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Implementation of Ambulance Over-riding the Traffic Signal by Using Internet of Things Techniques

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ABSTRACT: The paper is designed to develop the ambulance to override the traffic signal while crossing the signal. At first, we will learn about how a traffic signal works as we know there are three different colour lights that are at the traffic junction. These three colour lights (red, orange and green) are placed in the direction of each junction way. When the traffic signal turns red, the vehicles must stop. Vehicles are allowed to turn left at a red light if there is a free left sign. Orange light suggests a transition time before the red light turns on. Vehicles must slow down and stop before the light turns red .green light means GO. Due to heavy flow of traffic, sometimes ambulances are stuck in traffic which could be a life and death circumstances, the patient inside the ambulance might need emergency service of the hospital and due to heavy flow of traffic the patient might not reach to the hospital in the expected time which in turn could lead to serious health issues or even death.

KEYWORDS: Ultra sonic sensor sensors, Arduino UNO, Traffic light, Ambulance, IOT Model

I. INTRODUCTION

We build devices which are placed at 500m from all four sides of the junctions and a different device which are placed right beside the signal pole on all four sides of the junctions. There is another device which is placed in all the ambulances. So the Devices which are placed at the junctions act as receivers and the devices which are in the ambulances act as transmitters. So when there are critical patients in the ambulance, the driver would turn on the transmitter from the start of the location, so that at every signal the ambulance goes through the other device which is a receiver would receive the signal from the ambulance transmitter and override the signals at the junctions. The way for the ambulance is cleared with the green signal, once the ambulance passes through the other receiver which is placed at the signal pole, the signals would reset again and go back to its regular shift cycle. Thus ambulance would pass through the traffic signals without wasting time which in turn could save and bring out people from going into critical state and might save lives. When the transmitter which is placed 500m away from the junction, it overrides the signals and turns to green in all directions which means even taking left or right turn so that ambulance would not hesitate to make a right or left turn if needed. Thus the ambulances would be hassle free from the traffic junctions in the city. Internet of Things is a giant network with connected devices and sensors that gather and this is used to share data about how they are used and the environment in which they are operated. IOT is the collection of smart things which transmit and receive data in a much secured manner. Sensors are embedded in every physical device. These sensors continuously



emit data of the working state of the devices. Sensors are functionally simple devices that convert physical variables into electrical signals. Smart sensors are built as IOT components that change the existing variable that is being measured into a digital data stream for transmission from one gateway to another. Traffic is generally organized in many domains with marked lanes, junctions, intersections, traffic signals, or signs. The main problem is to regulate the movements at an intersection. When properly timed and maintained, a traffic signal increases the traffic handling capacity of an intersection. In most cases, the intersections are the limit to maximum throughput of the roadway. That is, increasing the number of lanes or the speed limit will not have any effect on the overall capacity of the road. The only way to increase the number of vehicles that travels safely from one point to another is to increase the efficiency of the intersections. Sirens are used function of any traffic signal is to assign right way to allow emergency vehicles such as ambulances, police cars, and fire trucks. The traffic analysis in is based on selection of vehicles by photoelectric sensors, radio frequency identification and GPS. Adaptive traffic signal control method considers a number of factors on traffic to determine green light sequence and the optimal green light length. A siren is a warning device which makes a lengthy, loud sound, thus alerting the vehicles on the way. Sirens are integrated into a warning system such that it is linked with other warning media. Siren comprises of multiple tones in which each tone has its own meaning given to alert the residents of the impending danger. A siren sound in emergency vehicles indicates that the direction in which it is approaching. It is done using varying the pitch of the sound. An ambulance is an emergency vehicle to provide emergency care to sick or injured people and to get them to hospital. Ambulance is mainly used to transport patients between hospitals. The siren sound of the ambulance has an alternative sequence of high frequency and a low frequency signal, the sequence of the frequency change is used to be the feature of the sound. They provide easy and quick access to health services, particularly out of hours. Thus it is very important for the ambulance to reach the destination at correct time. Traffic jams are common due to heavy traffic on road, as a result the emergency vehicles like ambulance and fire engines get stuck in traffic. Android mobile can be used to send message to the traffic controller using software installed in it. The message is sent through the short message service available in phone to the GSM module. Image processing is a widely used method for identifying the lane in which the ambulance is approaching. The proposed method will be useful for the ambulance to pass through the traffic junctions without waiting, so that they can reach their destination quickly. GPS does not help in recognizing and prioritizing emergency vehicles, its main function is to maintain the traffic system.

