

DENSITY BASED TRAFFIC SIGNAL CONTROL SYSTEM

Submitted in partial fulfillment of the requirements for
the award of
Bachelor of Engineering Degree in Computer Science and Engineering
by

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INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of Sai Raju rajanala (38110445,) who carried out the project entitled “DENSITY BASED TRAFFIC CONTROLLED AND EMERGENCY VEHICLE RESCUE MONITORING SYSTEM” under our supervision from November 2020 to April 2021.

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, hereby declare that the Project Reportentitled “**DENSITY BASED TRAFFIC
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VEHICLE RESCUE MONITORING SYSTEM” done by me under the guidance of
Dr. Rajalaekshmi, at Sathyabama Institute of Science and technology is
submitted in partial fulfillment of the requirements of the award **of Bachelor of
Engineering degree in Computer Science and Engineering.**

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ABSTRACT

Congestion in traffic is a serious issue. In existing system signal timings are fixed and they are independent of traffic density. Large red-light delays lead to traffic congestion. In this paper, IOT based traffic control system is implemented in which signal timings are updated based on the vehicle counting. This system consists of WI-FI transceiver module it transmits the vehicle count of the current system to the next traffic signal. Based on traffic density of previous signal it controls the signals of the next signal. The emergency vehicles such as ambulances, fire engines and police vehicles are given equal priority over other vehicles and hence get stuck up in this traffic congestion. A methodology for priority-based vehicle detection based on image processing techniques is proposed in this paper. If an emergency vehicle is detected on the road, the lane in which this vehicle is will be given higher priority over all other lanes. The paper proposes an algorithm which will detect whether a vehicle is an emergency one or not.

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CHAPTER 1

INTRODUCTION

Most of the traffic control systems in developing countries works on fixed time concept, the time for green/red signals are set on the basis of expected traffic density. Such systems are not dynamic and yields poor results in many situations. The existing timer-based traffic systems are not able to control traffic congestion effectively. Furthermore, emergency vehicles can also face problems whenever they reach at a traffic signal. An intelligent traffic control system is required to solve the problem faced by emergency vehicles. Nowadays the management of traffic is really inefficient. The major reason for this is because of the poor traffic prioritization. We had come across a situation where some lanes may have less traffic than the other but since the duration of the green signal is equal for all lanes no priority is given to any lanes and thus results in wastage of resources and drivers are stressed. Our research is on density-based traffic control in which priority is given to lanes in which the emergency vehicles are detected. The use of dynamic background to calculate the traffic density had enhanced the result by significant level and thereby reducing any automatic addition of stationary objects in a relevant scene. The priority lane after the allotted time is again set as a normal lane, thereby ensuring every lane has equal opportunity. The lanes with more traffic get the highest priority if no emergency vehicle is detected.

1.1 Internet Of Things:

The Internet of things (IoT) is the inter-networking of physical devices, vehicles (also referred to as "connected devices" and "smart devices"), buildings, and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to collect and exchange data. In 2013 the Global Standards Initiative on Internet of Things (IoT-GSI) defined the IoT as "a global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies" and for these purposes a "thing" is "an object of the physical world (physical things) or the information world (virtual things), which is capable of being identified and integrated into communication networks". The IoT allows objects to be sensed or controlled

remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of about 30 billion objects by 2020. Typically, IoT is expected to offer advanced connectivity of devices, systems, and services that goes beyond machine-to-machine (M2M) communications and covers a variety of protocols, domains, and applications. The interconnection of these embedded devices (including smart objects), is expected to usher in automation in nearly all fields, while also enabling advanced applications like a smart grid, and expanding to areas such as smart cities. "Things", in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, electric clams in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring, or field operation devices that assist firefighters in search and rescue operations. Legal scholars suggest regarding "Things" as an "inextricable mixture of hardware, software, data and service". These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. Current market examples include home automation (also known as smart home devices) such as the control and automation of lighting, heating (like smart thermostat), ventilation, air conditioning (HVAC) systems, and appliances such as washer/dryers, robotic vacuums, air purifiers, ovens, or refrigerators/freezers that use Wi-Fi for remote monitoring. As well as the expansion of Internet-connected automation into a plethora of new application areas, IoT is also expected to generate large amounts of data from diverse locations, with the consequent necessity for quick aggregation of the data, and an increase in the need to index, store, and process such data more effectively. IoT is one of the platforms of today's Smart City, and Smart Energy Management Systems.

History

As of 2016, the vision of the Internet of things has evolved due to a convergence of multiple technologies, including ubiquitous wireless communication, real-time analytics, machine learning, commodity sensors, and embedded systems. This means that the traditional fields of embedded systems, wireless sensor networks, control systems, automation (including home and building automation), and others all contribute to enabling the Internet of things (IoT). The concept of a network of smart devices was discussed as early as 1982, with a modified Coke machine at Carnegie Mellon University becoming the first Internet-connected appliance, able to report its inventory and whether newly loaded drinks were cold. Mark Weiser's seminal 1991 paper on ubiquitous computing, "The Computer of the 21st Century", as well as academic venues such as UbiComp and PerCom produced the contemporary vision of IoT. In 1994 Reza Raji described the concept in IEEE Spectrum as "[moving] small packets of data to a large set of nodes, so as to integrate and automate everything from home appliances to entire factories". Between 1993 and 1996 several companies proposed solutions like Microsoft's at Work or Novell's NEST. However, only in 1999 did the field start gathering momentum. Bill Joy envisioned Device to Device (D2D) communication as part of his "Six Webs" framework, presented at the World Economic Forum at Davos in 1999. The concept of the Internet of things became popular in 1999, through the Auto-ID Centre at MIT and related market-analysis publications. Radio-frequency identification (RFID) was seen by Kevin Ashton (one of the founders of the original Auto-ID Centre) as a prerequisite for the Internet of things at that point. Ashton prefers the phrase "Internet for Things. "If all objects and people in daily life were equipped with identifiers, computers could manage and inventory them. Besides using RFID, the tagging of things may be achieved through such technologies as near field communication, barcodes, QR codes and digital watermarking. In its original interpretation, one of the first consequences of implementing the Internet of things by equipping all objects in the world with minuscule identifying devices or machine-readable identifiers would be to transform daily life. For instance, instant and ceaseless inventory control would become ubiquitous. A person's ability to interact with objects could be altered remotely based on immediate or present needs, in accordance with existing end-user agreements. For example, such

technology could grant motion-picture publishers much more control over end-user private devices by remotely enforcing copyright restrictions and digital rights management, so the ability of a customer who bought a Blu-ray disc to watch the movie could become dependent on the copyright holder's decision, similar to Circuit City's failed DIVX.

Applications

According to Gartner, Inc. (a technology research and advisory corporation), there will be nearly 20.8 billion devices on the Internet of things by 2020. ABI Research estimates that more than 30 billion devices will be wirelessly connected to the Internet of things by 2020. As per a 2014 survey and study done by Pew Research Internet Project, a large majority of the technology experts and engaged Internet users who responded—83 percent—agreed with the notion that the Internet/Cloud of Things, embedded and wearable computing (and the corresponding dynamic systems will have widespread and beneficial effects by 2025. As such, it is clear that the IoT will consist of a very large number of devices being connected to the Internet. In an active move to accommodate new and emerging technological innovation, the UK Government, in their 2015 budget, allocated £40,000,000 towards research into the Internet of things. The former British Chancellor of the Exchequer George Osborne, posited that the Internet of things is the next stage of the information revolution and referenced the inter-connectivity of everything from urban transport to medical devices to household appliances. The ability to network embedded devices with limited CPU, memory and power resources means that IoT finds applications in nearly every field. Such systems could be in charge of collecting information in settings ranging from natural ecosystems to buildings and factories, thereby finding applications in fields of environmental sensing and urban planning. On the other hand, IoT systems could also be responsible for performing actions, not just sensing things. Intelligent shopping systems, for example, could monitor specific users' purchasing habits in a store by tracking their specific mobile phones. These users could then be provided with special offers on their favourite products, or even location of items that they need, which their fridge has automatically conveyed to the phone. Additional examples of sensing and actuating are reflected in applications that deal with heat, water, electricity and energy management, as well as cruise-assisting transportation

systems. Other applications that the Internet of things can provide is enabling extended home security features and home automation. The concept of an "Internet of living things" has been proposed to describe networks of biological sensors that could use cloud-based analyses to allow users to study DNA or other molecules. However, the application of the IoT is not only restricted to these areas. Other specialized use cases of the IoT may also exist. An overview of some of the most prominent application areas is provided here.

