RESEARCH ARTICLE

SMART TRAFFIC CONTROL SYSTEM FOR FIRE CAR CLEARANCE & STOLEN VEHICLE DETECTION USING ARDUINO SOFTWARE

*Vahedha and Dr. B. Naga Jyothi

Department of Electronics and Communication, DMSSVH College of Engineering,

ARTICLE INFO	ABSTRACT
	The paper mainly focuses on how smart the traffic controlling is being done. In India as the population is being increasing day by day the traffic is also increasing with proportionality. So the traffic signals need good coordination for the smooth flow of traffic during the busy hours as the traffic is at peaks. In order to avoid traffic jams when the emergency vehicles are passing towards the junction this work is being implemented. Each vehicle is equipped with the RFID tag which can't be removed or destroyed. When the emergency vehicle reaches the junction point the RFID reader reads the signals and shows a green wave so that it can move smoothly without any jam. Automatically when it crosses the signal point the signal gets changed. This is done by considering the multi road junction point. The application of the proposed work include • *Stolen vehicle detection.* • *Fire car clearance.* • *Clearance to emergency vehicles.*

INTRODUCTION

The first traffic lights were introduced in London in 1868 and from thenthey came into existence and now they were implemented with many existing techniques in the developing country like India growth of population adversely increases. With the increase in population the traffic is rapidly increasing and so bundle of problems too; these problems include traffic jams, accidents and traffic violation at the heavy traffic signal. This in turn has an adverse effect on the economy of the country as well as loss of lives. All this occurs because there were no separate lanes constructed in India. So in order to avoid these problems, in this project we have introduced an RFID based vehicular system. An RFID receiver and transmitter are being used to receive and transmit the information from the emergency vehicles to the signal points. In case the vehicle is stolen, then the RFID tags present in the vehicles are being matched. If it is correctly matched then when the vehicle comes nearer to a signal point red light blinks and so we can know that the vehicle is the stolen vehicle.

*Corresponding author: Vahedha,
Department of Electronics and Communication, DMSSVH College of Engineering,

Then a message is being sent to the police station and also to the vehicle owner that the vehicle is at a certain signal point.

Literature Survey

Green wave system was discussed [4] which was used to provide clearance to any emergency vehicles by turning all the red lights to green on the path of the emergency vehicles. A green wave is synchronized and it continues to receive the signal until it travels down the road. And it is also used to track the stolen vehicle when it passes through the traffic signal. In the survey we have observed the disadvantage that when the wave gets disturbed the disturbances cause the traffic problem. And also the system needs information of starting and ending point of the travel. It may not work if the ambulance needs to take any other route in emergency. RFID technique deals with multi lane multi junction areas. It provides efficient time management schemes by counting the number of vehicles and controls the traffic near the signal. The use of RFID distinguishes between the emergency and non emergency vehicles thus preventing the unnecessary traffic congestion. The communication is done through the transceiver and receiver and the system is fully automated and has less need of human intervention.
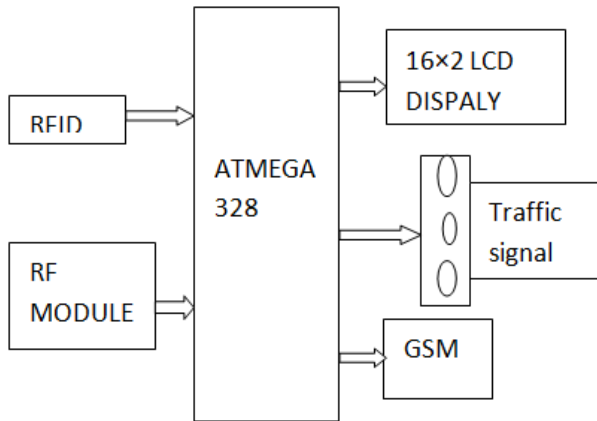
Block Diagram