II. ARCHITECTURE & MODEL

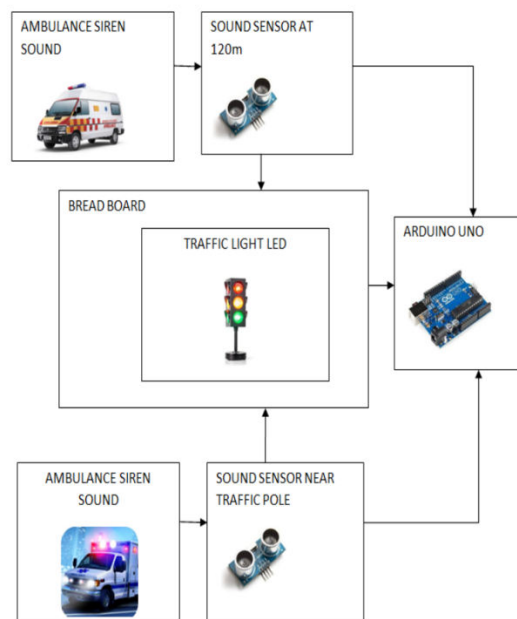


Fig 1. Model Architecture

1. Aim of the this paper

Main aim of the paper is to save the life of a person by implementing the Ambulance overriding the traffic signal.



2. WORKING MODULES

Initial Detection of Ambulance Sound: When the ambulance passes by the lane and is at a distance of 120m, the sound sensor detects the ambulance by recognising its sound level which is 120dB. Transmitting signal: The detected sound is then transmitted by the sound sensor to the traffic controller which is located at the intersection. This in turn enables them to change the signal at correct time. Switching the lights at the time of ambulance crossing: The traffic light at a particular lane in which the ambulance passes is changed to green and all other lanes are changed to red, thus allowing the uninterrupted passage of ambulance. Detecting ambulance sound near traffic pole: When the ambulance crosses the lane and reaches the traffic pole, the sound sensor detects the ambulance by recognising its frequency. Directing signal after the ambulance crosses: The detected sound is now transmitted by the sound sensor to the traffic controller again. This in turn enables them to change the signal. The traffic light at all the lanes meeting at the junction is changed back to normal form, thus allowing flow of vehicles in all the lanes. Reverting back the changes made: The traffic light is changed to normal form, thus allowing flow of vehicles in all the lanes.

III. RESULT ANALYSIS

The aim of this design is to obtain a highly accurate model for recognising the ambulance by detecting the ultra sonic sound at all the lanes. This is deployed by making use of ultra sonic sensor at a distance of 120m and the other sensor near the traffic pole. The ultra sonic sensor detects the ambulance sound passing the lane at 120m distance. This detected sound is sent to the traffic controller.

