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Developing A Real-Time Machine Learning Application to Track and Show Traffic on The Road Surface

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ABSTRACT: an innovative approach utilizing ir sensor technology is put forth to address the crucial problems of traffic signal time consumption and vehicle congestion. it might be the ideal replacement for the manually operated traffic light. the density of vehicles on the road is measured by the object detection sensor placed at the traffic signal path. it offers automatic signal timing in accordance with the density. this further simplifies the current system. the traffic signal's lengthy lineups make it uncomfortable to drive by an ambulance right away. we have suggested an rf transmitter and receiver solution that solves this issue. when the ambulance arrives, the specific path signal will become blue in addition to the green signal.

KEYWORDS: vehicle localization, IR Sensor, RF Transmitter, Receiver, RFID.

I. INTRODUCTION

With the aid of an IR sensor that determines the density of every path and provides priority-based signal timing, Automatic Congestion Control (ACC) enables vehicles to operate on a density-based basis. When a red signal indication is present at a junction, the path will automatically close with the assistance of a gate; this indication is represented by a buzzer. The gate opens upon the release of the green light signal. The Ambulance Clearance System (ACS) is an automated system that utilizes radiofrequency transmitters. And RF Receiver I.E. RADIO FREQUENCY TRANSMITTER AND RECEIVER Where Every Ambulance Will Have A RF Transmitter [1]. When The Ambulance Approaches A Junction The Driver Must Detect The Particular Path Switch, And then RF Signal Transmits The Signal To Receiver Which Is Placed In The Junction. Then The Ambulance Can Pass Smoothly. This System Can Effectively Communicate, And Then The Particular Path signal turn on the green light along with blue light.

That's the ambulance's indication. Every vehicle will have an RFID tag with a unique tag identification number as part of the Stolen Vehicle Detection System (SVDS), an automatic collection system based on radio frequency identification. This identifying number will be linked to the detailed information, like the owner's name, vehicle number, etc. Additionally, by consuming the RFID, theft-prone vehicles can be detected when they cross traffic intersections. The vehicle's owner is required to notify the RTO office of the theft. The Control Room Receives An SMS Alert When The Theft Vehicle Approaches The Junction [2].

II. RELATED WORKS

Hardware that is predetermined and has a specific time for the green and red lights is necessary for an adaptive traffic light system. We have the foundation for a network of intelligent traffic mechanisms to help with this. It is well observed



that the current traffic signal system is independent of traffic density. Therefore, we've proposed a system where the duration of the green and red lights is based on the volume of traffic that exists at that particular moment. IR sensors can be purchased in order to do this. After the density is determined, the ATMEEL 89C51 microcontroller is used to determine the green light's glowing.

modification on the real time basis. It also uses the IR sensor for density calculation depends on that vehicle information the microcontroller will make the decision. But it has major disadvantages that each vehicle has mount a one metal plate so cost of this system is very high.

In this structure CCTV is used for congestion control on the traffic. In the present situation vehicular travel is improved all over the world, particularly in urban areas. This system uses the wireless sensor and CCTV camera for the congestion using this sensor we can easily monitor the density of traffic as the general architecture of wireless sensor network is an infrastructure fewer communication network [5]. The speed enforcement cameras are used these are Gatos GTC-d, Multi Camera System, Digital Radar Camera System. Thus the system is extra cost effective and more complex.

In this framework they proposed a RFID and GPS based Automatic Lane Clearance for Ambulance. The focal point of this technique is to diminish the postponement in appearance of the emergency vehicle to medical clinic by unexpectedly clearing the path in which rescue vehicle is voyaging, prior it arrives at the traffic signal [6]. This can be attained by turning the traffic signal. The main disadvantage of this arrangement is that the Government ambulances, like the 108s, do not have the particular place from which they frequently leave to pick up the patients. Thus implementation is hard to achieve.

