International Journal Of

Recent Scientific Research

ISSN: 0976-3031
Volume: 7(3) March -2016

PLATE RECOGNITION & SIGNAL ADJUSTMENT USING WSN

Masthan Raj K., Prabakaran R and Sathish Kumar R

THE OFFICIAL PUBLICATION OF
INTERNATIONAL JOURNAL OF RECENT SCIENTIFIC RESEARCH (IJRSR)
http://www.recentscientific.com/ recentscientific@gmail.com

Available Online at http://www.recentscientific.com

ISSN: 0976-3031

International Journal of Recent Scientific Research
Vol. 7, Issue, 3, pp. 9565-9570, March, 2016

International Journal of Recent Scientific Research

RESEARCH ARTICLE

PLATE RECOGNITION & SIGNAL ADJUSTMENT USING WSN

Masthan Raj K[1]., Prabakaran R[2] and Sathish Kumar R[3]

Department of ECE, Vel Tech Engineering College, Chennai, India

ARTICLE INFO

Article History:

Received 16th December, 2015
Received in revised form 24th January, 2016
Accepted 23rd February, 2016
Published online 28th March, 2016

Keywords:

RFID, RASEBERRY-PI,GSM, ATML89S52, Congestion control, Ambulance vehicle, Crime vehicle identification.

ABSTRACT

Traffic congestion and tidal flow management were recognized as major problems in modern urban areas, which have caused much thwarting for the ambulance. Moreover road accidents in the city have been incessant and to bar the loss of life due to the accidents is even more crucial. To implement this we introduce a scheme called AARS (Automatic ambulance rescue system). The main theme behind this scheme is to provide a smooth flow for the ambulance to reach the hospitals in time and thus minifying the expiration. The idea behind this scheme is to implement an IT'S which would control mechanically the traffic lights in the path of the ambulance. The ambulance is controlled by the central unit which furnishes the most scant route to the ambulance and also controls the traffic light according to the ambulance location and thus reaching the hospital safely. The server also determines the location of the accident spot through the sensor systems in the vehicle which encountered the accident and thus the server walks through the ambulance to the spot. This scheme is fully automated, thus it finds the accident spot, controls the traffic lights, helping to reach the hospital in time.

INTRODUCTION

INDIA is the second most populous Country in the World and is a fast growing economy. It is seeing terrible road congestion problems in its cities. Infrastructure growth is slow as compared to the growth in number of vehicles, due to space and cost constraints. Also, Indian traffic is non-lane based and chaotic. It needs a traffic control solutions, which are different from the developed Countries. It needs signal adjustment using WSN. Signal adjustment using wsn reduces the negative impact of congestion. By using IR sensors, RFID and GSM we can reduce the traffic congstion.

The IR sensors are infrared sensors is used to detect the obsatcles, it can detect in certain range of area. RFID is a wireless technology that uses radio frequency electromagnetic energy to carry information between the RFID tag and RFID reader. Some RFID systems will only work within the range inches or centimeters, while others may work for 100 meters (300 feet) or more. A GSM modem is a specialized type of modem, which accepts a SIM card and operates over a subscription to a mobile operator, just like a mobile phone. AT commands are used to control modems. In this contains several sections they are literature survey, existing system, proposed system and enhancement of this work.

LITERATURE SURVEY

In existing system, to reduce the traffic congestion each vehicle is used by a RFID, which is used to identify the number of vehicles passing in that specific path, depending on that the congestion will be reduced. By using RFID for each and every vehicles the cost is more expensive, because the number of vehicles increased the RFID are also increasing. The time limit is already alloted for specific path, which having specific time limit in the traffic signals. Till now there should be the need of manual power to intimate the accident to the ambulance. It will lead to the human losses. So we go for the GSM based system to intimate the accident to the ambulance from that place itself

Vision-based real-time traffic accident detection, Zuhui (2014)

The author presents a vision-based real time traffic accident detection method. The author intends to extract foreground and background from video shots using the Gaussian Mixture Model (GMM) to detect vehicles; afterwards, the detected vehicles are tracked based on the mean shift algorithm. Then the three traffic accident parameters including the changes of the vehicles position, acceleration, and the direction of the moving vehicles are gathered to make the final accident decision. This project detects the traffic violation such as

Corresponding author:* **Masthan Raj K
Department of ECE, Vel Tech Engineering College, Chennai, India

speed, crossing red signal by tracking method. Traffic police has contact the traffic violator. There is no option used to control the violator vehicle automatically.