Media

In order to hone the manner in which things, media and big data are interconnected, it is first necessary to provide some context into the mechanism used for media process. It has been suggested by Nick Couldry and Joseph Turow that practitioners in media approach big data as many actionable points of information about millions of individuals. The industry appears to be moving away from the traditional approach of using specific media environments such as newspapers, magazines, or television shows and instead tap into consumers with technologies that reach targeted people at optimal times in optimal locations. The ultimate aim is of course to serve, or convey, a message or content that is (statistically speaking) in line with the consumer's mind-set. For example, publishing environments are increasingly tailoring the messages (advertisements) and content (articles) to appeal to consumers that have been exclusively gleaned through various data-mining activities. The media industries process big data in a dual, interconnected manner: Targeting of consumers (for advertising by marketers) Data-capture Thus, the Internet of things creates an opportunity to measure, collect and analyse an ever-increasing variety of behavioural statistics. Cross-correlation of this data could revolutionise the targeted marketing of products and services. For example, as noted by Danny Meadows-Klue, the combination of analytics for conversion tracking with behavioural targeting has unlocked a new level of precision that enables display advertising to be focused on the devices of people with relevant interests. Big data and the IoT work in conjunction. From a media perspective, data is the key derivative of device interconnectivity, whilst being pivotal in allowing clearer accuracy in targeting. The Internet of things therefore transforms the media industry, companies and even governments, opening up a new era of economic growth and competitiveness. The wealth of data generated by this industry (i.e. big

data) will allow practitioners in advertising and media to gain an elaborate layer on the present targeting mechanisms used by the industry.

Environmental monitoring

Environmental monitoring applications of the IoT typically use sensors to assist in environmental protection by monitoring air or water quality, atmospheric or soil conditions, and can even include areas like monitoring the movements of wildlife and their habitats. Development of resource constrained devices connected to the Internet also means that other applications like earthquake or tsunami early-warning systems can also be used by emergency services to provide more effective aid. IoT devices in this application typically span a large geographic area and can also be mobile. It has been argued that the standardization IoT brings to wireless sensing will revolutionize this area.

Infrastructure management

Monitoring and controlling operations of urban and rural infrastructures like bridges, railway tracks, on- and offshore- wind-farms is a key application of the IoT. The IoT infrastructure can be used for monitoring any events or changes in structural conditions that can compromise safety and increase risk. It can also be used for scheduling repair and maintenance activities in an efficient manner, by coordinating tasks between different service providers and users of these facilities. IoT devices can also be used to control critical infrastructure like bridges to provide access to ships. Usage of IoT devices for monitoring and operating infrastructure is likely to improve incident management and emergency response coordination, and quality of service, up-times and reduce costs of operation in all infrastructure related areas. Even areas such as waste management can benefit from automation and optimization that could be brought in by the IoT.

Manufacturing Network

Control and management of manufacturing equipment, asset and situation management, or manufacturing process control bring the IoT within the realm of industrial applications and smart manufacturing as well. The IoT intelligent systems enable rapid manufacturing of new products, dynamic response to product demands, and real-time optimization of manufacturing production and supply chain

networks, by networking machinery, sensors and control systems together. Digital control systems to automate process controls, operator tools and service information systems to optimize plant safety and security are within the purview of the IoT. But it also extends itself to asset management via predictive maintenance, statistical evaluation, and measurements to maximize reliability. Smart industrial management systems can also be integrated with the Smart Grid, thereby enabling real-time energy optimization. Measurements, automated controls, plant optimization, health and safety management, and other functions are provided by a large number of networked sensors. The National Science Foundation established an Industry/University Cooperative Research Center on intelligent maintenance systems (IMS) in 2001 with a research focus to use IoT-based predictive analytics technologies to monitor connected machines and to predict machine degradation, and further to prevent potential failures. The vision to achieve near-zero breakdown using IoT-based predictive analytics led the future development of e-manufacturing and maintenance activities. The term IIoT (Industrial Internet of Things) is often encountered in the manufacturing industries, referring to the industrial subset of the IoT. IIoT in manufacturing could generate so much business value that it will eventually lead to the fourth industrial revolution, so the so-called Industry 4.0. It is estimated that in the future, successful companies will be able to increase their revenue through Internet of things by creating new business models and improve productivity, exploit analytics for innovation, and transform workforce. The potential of growth by implementing IIoT will generate \$12 trillion of global GDP by 2030 while connectivity and data acquisition are imperative for IIoT, they should not be the purpose, rather the foundation and path to something bigger. Among all the technologies, predictive maintenance is probably a relatively "easier win" since it is applicable to existing assets and management systems. The objective of intelligent maintenance systems is to reduce unexpected downtime and increase productivity. And to realize that alone would generate around up to 30% over total maintenance costs. Industrial big data analytics will play a vital role in manufacturing asset predictive maintenance, although that is not the only capability of industrial big data. Cyber-physical systems (CPS) is the core technology of industrial big data and it will be an interface between human and the cyber world. Cyber-physical systems can be designed by following the 5C (connection, conversion, cyber, cognition, configuration) architecture, and it will transform the collected data into actionable

information, and eventually interfere with the physical assets to optimize processes. An IoT-enabled intelligent system of such cases has been demonstrated by the NSF Industry/University Collaborative Research Center for Intelligent Maintenance Systems (IMS) at University of Cincinnati on a band saw machine in IMTS 2014 in Chicago. Band saw machines are not necessarily expensive, but the band saw belt expenses are enormous since they degrade much faster. However, without sensing and intelligent analytics, it can be only determined by experience when the band saw belt will actually break. The developed prognostics system will be able to recognize and monitor the degradation of band saw belts even if the condition is changing, so that users will know in near real time when is the best time to replace band saw. This will significantly improve user experience and operator safety, and save costs on replacing band saw belts before they actually break. The developed analytical algorithms were realized on a cloud server, and was made accessible via the Internet and on mobile devices.

Energy management

Integration of sensing and actuation systems, connected to the Internet, is likely to optimize energy consumption as a whole. It is expected that IoT devices will be integrated into all forms of energy consuming devices (switches, power outlets, bulbs, televisions, etc.) and be able to communicate with the utility supply company in order to effectively balance power generation and energy usage. Such devices would also offer the opportunity for users to remotely control their devices, or centrally manage them via a cloud based interface, and enable advanced functions like scheduling (e.g., remotely powering on or off heating systems, controlling ovens, changing lighting conditions etc.). Besides home based energy management, the IoT is especially relevant to the Smart Grid since it provides systems to gather and act on energy and power-related information in an automated fashion with the goal to improve the efficiency, reliability, economics, and sustainability of the production and distribution of electricity. Using advanced metering infrastructure (AMI) devices connected to the Internet backbone, electric utilities can not only collect data from end-user connections, but also manage other distribution automation devices like transformers and reclosers.

Medical and healthcare

IoT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can range from blood pressure and heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers, Fitbit electronic wristbands, or advanced hearing aids. Some hospitals have begun implementing "smart beds" that can detect when they are occupied and when a patient is attempting to get up. It can also adjust itself to ensure appropriate pressure and support is applied to the patient without the manual interaction of nurses. Specialized sensors can also be equipped within living spaces to monitor the health and general well-being of senior citizens, while also ensuring that proper treatment is being administered and assisting people regain lost mobility via therapy as well. Other consumer devices to encourage healthy living, such as, connected scales or wearable heart monitors, are also a possibility with the IoT. More and more end-to-end health monitoring IoT platforms are coming up for antenatal and chronic patients, helping one manage health vitals and recurring medication requirements.

Building and home automation

IoT devices can be used to monitor and control the mechanical, electrical and electronic systems used in various types of buildings (e.g., public and private, industrial, institutions, or residential) in home automation and building automation systems. In this context, three main areas are being covered in literature: The integration of the internet with building energy management systems in order to create energy efficient and IOT driven "smart buildings". The possible means of real-time monitoring for reducing energy consumption and monitoring occupant behaviours. The integration of smart devices in the built environment and how they might be used in future applications.

Transportation

The IoT can assist in integration of communications, control, and information processing across various transportation systems. Application of the IoT extends to all aspects of transportation systems (i.e. the vehicle, the infrastructure, and the driver or user). Dynamic interaction between these components of a transport system enables inter and intra vehicular communication, smart traffic control, smart

parking, electronic toll collection systems, logistic and fleet management, vehicle control, and safety and road assistance.