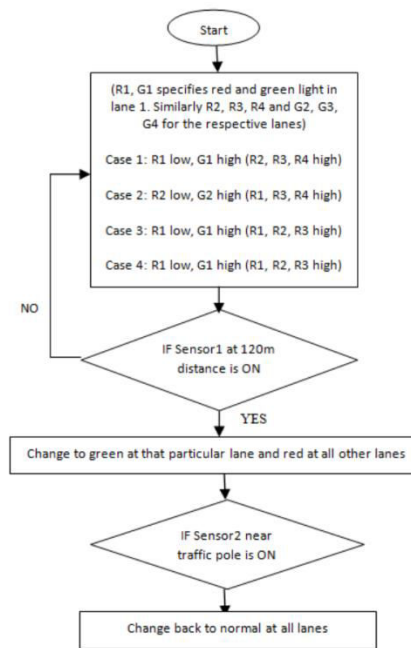


Fig 2: Workflow of IOT based traffic control system

The traffic light at that particular lane is changed to green and all other lanes are changed to red using Arduino UNO. After the ambulance crosses the lane, the sensor placed near the traffic pole detects the ambulance sound, and concludes that the ambulance has passed and thus sends the message to the traffic controller to change the traffic light back to normal at all the lanes. The efficiency of using the sound sensor over other method of traffic clearance such as Image processing, Android, GPS are analysed. The given analysis on traffic signal control for ambulance, travelling a distance of 50Km using GPS, image processing, android software and IOT shows that, the average time taken to reach the destination using GPS is 30 minutes, image processing is 26 minutes, android software is 22 minutes and IOT is 20 minutes. Thus, IOT seems to be an efficient way to reduce the delay of ambulance.

IV. DEVELOPMENT OF THE MODEL

One of the first recognizably modern embedded systems was the Apollo Guidance Computer,[citation needed] developed ca. 1965 by Charles Stark Draper at the MIT Instrumentation Laboratory. At the project's inception, the



Apollo guidance computer was considered the riskiest item in the Apollo project as it employed the then newly developed monolithic integrated circuits to reduce the computer's size and weight.

An early mass-produced embedded system was the Autonetics D-17 guidance computer for the Minuteman missile, released in 1961. When the Minuteman II went into production in 1966, the D-17 was replaced with a new computer that represented the first high-volume use of integrated circuits.

V. CHARACTERISTICS

Embedded systems are designed to do some specific task, rather than be a general-purpose computer for multiple tasks. Some also have real-time performance constraints that must be met, for reasons such as safety and usability; others may have low or no performance requirements, allowing the system hardware to be simplified to reduce costs.

Embedded systems are not always standalone devices. Many embedded systems consist of small parts within a larger device that serves a more general purpose. For example, the Gibson Robot Guitar features an embedded system for tuning the strings, but the overall purpose of the Robot Guitar is, of course, to play music. Similarly, an embedded system in an automobile provides a specific function as a subsystem of the car itself.

1. Advantages

- The main goal of this project is that we can save a life.
- Ambulances can be traffic tension free even in the busiest cities.
- It would develop smooth moving traffic even without a cop being at the junctions.
- Ambulance can drive fast even in the signals, so that it can reach the hospital in time.

2. Disadvantages

- If a Ambulance is coming from one side of the junction, people on the other junctions have to wait till the ambulance goes.
- If Ambulance is coming from once junction, the junction that has green signal when it turns red, will have to understand and wait for the ambulance to go.

VI. FUTURE SCOPE

Particularly we think that by displaying the data on LCD, people can know the upcoming Ambulance and give the way for the same.

REFERENCES

1. Smart' traffic signals cut air pollution in Pittsburgh". McCain, Inc. September 25, 2012. Archived from the original on October 10, 2013. Retrieved September 28, 2012.
2. "Smart and Scalable Urban Signal Networks". Richard (March 18, 2010). "Networked Traffic Lights Could Save Time, Fuel, and Lives". Narrative Content Group. Retrieved October 21, 2011.
3. Max Glaskin (February 12, 2008). "Could smart traffic lights stop motorists fuming?". Retrieved October 21, 2011.
4. "The first smart traffic signal experiment in the world is a great success" (PDF). 30 July 2019.
5. Astarita, Vittorio (2019-11-28). "INTER TRAFFIC WORLD 2020". Journaldownload.co.uk. Retrieved 2019-11-28.
6. Astarita, Vittorio; Giofre, Vincenzo Psquale; Festa, Demetrio Carmine; Guido, Giuseppe; Vitale, Alessardo (January 7, 2020). "Floating Car Data Adaptive Traffic Signal: A Description of the First Real-Time Experiment With "Connected Vehicle" Electronics.9(1): 114. Doi: 10.3390/electronics9010114.
7. Millward, David (May 19, 2011). "Smart traffic lightsto stop speeders". The Telegraph.
8. "Self organizing smart traffic lights offer significant reductions in waiting times and fuel consumption". August 20, 2008. Retrieved October 21, 2011.
9. Ahmed S. Salama, Bahaa K. Saleh, Mohamad M. Eassa(2016, Nov). Intelligent Cross Road Traffic Management System (ICRTMS). Presented at 2 nd International Conference on Computer Technology and Development (ICCTD 2016).
10. Arnab Kumar Saha , Sachet Sircar, Priyasha Chatterjee, Souvik Dutta, AnweshMitra, Aiswarya Chatterjee, SoumyoPriyoChattopadhyay, HimadriNathSaha. Department of Computer Science and Engineering IEEE 2013