A System for Traffic Violation Detection, Nourdine Aliane, Javier Fernandez, Mario Mata (2014)

This paper is to report the driver about some specific traffic violations like a no parking, no entry, speed limit, red signal and lane change. These Violations will be recorded in the local data-base and allow to visualization of the spatial and temporal information of the traffic violations in a geographical map using the standard Google Earth tool. The test-bed is composed by two parts. Traffic sign detection and recognition is observed by computer vision subsystem in both day and night time. The above mentioned traffic Violations is recorded by Event data recorder (EDR). In manual controlling system we need more manpower to control traffic violation. In manual controlling system we need more manpower to control traffic violation. Vehicle detectors were using to collect the data to find the actual flow and to get signal timing according to the present rules and regulation of traffic Control. These vehicle detectors detect the vehicle on the basis of lane

Traffic Violation Detection System based on RFID, S.Hajeb, M.Javadi, S.M.Hashemi, and P. Parvizi (2013)

In this paper by using RFID technology, vehicles are connected to computerized systems, intelligent light poles and other available hardware along the way. Intelligent control system is capable of tracking all vehicles, crisis management & control, traffic guidance and also recording driving offences along the highway. Each and every vehicle is equipped with RFID to hold the data like Car ID, position, etc. Along the highway, intelligent light poles are equipped with RFID reader, solar cells, etc. to cover both sides of the highway and to carry the data such as traffic conditions, accidents, the weather, etc. Vehicle and intelligent poles are communicating with the help of Short Range Communications protocol. When the vehicle crosses the highway, record the information on RFID tag. Information will be exchanged between vehicle and intelligent light pole. If the vehicle went into any one of the dangerous driving violation, information about the vehicle will send to the police station or else information on tag will be transferred to drivers license while leaving the highway. Provide the right exist before issue the license.

From the current problem section, it can be seen that, existing technologies are insufficient to handle the problems of congestion control, emergency vehicle clearance. We implement Intelligent Traffic Control System for Emergency Vehicle Clearance. The image sequences from a camera are analyzed using various edge detection and object counting methods to obtain the most efficient technique. Afterward, the number of vehicles at the intersection is evaluated and ttraffic is efficiently managed. The traffic signal indication continuously glows to green as long as the emergency vehicle is waiting at the traffic lane. After the vehicle crossed the junction, automatically the traffic signals follow the previous pattern generation of traffic signals.

System Implementation

The prototype model of a Plate recognition and traffic signal adjustment using WSN will be made in the following steps:

- Complete layout of the whole setup will be shown in the form of a block diagram.
- In our Idea, we are placing an two IR sensors on the sides of street with a certain distance between them.
- The ATMEL 89S51 microcontroller are placed in the traffic signals.
- So when the emergency ambulance came in that streets, the RFID reader detects and sends the signal to the traffic light.
- Then the traffic light allows the vehicle to pass through by displaying green signal.
- The ambulance is controlled by the central unit which furnishes the most scan route to the ambulance and also controls the traffic light according to the ambulance location and thus reaching the hospital safely.
- The vehicle drivers who are violating rules and regulations can be easily detected by police via passing the vehicle information to the police via GSM.
- Similarly the crime vehicles can also be tracked and detected.

Proposed System

To overcome the existing system, we are using IR sensors in proposed system using to detect the obstacles in which path having more vehicles, depending on that the IR sensor sends to controller to indicate the green signals. Using RFID method the ambulance quickly reach to destination. The RF transmitter fixed in ambulance, it sends the signal to the RF receiver. Which sends the signal to controller the specific way is indicate by green signal. Using Raspberry –pi doing image processing for the use of detection of which vehicle breaks the traffic rules, its number plate capture by this techniques .similarly when we want trace vehicle capturing the number plate of that vehicle using technique. The GSM used to sends the intimation to control room and to which vehicle breaks the traffic rules the intimation is given to that specific vehicles. The Pseudo code for the plate recognition and signal adjustement using WSN are as follows:

1. Store all lights in Queue
2. Sense the vehicles on different lights continuously
3. If a high priority vehicle is detected then

A. Send an emergency signal to center Traffic light controller
B. Find the road corresponding to the reader that detect a high priority vehicle
C. Set the corresponding traffic light Green

Block Diagram

Plate Recognition

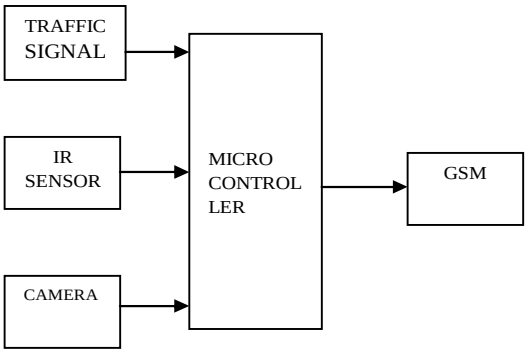

Fig.1 Plate recognition

It is used to reduce the traffic congestion and to detect the crime vehicles. The camera is used to capture the vehicles. The IR sensor detects the misbehaviour vehicles and sends the alert to the traffic control via GSM. So the vehicles can be easily tracked and detected

Vehicle and Ambulance Control

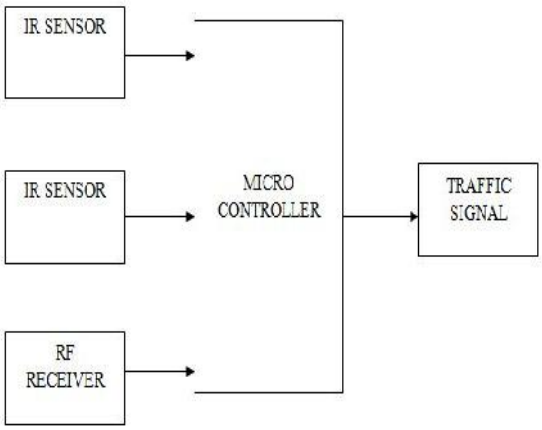

Fig 2 Vehicle and Ambulance control

This process is used to reduce traffic congestion and to ambulance control. The RF transmitter placed in the vehicles sends the signal to the RF receiver. The IR sensor placed on the sides of the street with the separation of certain distance sense the emergency signal and pass it to the Micro controller. The traffic light displays the green light which allows the emergency ambulance vehicle to easily pass through which reduces certain amount of delay and saves the valuable human lives.

