www.ijsetr.com

National Conference on
CASH LESS TRANSACTIONS USING COMPUTER AND COMMUNICATIONS

www.worldconferences.org

VIGNANA BHARATHI Institute of Technology
(Approved by AICTE, Accredited by NBA & NAAC, Permanently Affiliated to JNTUH)

Intelligent Vehicle Monitoring System for Educational Institutions with the Help of Tollgate and Wireless Camera

S. PRASHANTH[1], T. PUSHPA[2]

[1]PG Scholar, Dept of ECE(ES), Vignana Bharathi Institute of Technology, Hyderabad, TS, India,
E-mail: prashanth.spr436@gmail.com.

[2]Assistant Professor, Dept of ECE, Vignana Bharathi Institute of Technology, Hyderabad, TS, India,
E-mail: pushpa.404@gmail.com.

Abstract: This paper presents an intelligent vehicle monitoring system in educational institutions with the help of wireless camera and toll gate system. Each individual vehicle of the institution is equipped with the special radio frequency identification (RFID) tag. The RFID reader module will be placed near to the toll gate so whenever any vehicle approaches to the reader it will detect check whether it is authorized vehicle or not. If the vehicle is authorized one, then the gate will automatically open and allows the vehicle in to the campus and if is not authorized vehicle the gate will not open until we press the external switch which we have provided for the unauthorized vehicle entry. And we are using a wireless camera at the entry so that it will monitor continuously providing high level of security. The working model is developed and tested periodically for constant monitoring.

Keywords: RFID, LPC2148, ARM 7 Processor.

I. INTRODUCTION

In today's world, security in colleges and schools is one of the major concerns. India is the second most populous Country in the World and is a fast growing economy. School children safety is the most significant component encouraged to precede research with the support of advanced technology. Several bitter incidents forced to develop an innovative methodology to provide secure life for children.In recent years, wireless networks are widely used as they provide more cost effective Options. 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 centimetres, while others may work for100 meters (300 feet) or more. We are using the RFID technology in such a way that only authorized vehicle will enters in to the school/college so that we can track the unauthorized vehicle entry easily. This system will provide high level of supervision. The whole paper is grouped into 5 parts. Sections II talks about the literature survey. Section III discusses about the proposed model. Section IV gives the implementation details of the proposed model. Section V presents the enhancement of this work.

II. LITERATURE SURVEY

Security in institutions is a major problem in cities of developing Countries like India. Parents are unable to feel comfortable until the child resumed back to home safely. Missing of the students at school premises, anti-social elements kidnappings etc. are increasing in an advance. We are not using any technology based security in the institutions. Technology should be imperative to safe guard the society. Monitoring should be increased to reduce these kind incidents for that we need to use the cameras with advanced features and more pixel sizes. So thus can track the vehicles which are in the premises of the campus. The developed working model considered RF ID Technology and an advanced ARM 7 processor. The status of the children is readily available with the school principal and with the parent time to time.

III. MIX DESIGN

From the current problem section, it can be seen that, existing technologies are insufficient to handle the problems of security and monitoring. To solve these problems, we propose to implement our Intelligent Vehicle Monitoring System which is fixed for a toll gate system. It mainly consists of two parts. First part contains automatic signal control system. Here, 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 stating that the authorized vehicle then the gate will automatically open. The second part is switch, the is used in case of authorized vehicles. As the vehicle is unauthorized the gate won't open so we need to use this switch to open the gate. By this we can have the data of unauthorized vehicle entry in to the campus. List of

components used in the experiment are Microcontroller (LPC2148),RFID Reader–125KHz–TTL.