Metropolitan scale deployments

There are several planned or ongoing large-scale deployments of the IoT, to enable better management of cities and systems. For example, Song do, South Korea, the first of its kind fully equipped and wired smart city, is near completion. Nearly everything in this city is planned to be wired, connected and turned into a constant stream of data that would be monitored and analysed by an array of computers with little, or no human intervention. Another application is a currently undergoing project in Santander, Spain. For this deployment, two approaches have been adopted. This city of 180,000 inhabitants, has already seen 18,000 city application downloads for their smartphones. This application is connected to 10,000 sensors that enable services like parking search, environmental monitoring, digital city agenda among others. City context information is used in this deployment so as to benefit merchants through a spark deals mechanism based on city behavior that aims at maximizing the impact of each notification. Other examples of large-scale deployments underway include the Sino-Singapore Guangzhou Knowledge City; work on improving air and water quality, reducing noise pollution, and increasing transportation efficiency in San Jose, California; and smart traffic management in western Singapore. French company, Sigfox, commenced building an ultra-narrowband wireless data network in the San Francisco Bay Area in 2014, the first business to achieve such a deployment in the U.S. It subsequently announced it would set up a total of 4000 base stations to cover a total of 30 cities in the U.S. by the end of 2016, making it the largest IoT network coverage provider in the country thus far. Another example of a large deployment is the one completed by New York Waterways in New York City to connect all the city's vessels and be able to monitor them live 24/7. The network was designed and engineered by Fluid mesh Networks, a Chicago-based company developing wireless networks for critical applications. The NYWW network is currently providing coverage on the Hudson River, East River, and Upper New York Bay. With the wireless network in place, NY Waterway is able to take control of its fleet and passengers in a way that was not previously possible. New applications can include security, energy and fleet management, digital signage, public Wi-Fi, paperless ticketing and others.

Consumer application

A growing portion of IoT devices are created for consumer use. Examples of consumer applications include connected car, entertainment, residences and smart homes, wearable technology, quantified self, connected health, and smart retail. Consumer IoT provides new opportunities for user experience and interfaces. Some consumer applications have been criticized for their lack of redundancy and their inconsistency, leading to a popular parody known as the “Internet of Shit.” Companies have been criticized for their rush into IoT, creating devices of questionable value, and not setting up stringent security standards.

Unique addressability of things

The original idea of the Auto-ID Center is based on RFID-tags and unique identification through the Electronic Product Code however this has evolved into objects having an IP address or URI. An alternative view, from the world of the Semantic Web focuses instead on making all things (not just those electronic, smart, or RFID-enabled) addressable by the existing naming protocols, such as URI. The objects themselves do not converse, but they may now be referred to by other agents, such as powerful centralized servers acting for their human owners.

Integration with the Internet implies that devices will use an IP address as a unique identifier. Due to the limited address space of IPv4 (which allows for 4.3 billion unique addresses), objects in the IoT will have to use the next generation of the Internet protocol (IPv6) to scale to the extremely large address space required. Internet of things devices additionally will benefit from the stateless address auto-configuration present in IPv6, as it reduces the configuration overhead on the hosts, and the IETF 6LoWPAN header compression. To a large extent, the future of the Internet of things will not be possible without the support of IPv6; and consequently the global adoption of IPv6 in the coming years will be critical for the successful development of the IoT in the future. A combination of these ideas can be found in the current GS1/EPCglobal EPC Information Services (EPCIS) specifications. This system is being used to identify objects in industries ranging from aerospace to fast moving consumer products and transportation logistics.

1.2 Enabling technologies for IoT

There are many technologies that enable IoT. Crucial to the field is the network used to communicate between devices of an IoT installation, a role that several wireless or wired technologies may fulfil:

Short-range wireless

- Bluetooth low energy (BLE) – Specification providing a low power variant to classic Bluetooth with a comparable communication range.
- Light-Fidelity (Li-Fi) – Wireless communication technology similar to the Wi-Fi standard, but using visible light communication for increased bandwidth.
- Near-field communication (NFC) – Communication protocols enabling two electronic devices to communicate within a 4 cm range.
- QR codes and barcodes – Machine-readable optical tags that store information about the item to which they are attached.
- Radio-frequency identification (RFID) – Technology using electromagnetic fields to read data stored in tags embedded in other items.
- Thread – Network protocol based on the IEEE 802.15.4 standard, similar to Zigbee, providing IPv6 addressing.
- Transport Layer Security (network protocol) TLS – Network security protocol.
- Wi-Fi – Widely used technology for local area networking based on the IEEE 802.11 standard, where devices may communicate through a shared access point.
- Wi-Fi Direct – Variant of the Wi-Fi standard for peer-to-peer communication, eliminating the need for an access point.
- Z-Wave – Communication protocol providing short-range, low-latency data transfer at rates and power consumption lower than Wi-Fi. Used primarily for home automation.
- Zigbee – Communication protocols for personal area networking based on the IEEE 802.15.4 standard, providing low power consumption, low data rate, low cost, and high throughput.

Medium-range wireless

- HaLow – Variant of the Wi-Fi standard providing extended range for low-power communication at a lower data rate.
- LTE-Advanced – High-speed communication specification for mobile networks. Provides enhancements to the LTE standard with extended coverage, higher throughput, and lower latency.

Long-range wireless

- Low-power wide-area networking (LPWAN) – Wireless networks designed to allow long-range communication at a low data rate, reducing power and cost for transmission.
- Very small aperture terminal (VSAT) – Satellite communication technology using small dish antennas for narrowband and broadband data.

Wired

- Ethernet – General purpose networking standard using twisted pair and fiber optic links in conjunction with hubs or switches.
- Multimedia over Coax Alliance (MoCA) – Specification enabling whole-home distribution of high definition video and content over existing coaxial cabling.

Power-line communication (PLC) – Communication technology using electrical wiring to carry power and data. Specifications such as Home Plug utilize PLC for networking IoT devices.

CHAPTER 2

LITERATURE SURVEY

Title 1: Intelligent Traffic Information System Based on Integration of Internet of Things and Agent

Author: Hasan Omar Al-Sakran

In recent years popularity of private cars is getting urban traffic more and more crowded. As result traffic is becoming one of important problems in big cities in all over the world. Some of the traffic concerns are congestions and accidents which have caused a huge waste of time, property damage and environmental pollution. This research paper presents a novel intelligent traffic administration system, based on Internet of Things, which is featured by low cost, high scalability, high compatibility, easy to upgrade, to replace traditional traffic management system and the proposed system can improve road traffic tremendously. The Internet of Things is based on the Internet, network wireless sensing and detection technologies to realize the intelligent recognition on the tagged traffic object, tracking, monitoring, managing and processed automatically. The paper proposes an architecture that integrates internet of things with agent technology into a single platform where the agent technology handles effective communication and interfaces among a large number of heterogeneous highly distributed, and decentralized devices within the IoT. The architecture introduces the use of an active radio-frequency identification (RFID), wireless sensor technologies, object ad-hoc networking, and Internet-based information systems in which tagged traffic objects can be automatically represented, tracked, and queried over a network. This research presents an overview of a framework distributed traffic simulation model within Net Logo, an agent-based environment, for IoT traffic monitoring system using mobile agent technology.

Title 2: TRAFFIC MONITORING AND REPORTING SYSTEM USING IOT

Author: Chiranjeevi V. Tapas 1, Narendra Chaudhary

Although many traffic laws are introduced, we still don't see any fall in traffic rule violations or death caused by such negligence. The factors causing such failure

can either be people or the system. So to solve this issue we propose in this paper a device using Arduino Uno that will monitor each vehicle individually with the help of sensors and modules, that it is attached on and will store data of speed violation and impact or crash along with the location and time. The device when in the range of receivers (attached to signals) on any junctions will send data to receiver devices. This data then will be uploaded to a centralized database using IOT without any human interaction.

Title 3: Traffic Management System Using IoT Technology - A Comparative Review

Author: Omid Avatefipour ; Froogh Sadry

With an ever-increasing population growth in cities around the world, continuous production of all kinds vehicles by manufacturers, and the number of vehicles on the roads will only continue to rise. This naturally leads to increased traffic congestion, especially in large metropolitan areas and even more so during peak rush hour time. This phenomenon constantly puts pressure on researchers, city officials, and urban planners to continue to improve traffic management systems in ways that are safer and economically more efficient. In order to address this evolving problem, a number of studies have been conducted that have resulted in some notable improvements such as designated lanes for emergency vehicles in urban areas. However, even with these lanes, often the ideal target-times for emergency vehicles to reach their destinations is hard to achieve. A new method which seeks to address this issue is called Intelligent Transportation System (ITS). This method can help solve the problem by integrating existing technology with the current infrastructure. In this paper, our goal is to compare different methods for managing traffics, namely Traffic Light Systems (TLS): Static and Dynamic TLS, Radio Frequency Identification (RFID), and Internet of Things (IoT). In the latter method, traffic data are quickly acquired and sent to Big Data for processing and mobile applications AKA User Interface (UI) to estimate traffic density in various areas in order to suggest alternative ways to alleviate traffic.