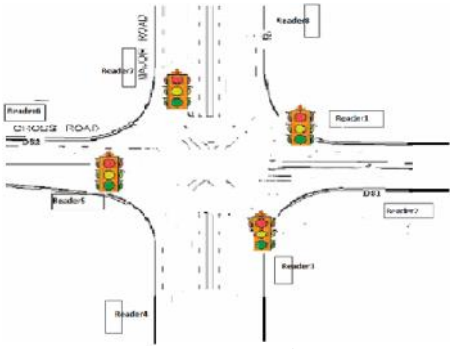

Fig.3 Working process of system

System flow design

Flow chart for emergency vehicles

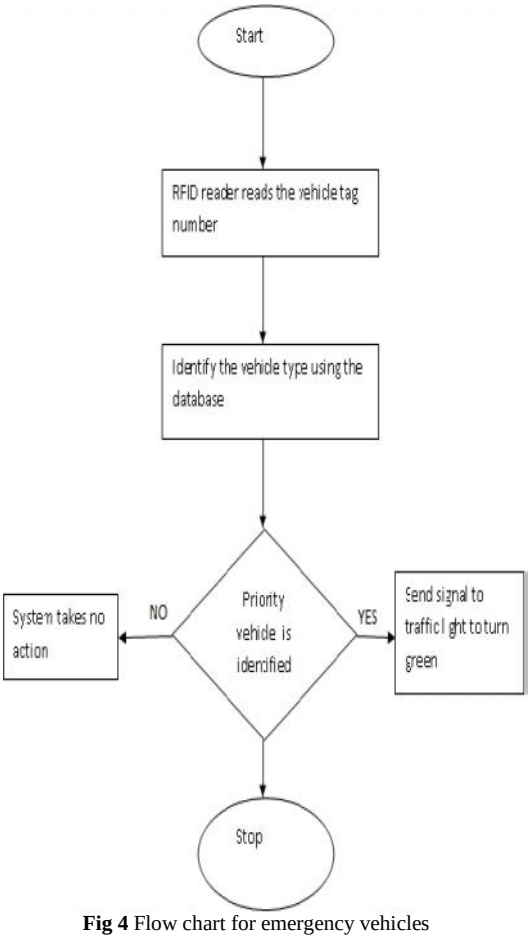

Fig 4 Flow chart for emergency vehicles

Flow chart for crime vehicles

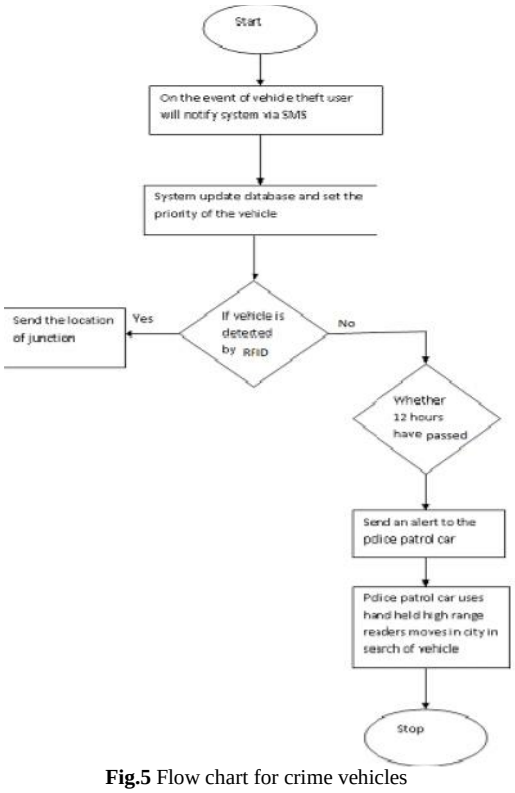

Fig.5 Flow chart for crime vehicles

Hardware and software description

Rasperry PI

The Raspberry Pi 2 delivers 6 times the processing capacity of previous models. This second generation Raspberry Pi has an upgraded Broadcom BCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core processor that runs at 900MHz. The board also features an increase in memory capacity to 1Gbyte

Fig.6 Overview of Rasperry pi

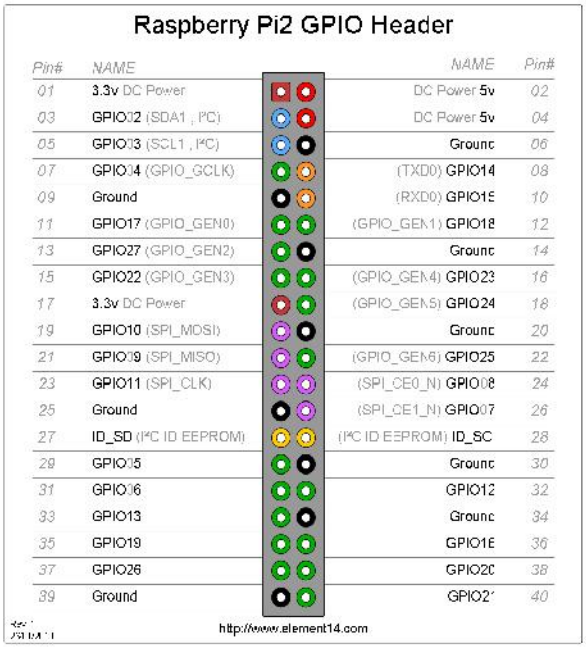

Fig.7 Rasperry Pi2 GPIO Header

AT89S52

AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density non-volatile memory technology and is compatible with the indus-try-standard 80C51 instruction set and pinout. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory pro-grammer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM con-tents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

