

Automated Road Control System Using Arduino

S.Sharmila, N.Dinesh Babu , J.R.Nishanth, R.Nivethika

Abstract: *In the emerging world of technology, almost everything has been changed into automation. The technology in everyday activities has advantages as well as disadvantages. Vehicles results can be Increased number of in heavy traffic and accidents which cause huge loss. Our ideology will decrease the loss caused due to traffic and provides a way for the emergency vehicle. The main advantage of our project is the traffic can be cleared when the ambulance coming from a certain distance apart. By using controller and Wi-Fi module, we enable an alarm which denotes the public to move aside. The transmitter module in the ambulance sends and updates the current location of it to the cloud. The respective pole is activated according to the shortest path to the hospital for the ambulance. The alarm has been attached in every poles where the traffic is very high. The sound of the alarm will get off when the ambulance passed the pole. It results in the speedy and safe travel of the ambulance.*

Keywords: *GPS, ESP8266, Node MCU, TCP protocoll.*

I. INTRODUCTION:

In cities and also in rural areas, the increased number of vehicle population results in traffic. Everyone is hurry in doing their own work. Due to this traffic congestion also occurs. During urgent situations, the ambulance or fire engine can't overcome this traffic. Even though there are many methods are identified and implemented to avoid traffic and make way for the ambulance, the fact is still the time delay for it can't be minimized. Due to that we are supposed to face the loss of humans in their way to hospital. In order to decrease the time delay we came out with an idea of clearing the traffic before the ambulance entering the traffic region. For this we have developed a method for the smooth and fast travelling of the ambulance. Currently all the existing ideas are clearing the traffic by controlling the traffic signals and also signalling the vehicles at the time of entering of the ambulance into the traffic region. By introducing small change in the existing ideas we have proposed that the ambulance must be identified from where it is coming and the signalling for the vehicles in the traffic area has to be made when the ambulance is nearing the region. This can be done using the GPS module at the transmitter side and a Wi-Fi module at the receiver side to receive the data. An alarm also fitted in the receiver side to enable the sound for the easy clearing of vehicles in the region.

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Cloud is used as a transmission medium for sending the latitude and longitudinal details of the ambulance to the receiver.

II. LITERATURE SURVEY:

Some of the related works which are similar to our idea is discussed here.

[1] Vigorous algorithm to control urban vehicle traffic methodology and provides way for the ambulance. [2] A Rescue System of an scheme implements Automatic Ambulance Rescue System (AARS) method which controls the traffic signal, finds the shortest path between the accident spot, hospital and the ambulance. [3] In Flexible Technologies for Smart Campus system, MAC and SSID has been measured to calculate the exact location of the ambulance. Wireless sensor networks has been used. [4] Study of Wireless Sensor Networks and Its Current Applications depicts the importance of WSN and it has been used in wide range of applications. [5] Smart Vehicles with Everything proposed a solution for traffic clearance by Intelligent Transportation System (ITS) based on Wireless Sensor Networks and Intelligent of Things (IoT). [6] introduces Micro Electrical Mechanical (MEMS) technology. It contains various sensors which sends and receives data from the server, sending SMS through GSM, gives the shortest way for the ambulance. [7] The Intelligent Traffic Control System idea clears the traffic by controlling the signal using RFID tagged in the traffic signals and also in the ambulance. [8] based on Forward Collision Warning (FCW) method that reduces the back-end collisions by Advanced Driver Assistance System. [9] model methodology which is a combination of various related works that pre-determine the traffic congestion and clears it manually. [10] Case study implies that the neural network architecture to analyze and correlate the driver's behaviour and also various types of road anomalies. [11] Depicts the idea of controlling the traffic signals during emergency using Petri nets. [12] Includes various algorithms like path tracking, collision avoidance and vehicle stabilization. It ensures safe driving and also avoids obstacles.

III. PROPOSED SYSTEM:

The main objective of our idea is to reduce the time delay and save the lives due to traffic. For that we suggested to clear the traffic for the ambulance when it is coming from a certain distance apart by enabling the alarm fixed in the poles. We have gathered information from various reference papers. The block diagram Fig 1.1 of our idea is given below.