Title 4: Intelligent Traffic Monitoring Using Internet of Things (IoT) with Semantic Web

Author: Manuj Darbari, Diwakar Yagyasen, Anurag Tiwari

The Internet of Things (IoT), a global Internet-based system of computing devices and machines, is one of the most significant trends in the information technology area. An accepted unified communication approach would be a prerequisite for its mass adoption. Semantic technologies (Semantic Web) have been advocated as enablers of unified communication. However, while there are advancements in research on application of Semantic Web in the IoT domain, the dynamic and complex nature of the IoT often requires case specific solutions hard to be applied widely. In the present survey, the semantic technology challenges in the IoT domain are amalgamated to provide background for further studies in the use of semantic technologies in the IoT.

Title 5: Development of IoT device for traffic management system

Author: Hon Fong Chong; Danny Wee Kiat Ng

Traffic congestion is a major issue that happens across urban cities around the world. In 2015, annual economic losses of Malaysia caused by traffic congestion is estimated about RM20 billion. Fixed cycle traffic light system (TLS) is first introduced on road intersection to solve traffic congestion. However, fixed cycle TLS is unable to cope with dramatically increase of registered vehicles. In this paper, development of Internet of Things (IoT) device for traffic management system is proposed. An Intel Edison collects real-time traffic flow and communicate with Microsoft Azure IoT cloud server. The cloud server assign priorities to each road bound based on their current traffic volume. Green light phase time (GLPT) is then calculated utilizing a dynamic algorithm. Simulation results showed that dynamic cycle TLS reduces queue length and waiting time on the road intersection by 68% and 67% respectively. Additionally, a monitoring application is designed to ease traffic officer in monitoring real-time traffic flow.

CHAPTER 3

SYSTEM SPECIFICATION

3.1 EXISTING SYSTEM

- In the existing system, traffic light signal is just monitoring and controlling purpose only depend upon the traffic can be identify through some kind of sensor like vibration sensor or image processing techniques.
- the same technique used for ambulance identification.
- it is not highly reliable in real time.

3.2 PROPOSED SYSTEM

This paper discusses the IOT based traffic control system in which signal timings are updated based on the vehicle density on the road. The proposed system is implemented using raspberry pi and Arduino. Density measurement is performed by Raspberry Pi. Proposed system gives good performance and helps to reduce traffic congestion. Results shows vehicle counting in real time. The proposed system is suitable for real time vehicle management. This paper proposed a priority-based traffic control system using image processing which will give high priority to all emergency vehicles thereby helping them to pass by the traffic light smoothly. This helps them to reach the emergency site fast, thereby saving the lives of many people around us. This is done based on pre-processing and image processing methods. As a future work, we are planning to add other features of emergency vehicles to make the detection more accurate.

3.3 SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Traffic light board
- ZigBee TX and RX
- Raspberry pi
- USB Camera

- Vibration Sensor
- Alcohol sensor
- GPS

SOFTWARE REQUIREMENTS

- Arduino IDE
- Embedded C language
- Flash magic

CHAPTER 4

SYSTEM DESIGN

Blockage in rush hour gridlock is a major issue. The timing of the signs is set and free of traffic thickness, which causes traffic blockage. The crisis vehicles, for example, ambulances, fire motors and police vehicles are given equivalent need over different vehicles and subsequently stall out up right now. If a crisis vehicle is recognized out and about, the path where this vehicle is available will be given higher need over every single other path. The undertaking proposes an IOT based methodology that distinguishes whether a vehicle is a crisis one or not. This undertaking addresses the IOT based traffic control system, in which signal timings are revised depending on vehicle inspection and vehicle thickness, and The proposed framework is executed utilizing raspberry pi which estimates thickness. It gives great execution and assists with decreasing traffic clog. This proposed work utilizes IOT segments which will give high need to all crisis vehicles accordingly helping them to pass by the traffic light easily and encourages them to arrive at the crisis site quick.

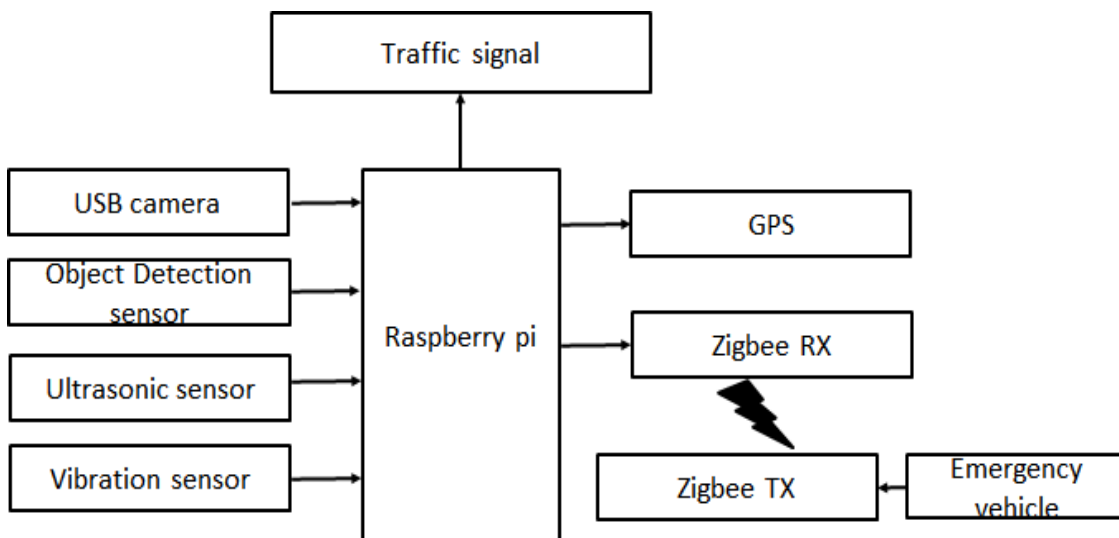


Fig 4.1 Block diagram

The traffic flagging system based on IoT depends on the traffic thickness of the street where vehicles are tested on each side of the street by sensor arrangement. Traffic lights, i.e. Golden and purple, are currently placed at the intersection of street sides. Two sensor sets are placed over the streets that mark

the spacing for thickness zones. The ultrasonic sensor is mounted here and the ultrasonic collector is reversed. Here, sensors are placed 50 meters from each other in good ways. The reasoning here is that as the vehicles pass the primary pair of sensors, an advanced sign is generated and as sensor requires, traffic blockage is expected to occur and around. So dependent on the information assembled, Arduino microcontroller imparts the planning sign yield by contrasting and nearby street's traffic. As the vehicle traverses the second pair of sensors, Sensor recognizes that it includes individually high traffic thickness. For high density traffic, there will be additional time distribution and ordinary time is given for low density traffic. Information on traffic thickness and traffic flagging control is sent remotely to Raspberry Pi3, where analysis with date and time is performed as Heavy Traffic and Regular Traffic. This data is at long last refreshed on Cloud website page which can be utilized for additional arranging and examination by Traffic office.

This venture explores the traffic control system focused on IOT, in which the signal times are refreshed depending on the vehicle thickness out and about. The proposed framework is actualized utilizing raspberry pi which estimates thickness. It gives great execution and assists with diminishing traffic clog. This proposed work utilizes IOT parts which will give high need to all crisis vehicles along these lines helping them to pass by the traffic light easily and causes them to arrive at the crisis site quick.

4.1 RASPBERRY PI

Raspberry Pi3 model is like a Visa sized single board PC. This board is financially savvy when contrasted with a genuine PC. It is additionally accessible as Compute Module Development Kit, which is helpful gadget for mechanical applications and has greater adaptability. This impressive smartcard sized PC can be used for other Applications. It also includes remote connectivity of LAN and Bluetooth making it the perfect solution for awesome related structures.



Fig. 4.2 Raspberry Pi

4.2 ZIGBEE

ZigBee is fundamentally utilized for two-path correspondence between a sensor and a control framework, Like Bluetooth it offers network up to 100 meters. ZigBee is an IEEE 802.15.4based determination of a series of major communications conventions used to create individual territorial structures with lightweight, low-power advanced radios.