Fig. 1. Smart traffic control

RF Module

The CC2500 is a RF module and has Trans receiver, which provides an easy way to use RF communication at 2.4 GHz. Every CC2500 is equipped with the ATMEGA328 microcontroller, which contains Unique Identification Number (UIN). This UIN is based on the registration number of the vehicle. Hence it provides information in one direction. The RX pin of CC2500 communicates with TX pin of microcontroller.
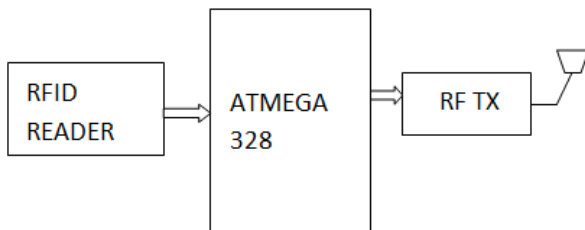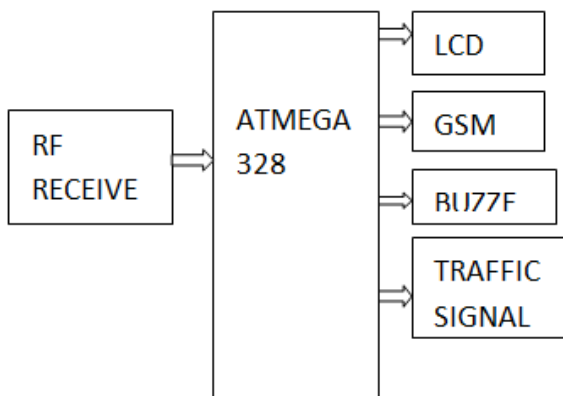

Fig. 2. RFID Transmitter

Fig. 3. RFID Transmitter

RFID: Radio Frequency Identification (RFID) is an information technology system that transmits signals without the presence of physical gadgets in wireless communication. It is categorized under automatic identification technology, which is well established protocol. The system utilizes the tags that are attached to various components to be tracked. The tags store data and information concerning the details of the product of things to be traced. The reader reads the radio frequency and identification tags. The antenna provides the means for the integrated circuit to transmit its information to the reader.

GSM Module: GSM modem is connected with the microcontroller. This allows the computer to use the GSM modem to communicate. It is used for sending and receiving SMS. GSM modem must support an "extended AT command set" for sending/receiving SMS messages. GSM modems are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery. SIM300 is designed for global market and it is a tri-band GSM engine.

WORKING MODEL: The disadvantages observed in the literature survey are considered and new methods are being implemented in this system to overcome them. There are three major operations that are being done in this system. The first is the automatic signal controlling, second is the stolen vehicle detection and the third is the emergency vehicle clearance system.

Automatic signal Controlling: Each vehicle is equipped with an RFID tag. When it comes in the range of RFID reader, it will send the signal to the RFID reader. The RFID reader will track how many vehicles have passed through for a specific period and determines the congestion volume. Accordingly, it sets the green wave path when the emergency vehicle arrives.

Stolen vehicle detection Method: Every vehicle is equipped with an RFID tag which cannot be removed or even destroyed. If our vehicle is stolen, we complain in the police station. Then at the signal points the RFID reader reads the RFID tag numbers and matches every number with the stolen number and in case if a match is found, then it automatically sends SMS to the police control room and the person who belongs to that vehicle. Also the traffic light changes to red, so that the vehicle is made to stop in the traffic junction and local police can take appropriate action.

Emergency vehicle clearance System: Each vehicle contains RF module with the transmitter and receiver implemented at the traffic junction and also in the ambulance unit. A buzzer is placed in the ambulance to switch on when the vehicle is used for the emergency purpose. A green wave is shown when the vehicle reaches the junction point so that it can move smoothly without any traffic jams and waste the time near the junction in emergency condition. When the ambulance passes away from the junction automatically the green is changed to red.

Here there is no need of giving the starting and ending point of the travel. So this system works even if the ambulance needs to take another route in emergency condition. When it takes another route then the receiver at that route sends the information to the RF receiver placed at the junction that the emergency vehicle has passed in this way so it can change the signal green to red and work in the normal way. In this way the system is being implemented.

