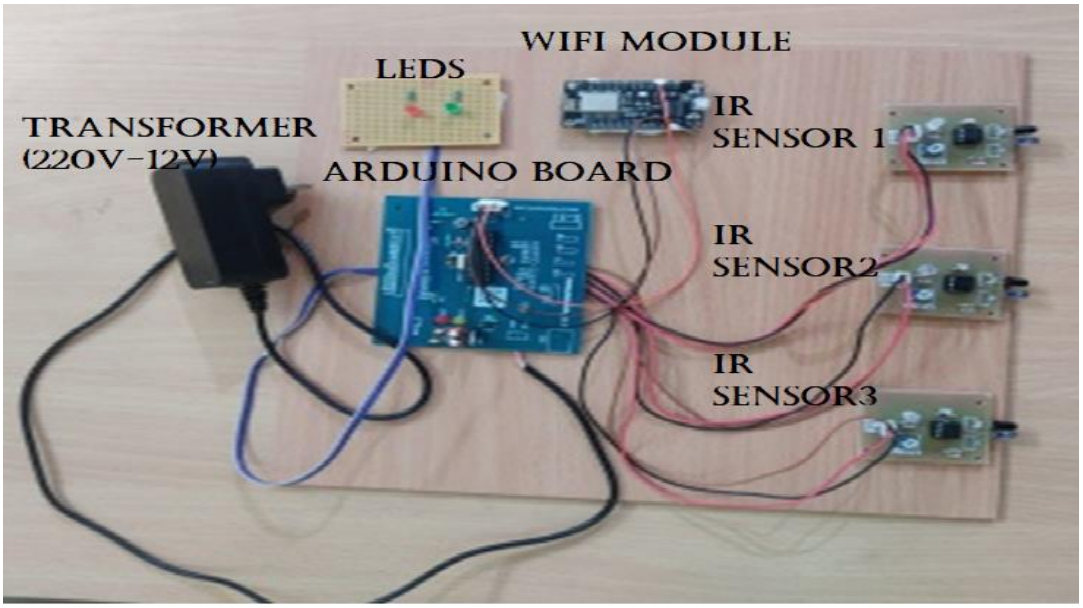

Figure.4.8 Experimental test set up of intelligent traffic monitoring system using IOT.