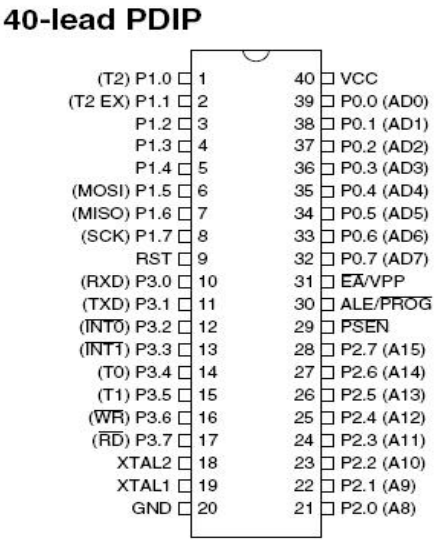

Fig.8 Pin diagram

RFID reader

This is a low frequency (125Khz) RFID reader with serial output with at range of 8-12cm. It is a compact units with built in antenna and can be directly connected to the PC using RS232 protocol. High frequency RFID readers are installed above the roads prior to every traffic light system in all directions in such a manner that the entire area comes under the range of RFID reader

Fig.9 RFID reader module

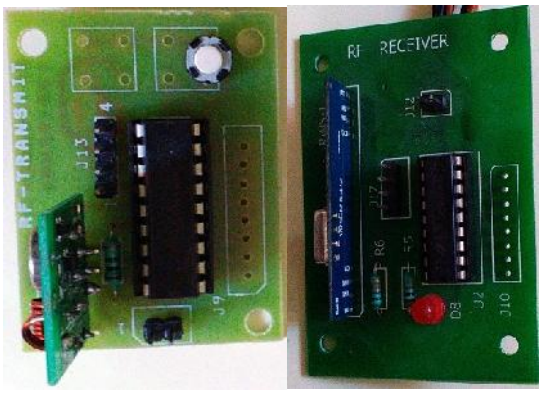

Fig.10 RF Transmitter & Receiver

IR sensor

An infrared sensor is an electronic device that emits and/or detects infrared radiation in order to sense some aspectof its surroundings. Infrared sensors can measure the heat of an object, as well as detect motion. In this projects the two pair of IR sensors are placed in two adjacent streets. So it is used to sense the crime vehicles and emergency ambulance and sends alert to the controller. The sensors are placed in a seaparation of certain distance

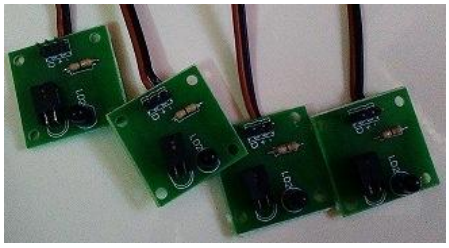

Fig.11 IR sensors

Camera

The camera is placed along the sides of the street to capture the vehicles and for surveillance

Fig.12 Camera

GSM

GSM uses Frequency Division Multiplexing AND Time Division Multiplexing. FDMA divides the frequency ranges for GSM, which are 890- 915, 935-960 and some others that the book didn't have. Each is divided into 200kHz wide channels. As far as TDMA goes, each time slot is 577 micro seconds long, 8 time slices is a frame, lasting for a grand total of 4.615ms. The GSM network can be divided into three parts to illustrate this, consider figure 1. i) Mobile station, ii) Base station subsystem and iii) Network subsystem.

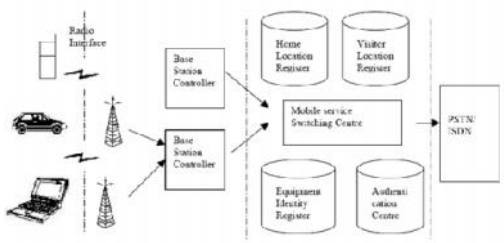

Fig.13 GSM

Applications

- Automatic signal control
- Stolen vehicle detection
- Reduces traffic congestion
- Detection of crime vehicles
- Automatic ambulance rescue system