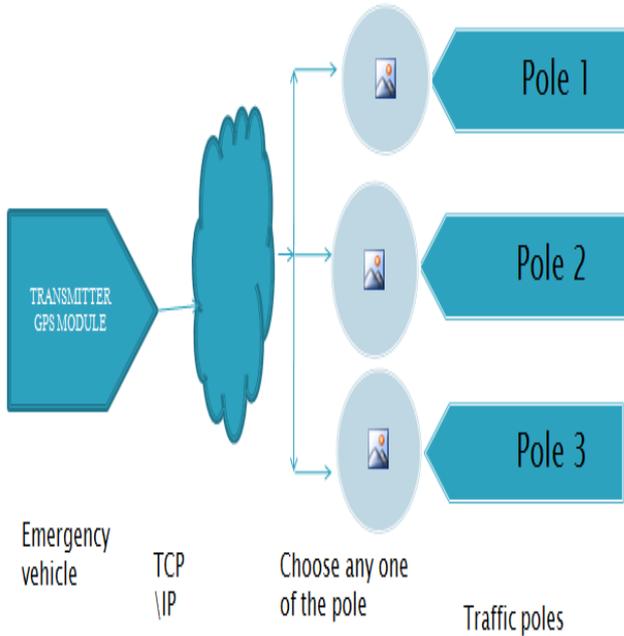


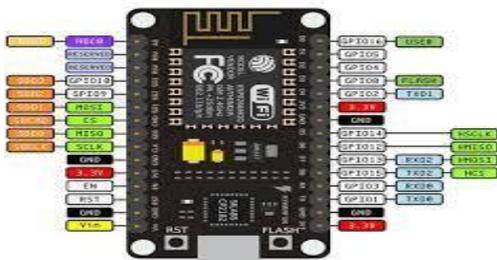
Fig. 1 BLOCK DIAGRAM

It consists of transmitter block and receiver block. The receiver pole is selected based on the direction in which the ambulance has to pass. The location i.e the latitude and longitudinal value of the ambulance is transmitted through cloud to the receiver. It continues until the ambulance reaches the certain distance from the pole. Once the alarm is enabled it stops only after the passage of the ambulance.

IV. HARDWARE DESCRIPTION:

In our project, the major components that we have used are Arduino, ESP 8266, Node MCU, GPS module and Relay.

A. Arduino: It is a single board kit which is used to operate, control and sense the objects in the outside world through the set of build-in microprocessors and microcontrollers. The board contains a set of analog input and output pins as well as digital input and output pins. These pins are used to interface the board with other blocks. It also contains communications interfaces, including Serial Bus (USB) used to load programs from PC. The microcontrollers are



B. typically programmed using C and C++.



Fig 2 Arduino

B.ESP 8266: It is a low cost microcontroller chip which is used to connect to a Wi-Fi network. It also makes simple TCP connections [16]. This module is connected in the receiver circuit to receive the data from the cloud. TCP protocol is used for the effective transmission of data from and to the cloud. It has number of external components so it is inexpensive.

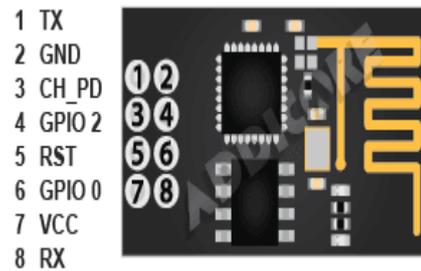


Fig 3 ESP 8266

C. MCU Node: Based on ESP 8266 module. It can be used for many projects. [13] It can be easily interfaced with LCD, VGA Displays and OLED. Node MCU contains upto 40 modules. From that 40 modules the user has to select the desired module according to their project.

D.GPS module: It is a source open universal navigation satellite system which provides the information of the desired thing in terms of time and position [14]. It can be accessed by anyone with a receiver. It is a independent satellite system which operated by its own and does not need any data to transmit from the user [15]. The major application of GPS is in the field of system, Geo-fencing, military applications and also by commercial



Fig 5 GPS Module

E. Relay: In our proposed method, to control the enabling and disabling of alarm relay is used. It is a switch which can be operated electrically as well as magnetically. It is also used to perform logical operations [17]. Protective relay, a type of relay, is used in protecting the circuits at the time of fault and overloading.