The following are advanced traffic light control system using barrier gate and GSM

- In this system IR sensor is used to find the density of path then the signal timing changes automatically.
- There is no provision for ambulance clearance this is main drawback of existing method.
- Large Manpower is required for signal breaking vehicular.
- The traffic signal requires large time, so traffic jam occurs at junction

III. SYSTEM DESIGN

This project deals with the interpretation of technique followed by customers to cross junction, like assembly it mechanized, ambulance clearance, vehicle stealing detection etc. All these activities are delivered out using IR sensor, RF transmitter and receiver, sole smart card (RFID tag). Thus saving the energies of booming money and records physically. The Proposed System Unit is shown in fig. 1

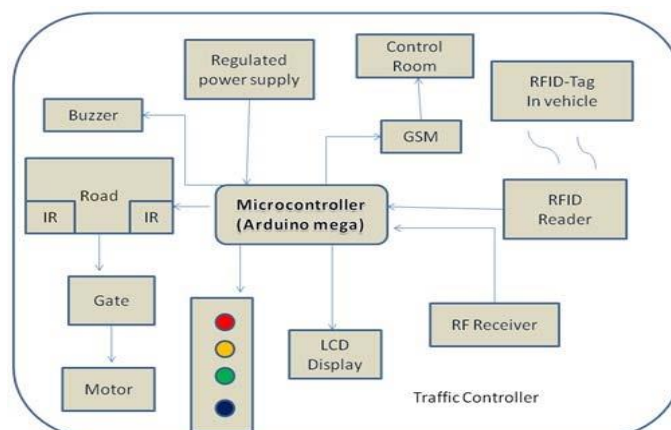


Fig. 1 Proposed System Unit



IR sensor is used to fastening the density of path be contingent on this density the signal timing alterations automatically [8]. When the ambulance forthcoming the junction, the particular path switch is identified by ambulance driver, where RF transmitter is positioned in the ambulance. The Block diagram for traffic controller is shown in fig. 2.

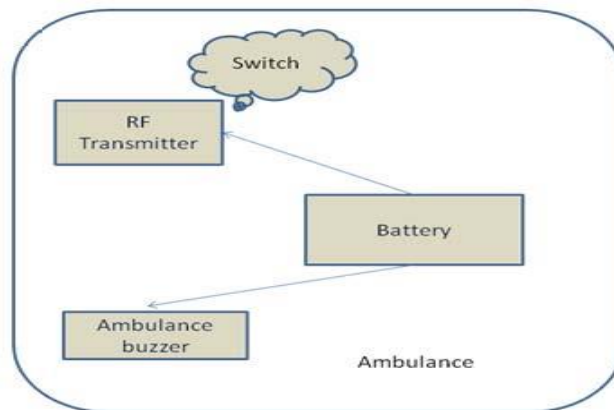


Fig. 2 Block diagram for traffic controller

The RF receiver receives the signal, which is located with the microcontroller. From that ambulance will be permits smoothly [10]. Whenever any person buys a vehicle, one first wants to get his or her vehicle recorded at the RTO office. RTO On the other hand, whenever any vehicle owner registers a complaint to RTO office concerning theft individual entry is made in the file. With the help of this stolen vehicle can be easily identified by RFID technology.

A) Arduino

Arduino is an open-source physical computing policy based on a simple I/O board and advance surroundings that implements the processing. The open- source IDE can be downloaded [9]. It includes all the functions required to support the microcontroller, simply link it to a device with a USB cable, or power it to get going with an AC-to-DC adapter or battery. The Mega is in accordance with most Arduino Duemilanove-designed shields. Because of its low price, wide range of applications, high quality, and simple handling this controller is commonly used for research and modern applications. It is suitable for applications such as computer control, measuring devices, research purpose, etc.[17].