CHAPTER 5
RESULT AND DISCUSSION

5.1 Hardware Implementation

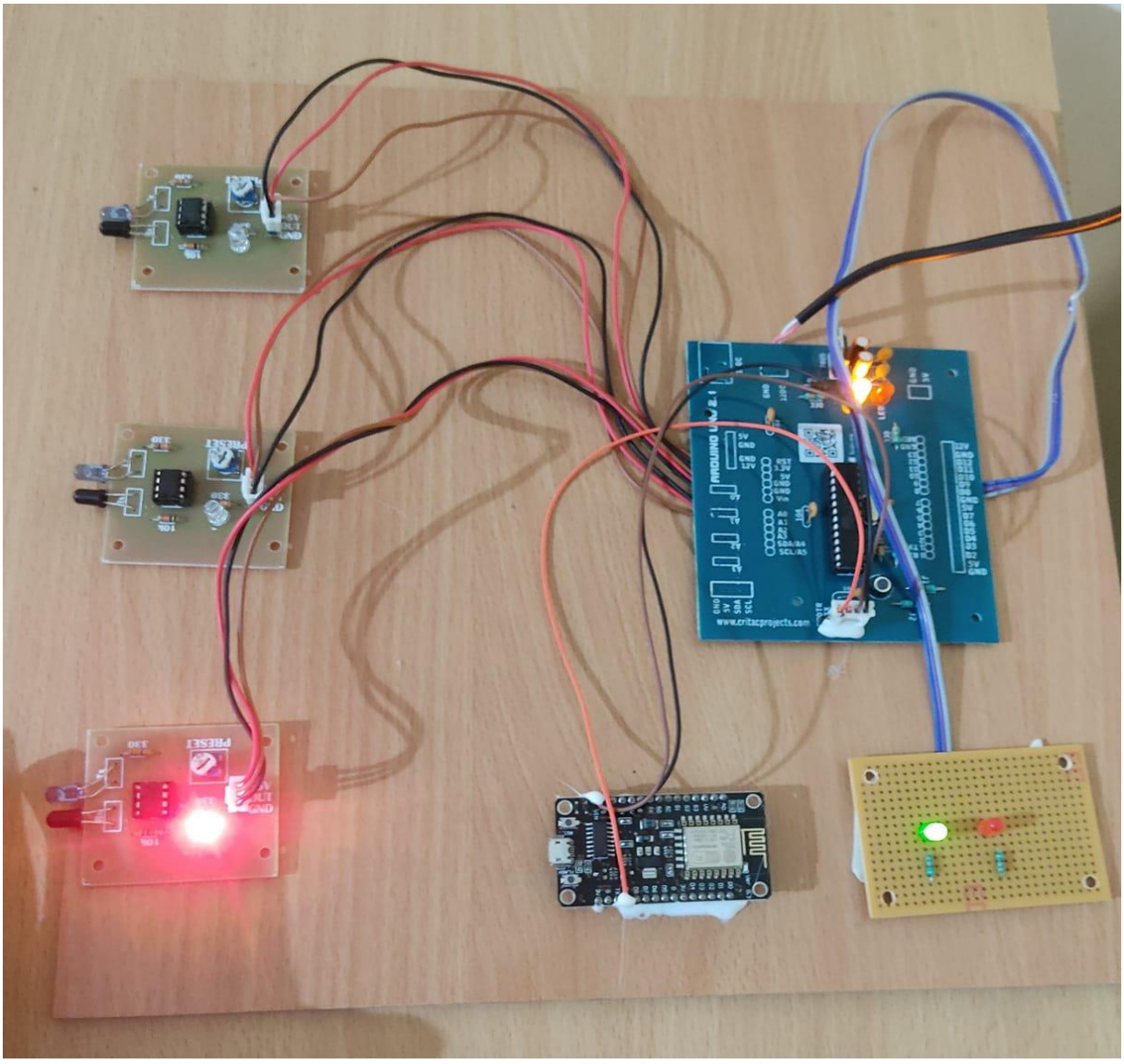

Figure.5.1 Demonstration test setup of intelligent traffic monitoring system using IOT.

5.2 Working principle of intelligent traffic monitoring system using IOT

A traffic monitoring system automatically and continuously monitors vehicles in moving traffic. Sensors that are installed in or near the road are used to record, aggregate, evaluate and visualize a wide variety of parameters from vehicles, infrastructure and the environment Smart traffic signals might look like your typical stoplight, but they use an array of sensors to monitor traffic in real-time. Often, the goal is to reduce the amount of time cars spend idle. Using IoT technology, the various signals communicate with each other and adapt to changing traffic conditions in real-time. Not only does this mean less time in traffic jams, but it cuts carbon emissions that cars release into the atmosphere. Carnegie Mellon University is part of a pilot program in Pittsburgh that has been testing this type of technology, and the initial data is very promising. The pilot run showed 40% reductions in vehicle wait time, 26% in travel time, and 21% in projected vehicle emissions.. Connect the connections as per the circuit diagram. The circuit is ready for the traffic monitoring purpose. Depending on the area of application, data visualization can take place at various aggregation levels. From the load the output is feedback to the Microcontroller through shunt resistor. Traffic monitoring systems are used to assist the police and transportation authorities with preventive and regulatory activities to increase road safety. Hence, the traffic monitoring system is used to control the traffic.