CONCLUSION & FUTURE ENHANCEMENTS

This system will definitely help to traffic police to give the way to the ambulance when there is heavy traffic on the road. The design and implementation of this technique is directly targeted for traffic management so that emergency vehicle on road get clear way to reach there destination in less time and without any human interruption. The main feature of this operation is the ability to communicate with purpose using GSM. It is very smart to find the location of emergency of VIP vehicle and get clear path to pass on. With automatic traffic signal control based on the traffic density in the route, the manual effort on the part of the traffic policeman is saved. As the entire system is automated, it requires very less human intervention. With stolen vehicle detection, the signal automatically turns to red, so that the police officer can take appropriate action, if he/she is present at the junction. Also SMS will be sent so that they can prepare to catch the stolen vehicle at the next possible junctions. Emergency vehicles like ambulance, fire trucks, need to reach their destinations at the earliest. If they spend a lot of time in traffic jams, precious lives of many people may be in danger. With emergency vehicle clearance, the traffic signal turns to green as long as the emergency vehicle is waiting in the traffic junction. The signal turns to red, only after the emergency vehicle passes through. Further enhancements can be done to the prototype by testing it with longer range RFID readers. so that the exact location of stolen vehicle is known. Currently, we have implemented system by considering one road of the traffic junction. It can be improved by extending to all the roads in a multi-road junction

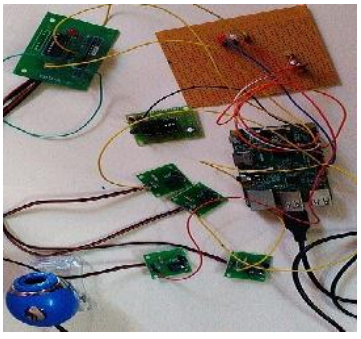

Fig.14 Plate recognition and signal adjustment using WSN

References

1. G. Varaprasad and R. S. D. Wahidabanu, "Flexible routing algorithm for vehicular area networks," in *Proc. IEEE Conf. Intell. Transp. Syst. Telecommun.*, Osaka, Japan, 2010, pp. 30–38.
2. B. P. Gokulan and D. Srinivasan, "Distributed geometric fuzzy multiagent urban traffic signal control," *IEEE Trans. Intell. Transp. Syst.*, vol. 11, no. 3, pp. 714–727, Sep. 2010.
3. K. Sridharamurthy, A. P. Govinda, J. D. Gopal, and G. Varaprasad, "Violation detection method for vehicular ad hoc networking," *Security Commun. Netw.*, to be published. [Online]. Available: http://onlinelibrary.wiley.com/doi/10.1002/sec.427/abstract
4. M. Abdoos, N. Mozayani, and A. L. C. Bazzan, "Traffic light control in non-stationary environments based on multi agent Q-learning," in *Proc.14th Int. IEEE Conf. Intell. Transp. Syst.*, Oct. 2011, pp. 580–1585.
5. *ZigBee Specifications*, ZigBee Alliance IEEE Standard 802.15.4k2013, 2014. [Online]. Available: http://www.zigbee.org/Specifications.aspx
6. *Traffic Congestion in Bangalore—A Rising Concern*. [Online]. Available: http://www.Commonfloor.com/guide/traffic-congestion-in-bangalore-arising-concern-27238. html, accessed 2013.
7. A. K. Mittal and D. Bhandari, "A novel approach to implement green wave system and detection of stolen vehicles," in *Proc. IEEE 3rd Int. Adv. Comput.*, Feb. 2013, pp. 1055–1059.
8. S. Sharma, A. Pithora, G. Gupta, M. Goel, and M. Sinha, "Traffic light priority control for emergency vehicle using RFID," *Int. J. Innov. Eng. Technol.*, vol. 2, no. 2, pp. 363–366, 2013.
9. R. Hegde, R. R. Sali, and M. S. Indira, "RFID and GPS based automatic lane clearance system for ambulance," *Int. J. Adv. Elect. Electron. Eng.*, vol. 2, no. 3, pp. 102–107, 2013.
10. P. Sood. *Bangalore Traffic Police-Preparing for the Future*. [Online]. Available: http://www.intranse.in/its1/sites/default/files/D1-S2-, accessed 2011.
11. *Traffic Management Centre*. [Online]. Available: http://www.bangaloretrafficpolice.gov.in/index.php?option =com content&view=article&id=87&btp=87, accessed 2014.

****

How to cite this article:

Masthan Raj K., Prabakaran R and Sathish Kumar R.2016, Plate Recognition & Signal Adjustment Using Wsn. *Int J Recent Sci Res.* 7(3), pp. 9565-9570.

TSSN 0976-3031