B) RFID

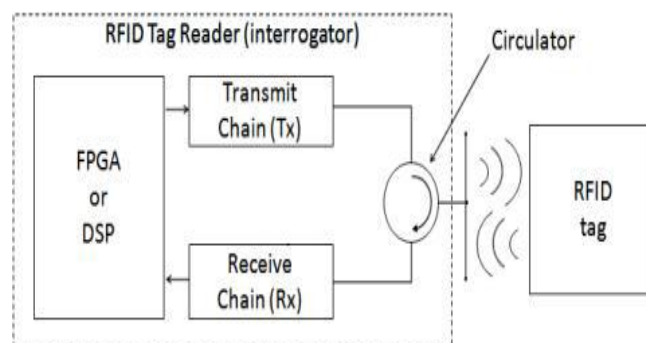


Fig. 3 Block Diagram of RFID

A radio-recurrence recognizable proof framework utilizes labels, or stickers appended to the things to be distinguished. Two-way radio transmitter- beneficiaries called examiners or perusers send a sign to the tag and read

its reaction.



Fig. 4Diagram of RFID Tags

A RFID peruser imparts an encoded radio sign to grill the tag. The RFID tag acknowledges the message and afterward answers with its distinguishing proof and other information. This might be just a solitary label sequential number, or might be item related information, for example, a stock number, parcel or bunch number, creation date, or other explicit information. Since labels have explicit sequential numbers, the RFID framework proposition can separate among certain labels that may be inside the scope of the RFID peruser and read them immediately.

C) RFID Reader

RFID structures can be configured by tag form and peruser [14]. A Passive Reader Active Tag (PRAT) system has a latent peruser that only gets radio signage from dynamic labels (battery operated, transmitted as it were). A PRAT system peruser's gathering distance can be balanced from 1–2,000 feet (0–600 m) allowing adaptability in applications, such as resource protection and oversight.



Fig. 5Diagram of RFID Reader

A working peruser has an Active Reader Passive Tag (ARPT) system, which transmits investigative specialist signals and additionally receives confirmatory responses from latent labels. An Active Reader Active Tag (ARAT) system uses dynamic labels awakened from the dynamic peruser with [13] a cross-examiner signal. A variation of this system could also use a Battery-Assisted Passive (BAP) label that functions as an aloof tag but has a bit of battery to monitor the announcement signal of the label's arrival. Repaired perusers are set to create a can cross-examination zone which can be controlled firmly. This makes for an exceptionally characterized perusing zone as labels go through the entire cross examination area. Versatile perusers can be placed on trucks or cars by hand.

D) GSM

GSM represents Global System for Mobile Communication. It is a computerized cell innovation utilized for moving portable voice and information administrations. GSM is a circuit-exchanged strategy that parts each 200 kHz channel into eight 25 kHz schedule openings. GSM works on the portable correspondence groups 900 MHz and 1800 MHz.



GSM utilizes narrowband Time Division Multiple Access (TDMA) system for transmitting signals [14]. GSM was created utilizing computerized innovation. It has a capacity to convey 64 kbps to 120 Mbps of information rates.

Directly GSM bolsters more than one billion versatile supporters. GSM digitizes and packs information at that point sends it down through a channel with two different surges of client information, each in its own timeslot

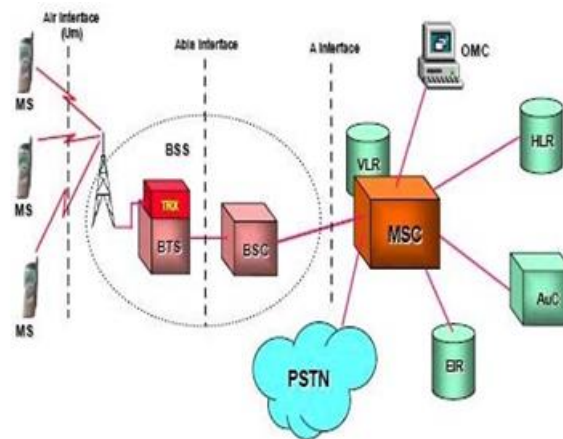


Fig. 6 GSM Architecture

E) GSM Kit

This is a plug and play GSM Modem with a simple to interface serial interface.