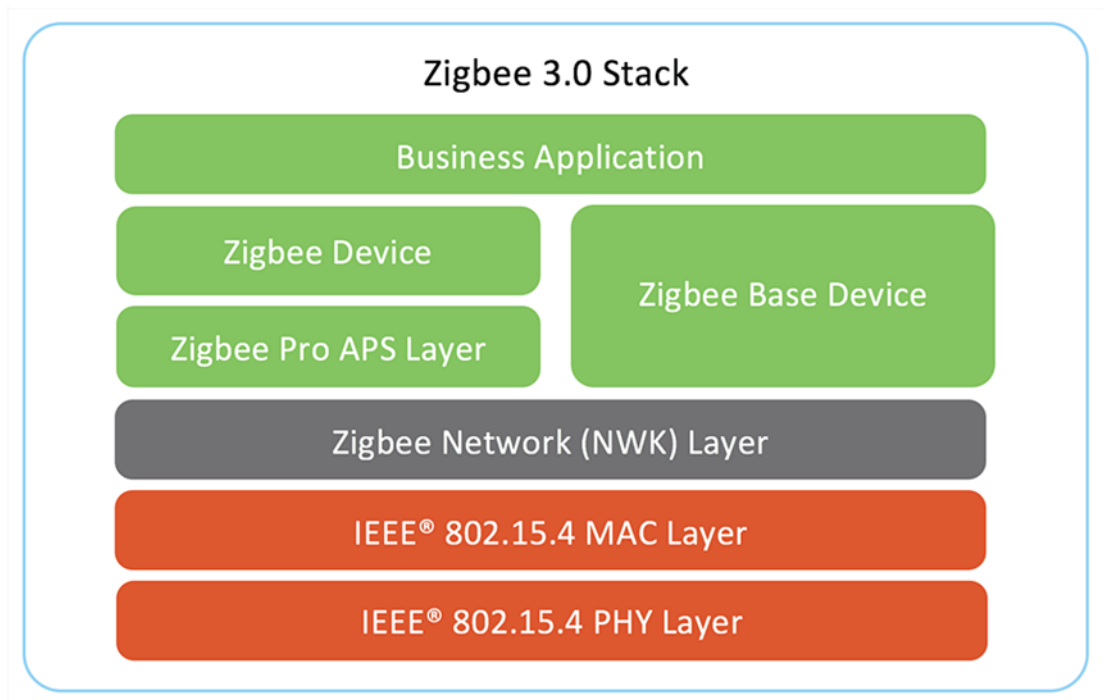


Fig. 4.3 Zigbee Stack diagram

4.3 ULTRASONIC SENSOR

Ultrasonic Sensors are autonomous, strong state gadgets intended to detect solid and fluid articles without contact. Here we use the Ultrasonic module running HCSR04, which gives 2cm-400 cm non-contact estimation function, with a precision up to 3mm.



Fig.4.4 Ultrasonic Sensor

4.4 Module usage

4.4.1 Raspberry Pie:

- It is used as OS to control the sensors
- It is programmed in python
- It send the required status based on the current status of sensor
- In our project we are using vibration sensor, usb camera, alcohol sensor

- When there is any movement in vibration sensor, the program in raspberry pie OS will calculate the moment frequency and will send the command whether vibration is detected or not
- If vibration is detected signal 1 is sent, and the display monitor shows a message that vibration is detected indicating that there is a speed breaker and notifies the driver to slow the vehicle
- Usb camera that is attached in front of ambulance is used to detect the number of vehicles in front and counts them to show whether driver can increase the speed or not based on density. Raspberry pie OS will send the vehicle density to analysis team through messages
- Alcohol sensor is near driver to make sure that he doesn't consume alcohol. If it tests positive immediately the raspberry os will send a message to higher official

4.4.2 Zigbee:

- Zigbee is wireless communication device
- Here in our project, ambulance driver has ZigBee transmitter, when clicked on particular signal button in that transmitter, the signal will be sent to ZigBee receiver that is connected Arduino.
- The Arduino that is placed in the traffic signal will automatically makes that particular signal to green and other signals to red

4.4.3 Arduino:

- Arduino is not allowing making the particular signal green or red but also it send the status to next signal
- If ambulance driver clicks on forward button, the arduino will send a information to next signal arduino that is connected through wire and make sure that next signal will also points green.
- It coordinates the response and request between ZigBee transmitter and ZigBee receiver
- It also coordinates the traffic signal management

4.4.4 Vibration Sensor:

- Vibration sensor is used to detect the vibration caused to the vehicle

- Whenever there is a speed breaker in front , the vibration sensor detects the vibration and notifies the driver to reduce the speed so that no harm occurs to the patient inside
- It also sends a message to the co driver of ambulance that speed should be reduced

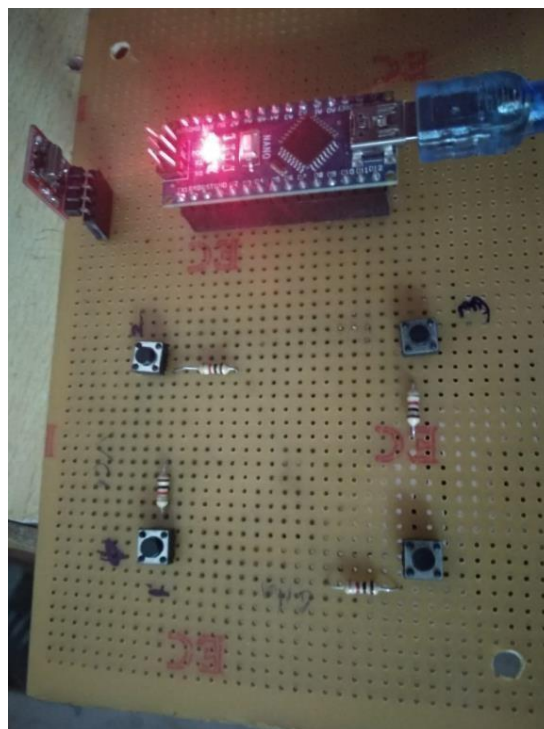
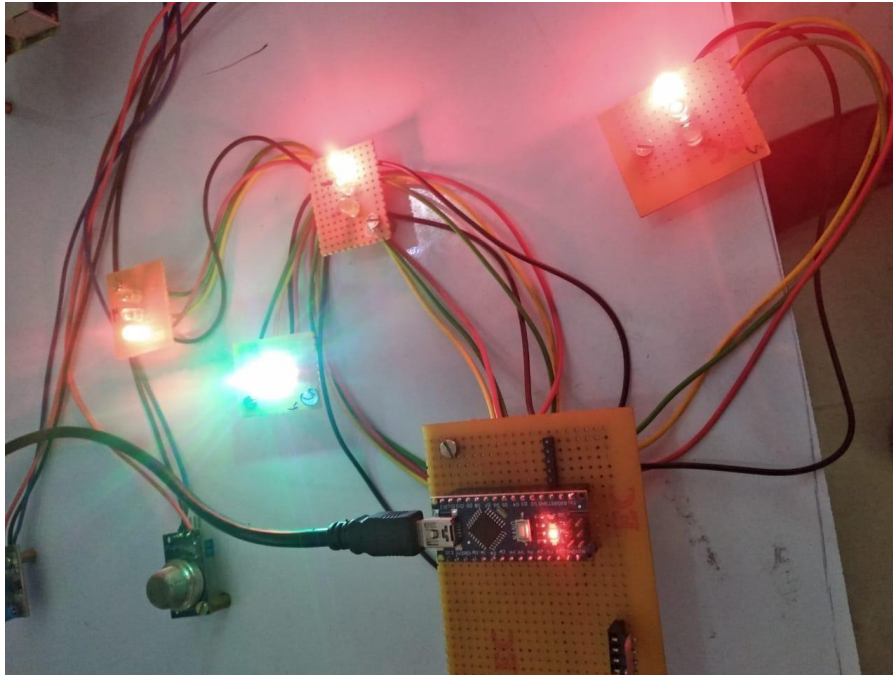
4.4.5 Alcohol Sensor:

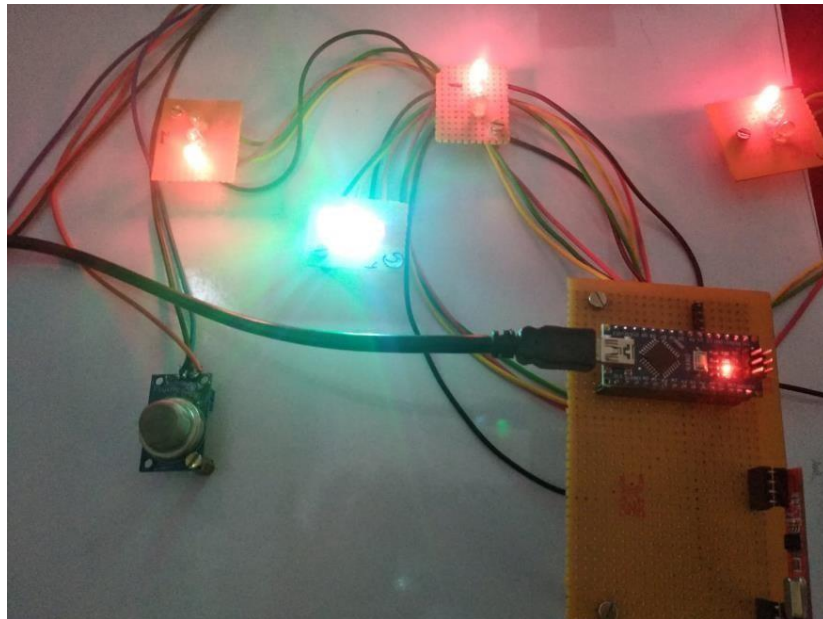
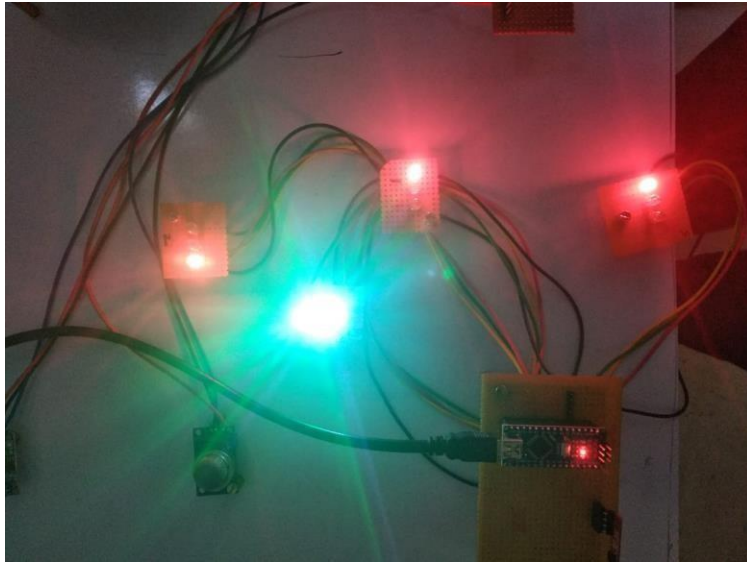
- Consumption of alcohol results in serious problems to avoid that alcohol sensor is used
- It is placed near to the string of ambulance driver
- It detects whether the driver of ambulance has consumed alcohol or not
- It is programmed in such a way that immediate message will be sent to higher authorities through raspberry pie

4.4.6 Usb Camera:

- Camera is used for vehicle density analysis purpose
- There is data set stored in raspberry pie that can detect the vehicle type based on the size like car or bus or bike
- It will detect the particular vehicle that and increase the count and sends data for data analysis to calculate the estimated time of arrival to hospital
- Raspberry Pie is programmed with image detection algorithms to achieve this.

SCREEN SHOTS





CHAPTER 5

CONCLUSION

Customary traffic signalling system is completely dependent on the traffic police to track the traffic signal for traffic control based on traffic thickness. Work has been completed in the identification of traffic thickness using sensors to monitor traffic light signals. Right now, thickness based traffic light control framework was created to identify crisis vehicles like ambulances and to control traffic at '+' street crossing point to decrease superfluous time wastage and limit street traffic setbacks, which the current customary traffic light control framework has neglected to accomplish. This paper addresses the IOT-based system for traffic control, in which signal timings are revised depending on the vehicle thickness. The proposed code is modified using Arduino and Raspberry Pi. MATLAB Simulink bolster package prompts quick frame execution. Estimation of thickness is achieved by raspberry pi. The proposed system gives great execution and helps to reduce traffic congestion. Results shows vehicle including progressively. The proposed framework is reasonable for constant vehicle the executives.

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APPENDIX

SOURCE CODE:

```
// RECIEVER CODE
```

```
//NOTE :- THIS RECEIVER CODE IS USED WHEN YOU WANT TO CONTROL  
THE ROBOT VIA THE COMPUTER
```

```
#include <VirtualWire.h>
```

```
//declaring pin Nos of FIRST L293D
```

```
int r1 = 5;
```

```
int g1 = 6;
```

```
int b1 = 7;
```

```
int r2 = 8;
```

```
int g2 = 9;
```

```
int b2 = 10;
```

```
//declaring pin nos of SECOND L293D
```

```
int r3 = 3;
```

```
int g3 = 11;
```

```
int b3 = 4;
```

```
int r4 = 12;
```

```
int g4 = 14;
```

```
int b4 = 15;
```

```
int motorPin[] = {3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15}; //array for storing pin nos
```

```
void setup()
```

```
{
```

```
  Serial.begin(9600); // Debugging only
```

```
  Serial.println("setup");
```

```
  // Initialise the IO and ISR
```

```
  vw_setup(2000); // Bits per sec
```

```
  vw_set_rx_pin(2); //Receiver at Digital Pin 2
```

```
  vw_rx_start(); // Start the receiver PLL running
```

```

for (int i = 0; i < 12; i++)
{
    pinMode(motorPin[i], OUTPUT);
} //close for loop

```

```

/*

```

This is basically what the for loop does :-

```

pinMode(r1, OUTPUT);
pinMode(g1, OUTPUT);
pinMode(b1, OUTPUT);
pinMode(r2, OUTPUT);
pinMode(g2, OUTPUT);
pinMode(b3, OUTPUT);
pinMode(r3, OUTPUT);
pinMode(g3, OUTPUT);
pinMode(b3, OUTPUT);
pinMode(r4, OUTPUT);
pinMode(g4, OUTPUT);
pinMode(b4, OUTPUT);
*/

```

```

} //close setup

```

```

void loop()

```

```

{

```

```

    uint8_t buf[VW_MAX_MESSAGE_LEN];
    uint8_t buflen = VW_MAX_MESSAGE_LEN;

```

```

    if (vw_get_message(buf, &buflen)) // Non-blocking

```

```

{
int i;

    digitalWrite(13, true); // Flash a light to show received good message
// Message with a good checksum received, dump it.

for (i = 0; i < buflen; i++)
{
    Serial.println(buf[i]);
    if(buf[i] == 49)
    {
        forward();//go forward when f is pressed
    }
    if(buf[i] == 50)
    {
        backward();//go backward when b is pressed
    }
    if(buf[i] == 51)
    {
        stopMotor();//stop/brake when s is pressed
    }
    if(buf[i] == 52)
    {
        left();//go left when l is pressed
    }
    if(buf[i] == 53)
    {
        right();//go right when r is pressed
    }

}

}

digitalWrite(13, false);

```

```
    }//close main if
  }//close loop
  //you can print the data entered when debugging by adding Serial.println
```

```
////////////////////////////////////
```

```
//set of functions
void forward()
{
  Serial.println("traffic1");
  digitalWrite(r1,LOW);
  digitalWrite(g1,HIGH);
  digitalWrite(b1,HIGH);
  digitalWrite(r2,HIGH);
  digitalWrite(g2,LOW);
  digitalWrite(b2,LOW);
  digitalWrite(r3,HIGH);
  digitalWrite(g3,LOW);
  digitalWrite(b3,LOW);
  digitalWrite(r4,HIGH);
  digitalWrite(g4,LOW);
  digitalWrite(b4,LOW);
}
```

```
void backward()
{
  Serial.println("traffic2");
  digitalWrite(r1,HIGH);
  digitalWrite(g1,LOW);
  digitalWrite(b1,LOW);
  digitalWrite(r2,LOW);
  digitalWrite(g2,HIGH);
  digitalWrite(b2,HIGH);
}
```

```
digitalWrite(r3,HIGH);
digitalWrite(g3,LOW);
digitalWrite(b3,LOW);
digitalWrite(r4,HIGH);
digitalWrite(g4,LOW);
digitalWrite(b4,LOW);

}
```

```
void left()
{
  Serial.println("traffic3");
  digitalWrite(r1,HIGH);
  digitalWrite(g1,LOW);
  digitalWrite(b1,LOW);
  digitalWrite(r2,HIGH);
  digitalWrite(g2,LOW);
  digitalWrite(b2,LOW);
  digitalWrite(r3,LOW);
  digitalWrite(g3,HIGH);
  digitalWrite(b3,HIGH);
  digitalWrite(r4,HIGH);
  digitalWrite(g4,LOW);
  digitalWrite(b4,LOW);

}
```

```
void right()
{
  Serial.println("traffic4");
  digitalWrite(r1,HIGH);
  digitalWrite(g1,LOW);
  digitalWrite(b1,LOW);
  digitalWrite(r2,HIGH);
```

```

digitalWrite(g2,LOW);
digitalWrite(b2,LOW);
digitalWrite(r3,HIGH);
digitalWrite(g3,LOW);
digitalWrite(b3,LOW);
digitalWrite(r4,LOW);
digitalWrite(g4,HIGH);
digitalWrite(b4,HIGH);

}