Fig 6 Relay

A. Ambulance section:

ESP 8266 module is used for the transmitting the geographical location of the ambulance to the cloud and receiving the data from the cloud. Based on the received data, the alarm is activated which denotes the drivers to move aside to provide for the ambulance. The transmitter circuit Fig 1.6 is given in which the GPS module gives the geographical location of the ambulance which is transmitted to the cloud through ESP 8266.

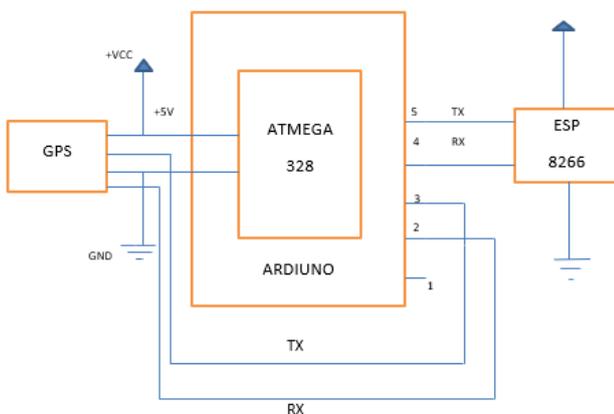


Fig. 7 Circuit of Transmitter

B. Pole section:

The position of the ambulance is continuously updated through the module. So when the ambulance is nearing the pole the receiver will get the data from the cloud which also enables the alarm. Alarm will get disabled when the ambulance passed the pole. The alarm when the ambulance passed away. Fig 1.7 depicts the receiver section that has to be fixed in the poles.

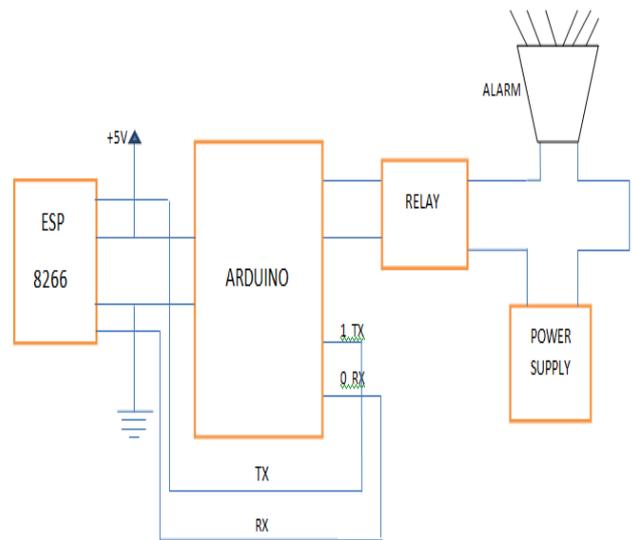


Fig. 8 Receiver circuit

V. CONCLUSION:

In order to save the precious human life, all the vehicle users must have to obey traffic rules and safety measures have to be taken during driving. Our methodology will reduce the delay caused due to traffic for the ambulance and save the human life which is at risk. The major advantage of our system is the traffic is cleared when the ambulance is coming from a certain distance which is very easy for the ambulance to travel.

VI. FUTURE WORK:

In future, our plan is to develop our idea by updating the current status of the patient to the hospital to which the ambulance intended to go and also to avoid the confusion caused in our proposed method of which side the vehicle users has to give the way for the ambulance in case of two way roads.