Fig. 7 Diagram of GSM Kit

Use this to send SMS, make and receive calls, and do other GSM operations by controlling it from micro controllers and computers via simple AT commands. It uses the very common module SIM800 for all of its operations. It comes with a basic RS232 interface that allows easy communication between the modem and microcontrollers and computers [13]. The modem consists of all the external circuitry needed to start experiments with the SIM800 module, such as power control, external SIM Holder antenna, etc

IV. RESULTS AND DISCUSSION

In this project have we proposed 3 modules that are explained below

A) Congestion control

Here, the density is designed by using the proximity sensor, clearly an IR sensor which is used to identify the density of the vehicle. With this information, our system routinely changes the signal timing according to the density of traffic measured [16]. Thus the above reduces the congestion in the link.

B) Ambulance clearance

When switch is identified by the ambulance driver in the specific path, the RF transmitter communicates the signal to the RF receiver. Depending on this statistics, the particular path signal will change according to the requirements. Using of this, the ambulance can easily pass even in heavy traffic signal controls and hence it reduces the density I ambulance passage even in peak traffic hours.

C) Theft vehicle detection

The owner of the vehicle must intimate about the theft to the RTO office. The complaint will be registered at the RTO office; the vehicle number is noted along with its RFID tag number [12] and entered into the database. By using the above details vehicles crossing the junction are checked with the help of above given information. If the theft vehicle is found, the intimation is given to control room via GSM.

D) SNAP SHOT OF THE RESULTS

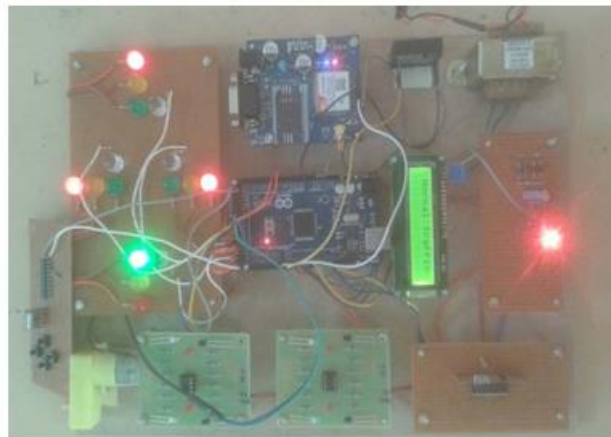


Fig. 8 Normal traffic

The above Fig. 8 shows the signal path at normal traffic conditions. Fig. 9 shows the snapshot of the signal paths during heavy traffic conditions with the help of barrier gate. Path 2 signal timing is increased on detection of more vehicles in the same.