Flow Chart
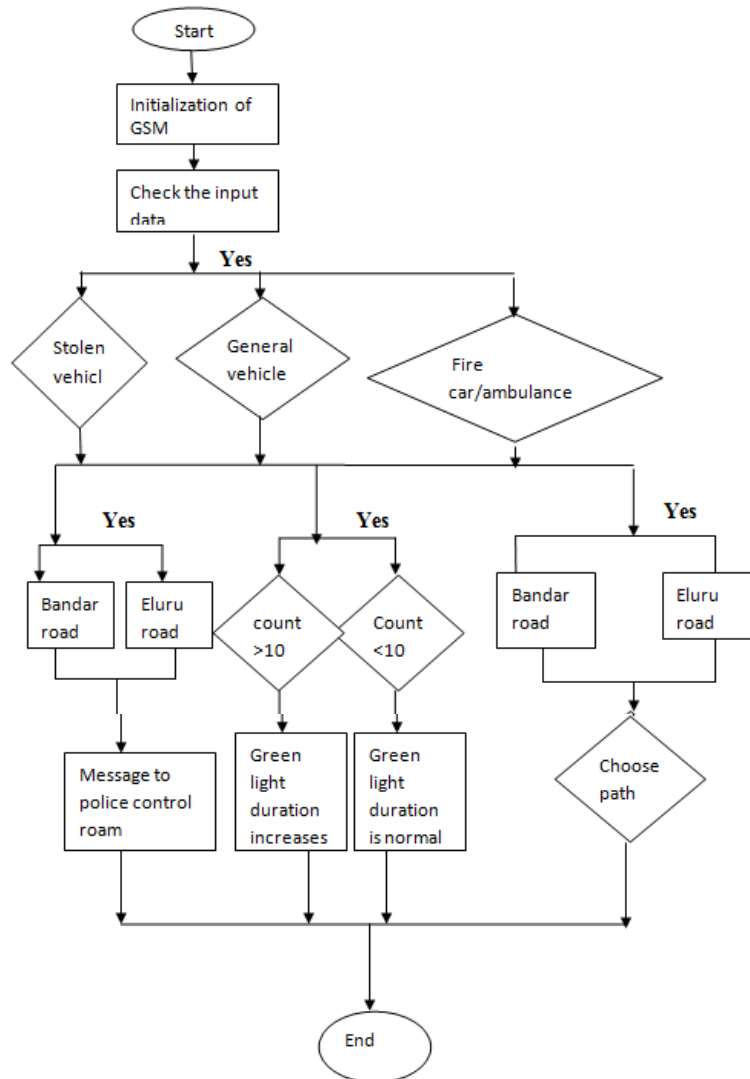
Conclusion

The design and implementation of this technique is directly targeted for traffic management so that emergency vehicles on road move smoothly without any traffic jam till they reach the destination in less time and without any human interruption. It also controls the traffic congestion of the system and identifies the stolen vehicle.

REFERENCES

"Hi-Fi Traffic Clearance Technique for Life Saving Vehicles Using Differential GPS System", Yuvaraj.N, Prakash.V.B. Venkatraj.D. World Academy of Science, Engineering and Technology, 2011.

"RFID and GPS based Automatic Lane Clearance System for Ambulance", Rashmi Hegde,

"The Role of Zigbee Technology in Future Data Communication System", Riaz Ahamed. S.S., Journal of Theoretical and Applied Information Technology 2005 – 2009.

"Traffic Control by Bluetooth Enabled Mobile Phone", Manikandan.G, Srinivasan.S. *International Journal of Computer &Communication Engineering* vol.1, No.1, May 2012.

Abdoos, M., Mozayani, N. and Bazzan, A. L. C. 2011. "Traffic light control in Non-stationary environments based on multi agent Q-learning," in *Proc.14th Int. IEEE Conf. In tell. Transp. Syst.*, Oct., pp. 580–1585.

Abhilash.G, Gokul.G, International Journal of Advanced Tech and Engg. Research,Vol 2,Issue 2, May 2012

Hegde, R., Sali, R. R. and Indira, M. S. 2013. "RFID and GPS based automatic Lane clearance system for ambulance," *Int. J. Adv. Elect. Electron. Eng.*, vol. 2, no. 3, pp. 102–107.

Mittal, A. K. and Bhandari, D. 2013. "A novel approach to implement green wave system and detection of stolen vehicles," in *Proc. IEEE 3rd Int. Adv. Comput.*, Feb., pp. 1055–1059.

Rohith R. Sali & Indira.M.S. IJAEE Volume-2, Issue-3, 2013.

Sharma, S., Pithora, A., Gupta, G., Goel, M. and Sinha, M. 2013. "Traffic light priority control for emergency vehicle using RFID, "*Int. J. Innov. Eng.Technol.*, vol. 2, no. 2, pp. 363–366.

Sood. P. 2011. *Bangalore Traffic Police-Preparing for the Future*.[Online].Available:http://www.intranse.in/its1/sites/default/files/D1-S2-, accessed.

Traffic Congestion in Bangalore—A Rising Concern. [Online].Available:http://www.commonfloor.com/guide/traffic-congestion-in-bangalore-arising-concern-27238. html, accessed 2013.

Traffic Management Centre. [Online]. Available: http://www.bangaloretrafficpolice.gov.in/index.php?Option=com_content&view=article&id=87&btp=87, accessed 2014.

Traffic Solution. [Online]. Available: http://phys.org/news/2013–05-physics-green-city-tr   affic-smoothly.html, accessed 2013

Varaprasad, "High stable power aware multicast algorithm for mobile ad hoc networks," *IEEE Sensors J.*, vol. 13, no. 5, pp. 1442–1446, May 2013.

ZigBee Specifications, ZigBee Alliance IEEE Standard 802.15.4k2013,2014.[Online].Available:http://www.zigbe.org/Specifications.aspx

****