```

```

void stopMotor()
{
  Serial.println("traffic5");
  digitalWrite(r1,HIGH);
  digitalWrite(g1,LOW );
  digitalWrite(b1,LOW);
  digitalWrite(r2,HIGH);
  digitalWrite(g2,LOW);
  digitalWrite(b2,LOW);
  digitalWrite(r3,HIGH);
  digitalWrite(g3,LOW);
  digitalWrite(b3,LOW);
  digitalWrite(r4,LOW);
  digitalWrite(g4,HIGH);
  digitalWrite(b4,HIGH);
}

```

// TRANSMITTER CODE

//NOTE :- THIS TRANSMITTER CODE IS USED WHEN YOU WANT TO
CONTROL THE ROBOT VIA THE BREADBOARD REMOTE

#include <VirtualWire.h>

//Assigning controller buttons to Digital Pins

```

int traffic1 = 8;
int traffic2 = 9;
int traffic3 = 10;
int traffic4 = 11;
int remotePins[] = {8,9,10,11}; //array to store pin nos

void setup()
{
    Serial.begin(9600); // Debugging only
    Serial.println("setup");
    // Initialise the IO and ISR
    vw_setup(2000); // Bits per sec
    vw_set_tx_pin(3); //Transmitter Data Pin to Digital Pin 3

    for(int i = 0; i<5 ; i++)
    {
        pinMode(remotePins[i], INPUT);
        digitalWrite(remotePins[i], HIGH);
    }
    /*
    This is what the loop above does :-
        pinMode(8, INPUT);
        pinMode(9, INPUT);
        pinMode(10, INPUT);
        pinMode(11, INPUT);
        pinMode(12, INPUT);

        digitalWrite(8, HIGH);
        digitalWrite(9, HIGH);
        digitalWrite(10, HIGH);
        digitalWrite(11, HIGH);
        digitalWrite(12, HIGH);*/

```

```

} //close setup

void loop()
{
    char *msg2;

    if(digitalRead(traffic1) == HIGH) //if the forward button is pressed
    {
        char *msg2 = "1"; //send 1 to the receiver
        digitalWrite(13, true); // Flash a light to show transmitting
        vw_send((uint8_t *)msg2, strlen(msg2)); //send the byte to the receiver
        vw_wait_tx(); // Wait until the whole message is gone
        digitalWrite(13, false);
    }

    if(digitalRead(traffic2) == HIGH) //if the back button is pressed
    {
        char *msg2 = "2"; //send 2 to the receiver
        digitalWrite(13, true); // Flash a light to show transmitting
        vw_send((uint8_t *)msg2, strlen(msg2)); //send the byte to the receiver
        vw_wait_tx(); // Wait until the whole message is gone
        digitalWrite(13, false);
    }

    if(digitalRead(traffic3) == HIGH) //if the left button is pressed
    {
        char *msg2 = "3"; //send 3 to the receiver
        digitalWrite(13, true); // Flash a light to show transmitting
        vw_send((uint8_t *)msg2, strlen(msg2)); //send the byte to the receiver
        vw_wait_tx(); // Wait until the whole message is gone
        digitalWrite(13, false);
    }

    if(digitalRead(traffic4) == HIGH) //if the right button is pressed

```

```

{
  char *msg2 = "4";//send 4 to the receiver
  digitalWrite(13, true); // Flash a light to show transmitting
  vw_send((uint8_t *)msg2, strlen(msg2));//send the message to the receiver
  vw_wait_tx(); // Wait until the whole message is gone
  digitalWrite(13, false);
}

// if(digitalRead(traffic4)==HIGH)//if the stop button is pressed
// {
//   char *msg2 = "5";//send 5 to the receiver
//   digitalWrite(13, true); // Flash a light to show transmitting
//   vw_send((uint8_t *)msg2, strlen(msg2));//send the message to the receiver
//   vw_wait_tx(); // Wait until the whole message is gone
//   digitalWrite(13, false);
// }
} //close loop

```

DENSITY BASED TRAFFIC CONTROLLED AND EMERGENCY VEHICLE RESCUE MONITORING SYSTEM

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Abstract:- As of now in India, we rely on the traffic police to handle the traffic flagging process based on traffic thickness. Vehicular traffic is interminably expanding wherever on the planet and can cause horrendous traffic blockage at convergences. A large portion of the traffic lights today include a fixed green light grouping, in this way the green light succession is resolved without considering the nearness of the crisis vehicles. Accordingly, crisis vehicles, for example, ambulances, squad cars, fire motors, and so forth stuck in a congested driving conditions and deferred in arriving at their goal can prompt loss of property and significant lives. This paper exhibits a way to deal with plan crisis vehicles in rush hour gridlock. This undertaking talks about the traffic control framework that relies on IOT where the timings of the signal are refreshed dependent over the thickness of vehicles out and about. Traffic Density checking framework controlled by Raspberry Pi . Raspberry Pi is a smartcard sized PC which can be used successfully for multi-functionalities. In raspberry pi3 are an extraordinary decision for traffic detecting since it is furnished with an assortment of sensors. This traffic report is refreshed occasionally and showed on the open spots.

Key words: Raspberry Pi; Traffic Density; Live Streaming; Traffic Surveillance, ZigBee.

I

INTRODUCTION

The Internet of Things (IOT) is a significant area of research that allows for a strong connection among physical articles via the web network. The Internet of things is the interconnection among the physical elements, for example, autos, structures, different vehicles, kitchen apparatuses and other installed gadgets with hardware, programming, Sensors and actuators which allow such articles that can send and obtain information about a system without any unnecessary intervention for human-to-human either human-to-PC cooperation. Web of items gadget is a device which can be controlled remotely from any other position. Within a few applications IOT based systems were proposed, For example, tracking diabetes care, building clever homes, supporting disabilities, improving safety in mining. So as to utilize IOT for smart interaction applications it is utilized through an Universal Computing [1]. Traffic clog is expanding step after step and it is necessary to look through numerous issues. Huge volume of automobiles, inadequate base, are the key reasons behind traffic blockage., and the unreasonable appropriation of the advancements. Longer journey times describe traffic clog, more so speeds or expanded lining. At the point where the demand for traffic is strong, contact between vehicles can ease the intensity of the traffic flow. Equally, these cause some traffic clogs [2]. The ordinary frameworks depend on clock which causes constraints, for example, wastage of time, overwhelming congested driving conditions, given the fact that there were none out and about vehicles, even sign appears in red light of static clock timings of the sign [3].

At present the quantity of vehicles is growing slowly and the traffic clog on the streets is expanding, hopping off the traffic signal. It should be decreased according to the vehicles which are accessible on street paths. The traffic observation process assumes an exceptionally vital job in finding the injured individual who caused the traffic deterrent driving an approach to advancement of traffic reconnaissance which is finished utilizing Raspberry Pi instead of utilizing customary techniques. The introduced Raspberry Pi framework gives live spilling of the checked traffic

in a specific region. This strategy is adjusted by considering different focal points that goes along utilizing Raspberry Pi with live spilling. This proposition framework permits the camera to check the traffic thickness in the encompassing spots. These adds an extra bit of leeway to our framework by at the same time carrying out another responsibility without interfering with the fundamental undertaking. It accumulates the data about measurable circulation of traffic over the geological region which is under observation and stores it in a database. tell the explorer's the data about traffic thickness, show on to the screens there will be a site which is uniquely intended to show the traffic smallness A specific spot. In this way individuals will know about the traffic ahead of time and change their way to arrive at their goal in time.

These days the administration of traffic is extremely wasteful. The significant explanation behind this is a result of the poor traffic prioritization. We had run over a circumstance where a few paths may have less traffic than the other yet since the term of the green sign is equivalent for all paths no need is given to any paths and in this way brings about wastage of assets and drivers are focused. Our examination is on thickness based traffic control in which need is given to paths in which the crisis vehicles are detected[7-13]. The utilization of dynamic foundation to figure the traffic thickness had improved the outcome by huge level and consequently decreasing any programmed expansion of stationary items in an applicable scene[14-17]. The need path after the dispensed time is again set as a typical path, in this way guaranteeing each path has equivalent chance. The paths with more traffic get the most elevated need if no crisis vehicle is distinguished.