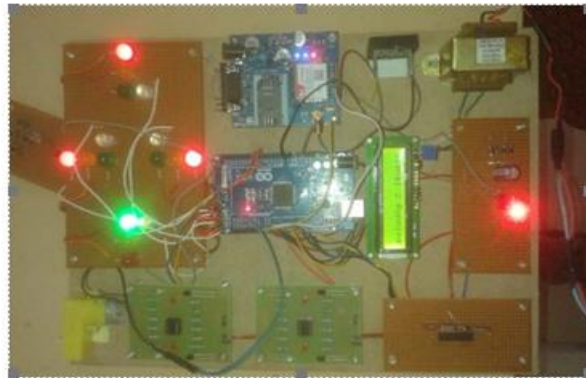


Fig. 9 Congestion control

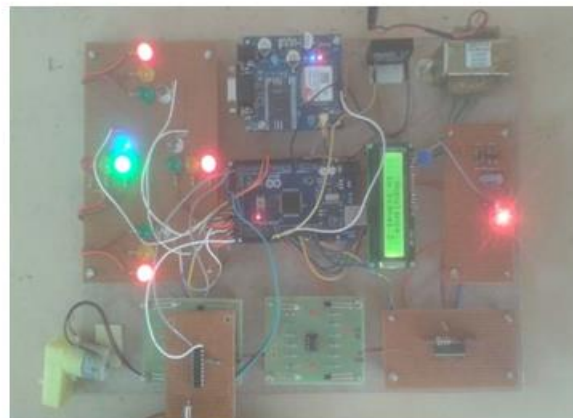


Fig. 10 Ambulance clearance

The above Fig. 10 shows the ambulance clearance at heavy traffic with help of RF module. The blue light is indicated the ambulance arrival. The Fig. 11 shows the stolen vehicle detection by using RFID.

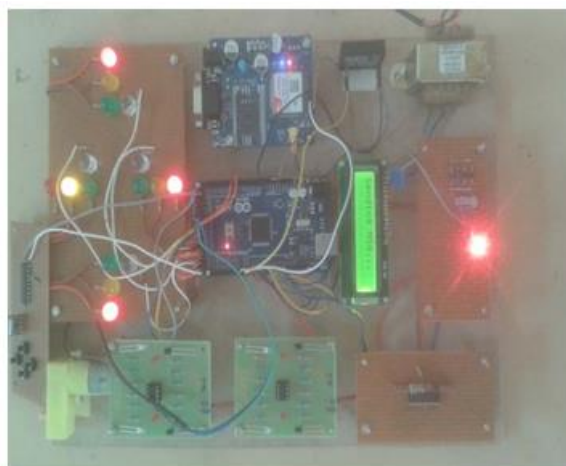


Fig. 11 Stolen vehicle detection



V. CONCLUSION

The Automatic Traffic control system is calculated could repeatedly detect the density of the vehicle. The system could mechanically open and close the gate. The gate closed suggestion is signified by buzzer sound. The ambulance can also permit smoothly. These were the major attainments met in the project, among other purposes also achieved which include congestion control, ambulance permission and stolen vehicle detection. Reading things and objects in motion can be done correctly using RFID. A system advanced with high security and the overall cost of employing the system may seem high but after a year of administration the system, very high profits will be realized.

Future Enhancement

- Automated Reserve Vehicle Clearance.
- Can be implemented in standing CCTV based signals with low cost.
- Alternate Path Stipulations with help of maps in case of path blocks.

REFERENCES

- [1] M.Ashein Kumar, G.Akshay Kumar And S.M.Shyni, "Advanced Traffic Light Control System Using Barrier Gate And GSM", IEEE, Dec 2016..
- [2] Monika.G And Kalpana.N, "An Intellegent Automatic Traffic Light Control Using Embedded System", International Journal Of Innovative Research In Science, Engineering And Technology, Volume 4, Issue No. 4,Pp.19-27, April 2015.
- [3] Nilay Mokashi, "International Traffic Signal Control Using Image Processing", International Journal Of Advance Research In Computer Science And Management Studies, Volume 3, Issue No.10,Pp. 137-143, Oct 2015.
- [4] Padmini G. Kaushik And Vishal D. Dahake, "Design Of Intelligent Traffic Light Controller", International Journal Of Engineering In Science And Management, Volume 5,Issue No.1,Pp.120-129, Jan 2015..
- [5] Pramod Sharma And Akanksha Mishra, "Density Based Intellegent Traffic Control System Using IR Sensor", International Journal Of Scientific Research, Volume 4, Issue No.5,Pp.3-4, May 2015 .
- [6] N.Kumareshan,N.Prakash ,N.Arun Vignesh And G.Kumaran"Performance Analysis Of Various Routing Protocols For Vanet Environments" In International Journal Of Innovative Technology And Exploring Engineering (Ijitee) ISSN: 2278-3075, Volume-8 Issue-12, October 2019.
- [7] N.Kumareshan,N.Prakash "Implementing P2p Resource Sharing Applications In Wireless Mesh Networks" International Journal Of Scientific Engineering And Applied Science (IJSEAS) – Volume-3, Issue-8, August 2017.
- [8] Kumareshan,N.Prakash "M-Chord And Mr-Chord Protocol For High-Throughput Hybrid Wireless Networks" International Journal Of Information And Computing Science Volume 5, Issue 11, November 2018
- [9] Dr.P.Vetrivelan, "A Neural Network Based Automatic CropMonitoring Robot For Agriculture", The IoT and the Next Revolutions Automatingthe World, IGI Global, chapter 13, pp.203-212, 2019..
- [10] E.Udayakumar, "An Event Based Neural Network Architecturewith Content Addressable Memory", International Journal of Embedded and Real-Time Communication Systems, IGI Global, Vol 11, Issue 1, January 2020.
- [11] Dr.P.Vetrivelan, "Design of Smart Surveillance SecuritySystem Based on Wireless Sensor Network", International Journal of ResearchStudies in Science, Engineering and Technology, Sryahwa Publications, Volume 4,Issue 5, August 2017, pp.23-26.
- [12] T.Kanagaraj, "Foot Pressure Measurement by using ATMEGA164 Microcontroller", Advances in Natural and Applied Sciences, AENSI Journals,Vol 10, Issue 13, September 2016, pp.224-228.
- [13] Dr.K.Srihari, "Automatic Battery Replacement of Robot",Advances in Natural and Applied Sciences, AENSI Publications, Vol 9, Issue 7, June2015, pp.33-38.
- [14] Dr.P.Vetrivelan, "PAPR Reduction for OQAM/OFDM Signalsusing Optimized Iterative Clipping and Filtering Technique", Proceedings of IEEEInternational Conference on Soft-Computing and Network Security (ICSNS`15),SNS