BIOGRAPHY



Dr. K. Naveen Kumar presently working as a Professor in the Department of ECE at Holy Mary Institute of Technology and Science, Keesara, Hyderabad - 501301 India. He has vast teaching and research experiences in Engineering and Technology. He has published more than 40 research articles in various journals like National and International. He has attended 6 National and 16 International Conferences. In His credit as an Author for 5 Text books which are useful for engineering students under JNTUH and Anna University. He has attended 6 Short Term Training Programs at JNTUH HRDC and attended more than 20 Faculty Development Programs in India. He has Organized Workshops and Symposiums, National and International conferences. He worked in Engineering colleges and Universities at various capacities. He has done the 8 Courses of NPTEL/SWAYAM-UGC. He has achieved the best faculty Award from St. Martin's Engineering College, Hyd. His research interested areas are Embedded Systems, Digital Image Processing, CBIR Images, and Internet of Things, Deep Learning and Machine Learning. He is a member in professional societies like ISTE, IAEng and Indian Science Congress etc.. IEEE Member in Hyderabad Chapter.



Dr. E. Krishna Hari presently working as a Professor & Project Coordinator in the Department of ECE at Holy Mary Institute of Technology and Science, Keesara, Hyderabad - 501301 India. He has vast teaching and research experiences in Engineering and Technology. He has published more than 30 research articles in various journals like National and International. He has attended 4 National and 10 International Conferences. In His credit as an Author for 5 Text books which are useful for engineering students under JNTUH and Anna University. He has more than 10 Faculty Development Programs in India. He has Organized Workshops and Symposiums, National and International conferences. He worked in Engineering colleges and Universities at various capacities. He has done the 8 Courses of NPTEL/SWAYAM-UGC. His research interested areas are VLSI Design, FPGA Systems and Internet of Things, Deep Learning and Machine Learning. He is a member in professional societies like ISTE, IAEng.



Velumula Sahithi is a UG-Scholar, Studying B.Tech-ECE IV Year at Holy Mary Institute of Tech and Sciences, Hyderabad, India. She has a good academic back ground. She is proactive attitude towards the goal achievement. She is a habit listening music and watching movies. She secured more than distinction results in her inter and school education. She has attended 2 workshops in inter college level and attended the one National Technical Symposism. She has led the team in Mini and Major Projects.



Mr. Sai Reddy Velumula is currently pursuing Bachelor of Technology in Electronics&Communications Engineering from Holy Mary Institute Of Technology& Science, Hyderabad,India. He has always proven to be a perfect example of a great scholar. His hobbies include playing chess which depicts his intelligence and reading books which depicts his word power. He is a very sporty and competitive person and has always been leading the class in the right path. He has successfully completed two internships on embedded systems and has gained valuable knowledge by completing 5 courses in swayam. He is a beginner in cyber security and had attended 9 webinars on the topics related to it. He has completed his internship from a renowned company named nucleonix in the field of TLD badge reader. He is a keen learner and has completed his vlsi training program from government of telangana collaborative training program. His interest for learning has no limits and he has completed 2 courses from coursera. He has gained intermediate level knowledge on VHDL and verilog along with C language and digital electronics.



Allam abhinaireddy is a B.Tech IV ECE graduate UG scholar studying at Holy Mary institute of technology at Hyderabad. He has good academic background and has completed 3 projects on embedded systems, he has made his own CNC machine DIY , has a grip on 3D modeling . He has been working on 3D Printers to print 3D model for prototypes, languages know C, C++, Java, Python. His hobby is watching YouTube to explore new technology and very much interested in watching newly released gadgets. He has achieved the first prize in National level technical workshop.



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