REFERENCE:

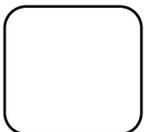
1. S.Sharmila, R.Kirubhanidhi, N.Keerthana, N.Aiswarya, R.Karthika Dept. of ECE, SNS College of Engineering, Coimbatore, Tamil Nadu, India. "Flexible Technologies for Smart Campus" ISSN (Online): 2320-9801 ISSN (Print): 2320-9798 Vol. 5, Issue 3, March 2017
2. Deepika.R, Gomathi.B, Karthik.J "Study of Wireless Sensor Network and Its Current Trend in Application" ISSN: 2319-5967 International Journal of Engineering Science and Innovative Technology (IJESIT) Volume 3, Issue 1, January 2014.
3. Dr.S.Saravanan, D.Jayaprakash, R.Srinivasan, A.Sharmili, Department of Computer Science and Engineering, Dhirajlal Gandhi College of Technology, Salem, India. "Smart Vehicles with Everything" 978-1-5090-5256-1/16 c 2016 IEEE 2016 2nd International Conference on Contemporary Computing and Informatics (ic3i).
4. B.Janani Saradha, G.Vijayshri, T.Subha, Department of IT, Sri Sairam Engineering College, Chennai, India. "Intelligent Traffic Signal Control System for Ambulance Using RFID and CLOUD" 978-1-5090-6221-8/17/\$31.00 c 2017 IEEE 2017 Second International Conference On Computing and Communications Technologies (ICCCT'17).

5. Seyed Mehdi Iranmanesh , Hossein Nourkhiz Mahjoub , Hadi Kazemi , and Yaser P. Fallah “An Adaptive Forward Collision Warning Framework Design Based on Driver Distraction” 1524-9050 © 2018 IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS
6. Stavros-Richard G. Christopoulos, Stratis Kanarachos , and Alexander Chronos. “Learning Driver Braking Behaviours Using Smart phones, Neural Networks and the Sliding Correlation Coefficient: Road Anomaly Case Study” 1524-9050 © 2018 IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS.
7. Liang Qi, MengChu Zhou, Fellow, IEEE, and WenJing Luan “Emergency Traffic-Light Control System Design for Intersections Subject to Accidents” 1524-9050 © 2015 IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS.
8. Joseph Funke, Matthew Brown, Stephen M. Erlien, and J. Christian Gerdes “Collision Avoidance and Stabilization for Autonomous Vehicles in Emergency Scenarios” 1063-6536 © 2016 IEEE TRANSACTIONS ON INTELLIGENT TRANSPORTATION SYSTEMS.
9. M.Arun Kumar and N Kirthika, “Efficient implementation of ROM-less FFT/IFFT processor using fused multiply and added unit,” International Journal of Electrical and Electronic Engineering & Telecommunications, vol. 2,No. 2, April 2013.
10. M. Arun Kumar and Dr.Arvind Chakrapani, “An survey of low power FFT processor for signal processing applications,” Jour of Adv Research in Dynamical & Control Systems, 15-Special Issue, October 2017.
11. M. Arun Kumar, “Efficient implementation Of MIMO using OFDM applications,” International Journal of Science and Research (IJSR), volume 3 Issue 6, June 2014.
12. M.Arun Kumar, C.P Jeba Samuel, L.Saranya and T.Karthik, “Efficient time sharing of traffic signal using wireless sensor networks,” International Journal of Applied Engineering Research, ISSN 0973-4562 vol.10 No.20 (2015).
13. M. Arun kumar “An Efficient Design and Implementation of Ambient Power Harvesting Method Using Radio Waves for IoT System Monitoring Module”, International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 05 May-2018.
14. Suma, N. and Purusothaman, T. ‘Logical Tree Based Routing for Energy Efficient Wireless Sensor Networks’ European Journal of Scientific Research, Vol.87 No 4 October 2012, pp.504-511.
15. Suma, N. and Purusothaman, T. ‘Secure Authentication Based Multipath Routing Protocol for WSNs’, Journal of theoretical and Applied Information technology, Vol.59 (1) January 2014, pp.222-231.
16. Suma, N. and Purusothaman, T. ‘Efficient Multipath Routing Tree based Energy Minimization in Wireless Sensor Networks’, Asian Journal of Information Technology, Vol.13 (6), 2014, pp.338-345.
17. Dr.N.Suma ,S.Jayashree , E.Shanthini , “Design of High Speed Architecture of ECSM”, Middle-East Journal of Scientific Research 25 (4): 684-689, 2017
18. Dr.N.Suma and Sandra Rhea Samson, “IOT Based Smart Agriculture Monitoring System”, International Journal on Recent and Innovation Trends in Computing and Communication Volume: 5 Issue: 2 177 – 181, 2017.



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