College of Technology, Coimbatore, 25 th to 27 th February 2015, pp. 72.

[15] Dr.S.Santhi, “SoS Emergency Ad-Hoc Wireless Network”, Computational Intelligence and Sustainable Systems (CISS), EAI/Springer Innovations in Communications and Computing, pp.227-234, 2019.

[16] Dr.S.Santhi, “Design and Implementation of Area and Delay Efficient FXLMS Filter for active Noise Cancellation”, Computational Intelligence and Sustainable Systems (CISS), EAI/Springer Innovations in Communications and Computing, pp.115-129, 2019.

[17] E.Udayakumar, “Design and Analysis of Efficient Special Modern Adder”, Lambert Academic Publishing, Germany, pp.1-77, July 2019.

Publications, Volume 4, Issue 5, August 2017, pp.23-26.

[12] T.Kanagaraj, “Foot Pressure Measurement by using ATMEGA164 Microcontroller”, Advances in Natural and Applied Sciences, AENSI Journals, Vol 10, Issue 13, September 2016, pp.224-228.

[13] Dr.K.Srihari, “Automatic Battery Replacement of Robot”, Advances in Natural and Applied Sciences, AENSI Publications, Vol 9, Issue 7, June 2015, pp.33-38.

[14] Dr.P.Vetrivelan, “PAPR Reduction for OQAM/OFDM Signals using Optimized Iterative Clipping and Filtering Technique”, Proceedings of IEEE International Conference on Soft-Computing and Network Security (ICSNS`15), SNS College of Technology, Coimbatore, 25 th to 27 th February 2015, pp. 72.

[15] Dr.S.Santhi, “SoS Emergency Ad-Hoc Wireless Network”, Computational Intelligence and Sustainable Systems (CISS), EAI/Springer Innovations in Communications and Computing, pp.227-234, 2019.

[16] Dr.S.Santhi, “Design and Implementation of Area and Delay Efficient FXLMS Filter for active Noise Cancellation”, Computational Intelligence and Sustainable Systems (CISS), EAI/Springer Innovations in Communications and Computing, pp.115-129, 2019.

[17] E.Udayakumar, “Design and Analysis of Efficient Special Modern Adder”, Lambert Academic Publishing, Germany, pp.1-77, July 2019.



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