CHAPTER 6

CONCLUSION AND FUTURE SCOPE

6.1 Conclusion

We are successful in classifying humans, vehicles, and animals as precisely as possible. Detection of these objects will vary according to the weather conditions as well as day and night duration, we are trying to improve our system for every weather and lighting condition as the whole system depends upon the quality of video captured by the cameras like exposure, saturation, hue and color temperature. Our algorithm divides the traffic light timing efficiently sent as possible. So, our whole traffic management system works nearly 96% efficiently when compared to present working traffic management systems. In this study two different models have been developed based on different decision criteria: ·Finding the shortest path based on the real time data collected from the street network. ·Finding the shortest path using travel time modeling method based on historical and real time data that incorporates both concepts of short-term travel time forecasting and shortest path finding. Therefore, this research effort opens many interesting and practical issues for future work. Hence, the project named as the intelligent traffic management system and it has been successful and we have tested everything and the sensors are also working great. And the main process of the project that intelligent traffic management system and how it work means if any one crossing the signal rashly and or going very speed or any one crossing the on the zebra lines when it is in green light then and there only the camera it will take a photograph and sends to the control room and sensors also will make one sound right there . it is very useful to keep those in and near traffic signals . As a conclusion, the controller can control the traffic movement and detect a busy and non-busy road. The overall of this project is ok but certain condition the traffic signals is not function properly. The critical problem is about the timing.

6.2 Future scope

Because of the non-stop increase of the population inside the global, it is an extraordinary challenge for the imminent generation to manipulate the Traffic system. a good deal of improvement will come in the future. To manipulate the conventional transport device, we must consider an intelligent and automated manner of controlling the machine. as the population increases, it will increase the range of motors also. to manipulate the huge wide variety of vehicles intelligent methods ought to be followed. For future purposes, we can use the picture sensor or imager. It does its work by generating photos of the roads. It creates the image with the aid of changing the variable attenuation of mild into a sign that conveys the photograph. This project can be enhanced in such a way as to control automatically the signals depending on the traffic density on the roads using sensors like IR detector/receiver module extended with automatic turn off when no vehicles are running on any side of the road which helps in power consumption saving. • No. of passing vehicle in the fixed time slot on the road decide the density range of traffics and on the basis of vehicle count microcontroller decide the traffic light delays for next recording interval. In future this system can be used to inform people about different places traffic condition. This can be done through RADIO. Data transfer between the microcontroller and computer can also be done through telephone network, data call activated SIM This technique allows the operator to gather the recorded data from a far end to his home computer without going there • Traffic lights can be increased to N number and traffic light control can be done for whole city by sitting on a single place. • In ambulance system, the data of the patient in the ambulance can be sent to the Hospitals via GSM technology. Thus, it can provide early and fast treatment of the patient.

6.3 Applications

IoT sensors can monitor important safety elements on the vehicles themselves, like tire pressure, and alert drivers to any issues. IoT devices can also follow the cars in real-time, redirecting drivers to the most efficient route or allowing the owners to track the vehicle from a computer. Future generation can use in wide range for various applications. Travel time modeling is used to estimate the travel time associated with each street segment by taking into account the events that periodically cause traffic congestion (e.g., going to work at a specific time). Here days are categorized, e.g. Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday. Travel time modeling is used to estimate the travel time associated with each street segment by taking into account the events that periodically cause traffic congestion (e.g., going to work at a specific time). It allows the user to define a limited number of linear detection zones on the roadway in the field-of-view of the video camera. When a vehicle crosses one of these zones, it is identified by noting changes in the properties of the affected pixels relative to their state in the absence of a vehicle. it estimates vehicle speed and then measure the time that an identified vehicle needs to traverse a detection zone of known length. the number of vehicles (volume) and speed of each vehicle in order to calculate the time each vehicle needs to cover a particular route. Timetable and speed table updating system stores all estimated travel times and traffic mean speeds related to each route in previous days. A new time table and speed table with up dated data will be created every 20 seconds. On the other hand the time interval between two Time tables or speed tables is 20 second, hence in this study t_0, t_1,...,t_k are the times at which time tables and speed tables have been created. Such tables involve the characteristics of a street network, for example travel time and traffic mean speed are set to ∞ and 0 respectively for nodes not directly linked to each other.

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