II

RELATED WORK

Work has been carried out using PIC Microcontroller[1] for Intelligent Traffic Signaling System based on thickness.

This system tracks the maximum number of vehicles in the memory based on the ongoing assumption of the client. Such captured data are sent from the microcontroller to the PC. The head of the focal station PC will get to traffic conditions linked to some friendly traffic lights and near by traffic congestion. In the future, this system will teach individuals about properly putting conditions for traffic.

Another exploration of the Density Based Traffic Signal System[2] is dependent on picture preparation technique such as edge detection to detect the traffic thickness that manages the traffic signals. The upside of Intelligent Traffic Control System construction is that it reduces blockage; Operating Costs, give backup courses of action to voyagers and expands limit of foundation. Thicknessbased Intelligent Traffic Control System[3] was calculated using a sensor that by microcontroller methods dissolves the glowing period of green light. Here, sensors are placed on street sides that would recognize vehicle proximity and send data to microcontroller. Here the Miniaturized Scale Controller decides on a decision to relegate the glossy Green and Red light time. That is the timing of the lights depending on the vehicle thickness.

Savvyusing AVR 32 piece microcontroller with programmable blaze memory, Savvy Traffic Signal Control framework[4] was developed, Analog to Digital Converter and IR Sensor operated in 8 channels. These sensors recognize the proximity of crisis vehicles and microcontrollers likewise give red signals to all sides of the street apart from one with a crisis vehicle. Remote Sensor Networks[5] was displayed in the Priority Based Traffic Light Controller where the heading of any crisis vehicle uses a fluffy justification and, by collecting all the data, the focal observation system provides the corresponding fitting response.

G.Kavya et al[6] Intelligent traffic signaling system based on height, using PIC microcontroller, the improvement of movement light controller in a city using sensors and microcontroller. By using this system arrangement the potential results of blocked streets are decreased somewhat which are brought about by movement lights, and viably gets the results. Number of passing vehicles in the settled accessibility all over the place picks the thickness extent of development. The recorded data can be downloaded to the PC through correspondence among microcontroller and the PC.

According to *Shwetha N et al[7]* Density, speed, and stream are the three essential parameters for road development assessment. Predominant road development organization and control require continuous estimation of room, mean speed and thickness as commitment for considerable spatial and temporary extent of the roadway sort out.

As demonstrated by *K.Vidhya et al[8]*, use the Density estimation by using open instrument as programming for picture getting ready by essentially indicating The variety of picture differences in the screen in conclusion including the vehicle holder in the picture given, the number of vehicles being registered. By using a mat lab tool, they can measure the vehicle's thickness by taking a gender on the four side of the image as a data.

As showed by *Mehal Zaman et al[9]* investigate paper, the development blockage can be reduced by arranging the development into low, medium and high and considering the class the signs are reworked among the four paths. The furthermore used sensors on the zebra crossing way so at whatever point the individuals by walking are using the zebra crossing a ringer is rung and the signs change their activities.

III

EXISTING SYSTEM

All existing systems used IR sensors for traffic flagging applications that were tested. The requirement is that the vehicles should be close to these sensors in order to recognize the presence of a vehicle that is not always conceivable. In existing frameworks time is as of now appointed to each flag. As the relegated "time" signals indicate, they operate in any direction. Suppose two directions are L1 and L2. Assume that all vehicles in route (L1) are passed and that vehicles in a different path (L2) are still holding up as the signal is still red. These systems are static, and for the rest of the day they can not cope with the various basic traffic conditions.

IV PROPOSED SYSTEM

Blockage in rush hour gridlock is a major issue. The timing of the signs is set and free of traffic thickness, which causes traffic blockage. The crisis vehicles, for example, ambulances, fire motors and police vehicles are given equivalent need over different vehicles and subsequently stall out up right now. In the event that a crisis vehicle is recognized out and about, the path where this vehicle is available will be given higher need over every single other path. The undertaking proposes an IOT based methodology that distinguishes whether a vehicle is a crisis one or not. This undertaking addresses the IOT based traffic control system, in which signal timings are revised depending on vehicle inspection and vehicle thickness, and The proposed framework is executed utilizing raspberry pi which estimates thickness. It gives great execution and assists with decreasing traffic clog. This proposed work utilizes IOT segments which will give high need to all crisis vehicles accordingly helping them to pass by the traffic light easily and encourages them to arrive at the crisis site quick.

V

IOT BASED TRAFFIC SIGNALING SYSTEM

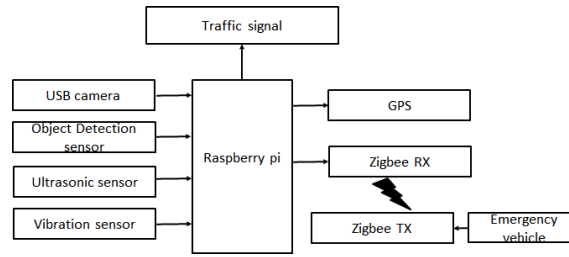


FIG 1 OVERVIEW OF THE PROPOSED SYSTEM

The traffic flagging system based on IoT depends on the traffic thickness of the street where vehicles are stationed on each side of the street by sensor arrangement. Traffic lights, i.e. Golden yellow and red, are currently placed at the intersection of street sides. Two sensor sets are placed over the streets that mark the spacing for thickness zones. The ultrasonic sensor is mounted here and the ultrasonic collector is reversed. Here, sensors are placed 50 meters from each other in good ways. The reasoning here is that as the vehicles pass the primary pair of sensors, an advanced sign is generated and as sensor requires, traffic blockage is expected to occur and around. So dependent on the information assembled, Arduino microcontroller imparts the planning sign yield by contrasting and nearby street's traffic. As the vehicle traverses the second pair of sensors, Sensor recognizes that it includes individually high traffic thickness. For high density traffic, there will be additional time distribution and ordinary time is given for low density traffic. Information on traffic thickness and traffic flagging control is sent remotely to Raspberry Pi3, where analysis with date and time is performed as Heavy Traffic and Regular Traffic. This data is at long last refreshed on Cloud website page which can be utilized for additional arranging and examination by Traffic office.

This venture explores the traffic control system focused on IOT, in which the signal times are refreshed depending on the vehicle thickness out and about. The proposed framework is actualized utilizing raspberry pi which estimates thickness. It gives great execution and assists with diminishing traffic clog. This proposed work utilizes IOT parts which will give high need to all crisis vehicles along these lines helping them to pass by the traffic light easily and causes them to arrive at the crisis site quick.

VI

SYSTEM DESIGN

6.1 RASPBERRY PI

Raspberry Pi3 model is like a Visa sized single board PC. This board is financially savvy when contrasted with a genuine PC. It is additionally accessible as Compute Module Development Kit, which is helpful gadget for mechanical applications and has greater adaptability. This impressive smartcard sized PC can be used for other applications. It also includes remote connectivity of LAN and Bluetooth making it the perfect solution for awesome related structures.

6.2 ZIGBEE

ZigBee is fundamentally utilized for two-path correspondence between a sensor and a control framework, Like Bluetooth it offers network up to 100 meters. ZigBee is an IEEE 802.15.4 based determination of a series of major communications conventions used to create individual territorial structures with lightweight, low-power advanced radios.

6.3 ULTRASONIC SENSOR

Ultrasonic Sensors are autonomous, strong state gadgets intended to detect solid and fluid articles without contact. Here we use the UltraSonic module running HCSR04, which gives 2cm-400 cm non-contact estimation function with a precision up to 3mm.

VII

CONCLUSION

Customary traffic signaling system is completely dependent on the traffic police to track the traffic signal for traffic control based on traffic thickness. Work has been completed in the identification of traffic thickness through the use of sensors to monitor traffic light signals. Right now, thickness based traffic light control framework was created to identify crisis vehicles like ambulances and to control traffic at '+' street crossing point to decrease superfluous time wastage and limit street traffic setbacks, which the current customary traffic light control framework has neglected to accomplish. This paper addresses the IOT-based system for traffic control, in which signal timings are revised depending on the vehicle thickness. The proposed code is modified using arduino and raspberry pi. MATLAB Simulink bolster package prompts quick frame execution. Estimation of thickness is achieved by raspberry pi. The proposed system gives great execution and helps to reduce traffic congestion. Results show vehicle including progressively. The proposed framework is reasonable for constant vehicle the executives.

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