A. Microcontroller (LPC2148):

ARM stands for Advanced RISC Machines. It is a 32-bit processor core, used for high end application. It is widely used in Advanced Robotic Applications. The key Features are:

- 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
- 8 kB to 40 kB of on-chip static RAM and 32 kB to 512 kB of on-chip flash memory.
- 128-bit wide interface/accelerator enables high-speed 60 MHz operation.
- In-System Programming/In-Application Programming (ISP/IAP) via on-chip boot loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1 ms.
- Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high-speed tracing of instruction execution.
- USB 2.0 Full-speed compliant device controller with 2 kB of endpoint RAM.
- In addition, the LPC2146/48 provides 8 kB of on-chip RAM accessible to USB by DMA.
- Up to 45 of 5 V tolerant fast general purpose I/O pins in a tiny LQFP64 package.
- On-chip integrated oscillator operates with an external crystal from 1 MHz to 25 MHz.
- Power saving modes include Idle and Power-down.
- Single power supply chip with POR and BOD circuits.
- CPU operating voltage range of 3.0 V to 3.6 V (3.3 V ± 10 %) with 5 V tolerant I/O pads.

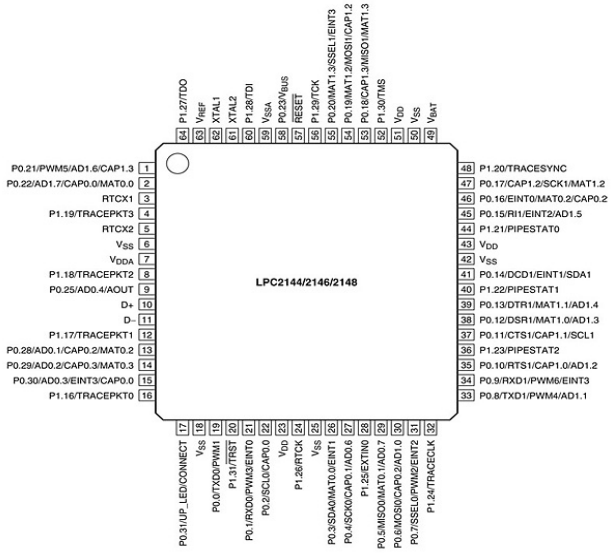


Fig 1. Pin diagram of LPC2148.

B. RFID Reader–125 kHz–TTL:

Radio Frequency Identification (RFID) is an IT 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 working of an RFID system is very simple. The system utilizes 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 identifies the tags. The antenna provides the means for the integrated circuit to transmit its information to the reader. There are two types of RFID categories, active and passive tags. The tags that do not utilize power are referred to as passive and they are driven by an antenna that enables the tag to receive electromagnetic waves from a reader. On the contrary, active tags rely on power and they have inbuilt power sources that enable it to send and receive signals from RFID reader. RFID range depends on transmit power, receive sensitivity and efficiency, antenna, frequency, tag orientations, surroundings. Typically, the RFID range is from a few centimetres to over hundred meters. RFID reader uses frequency 125 KHz with a range of 10 cm.

C. Wireless Camera:

Wireless A/V camera highly suitable for mounting on robots and getting your video transmitted wirelessly. With high receive sensitivity +18dB, receive signal picture sound 0.9G/1.2G with high quality output it's the most economical camera available.

Specifications:

1. Wireless A/V camera high receive sensitivity +18dB, Receive signal picture sound 0.9G/1.2G.
2. Camera apparatus: 1/3 picture sensor.
3. System: PAL.
4. Validity pixel: PAL: 5.78x4.199mm.
5. Picture area: PAL 628x582.
6. Scan frequency: PAL: 50HZ.
7. Transmission signal: picture sound.
8. Deliver the distance:50-100M.
9. Voltage: DC+9V.
10. 8. Deliver the distance: 50-100M.
11. Voltage: DC+9V.

Fig 2. Wireless Camera.

D. LCD:

In recent years the LCD is finding widespread use replacing LED s (seven-segment LED or other multi segment LED s)

- The declining prices of LCD s.

- The ability to display numbers, characters and graphics. This is in contract to LED s, which are limited to numbers and a few characters.
- Ease of programming for characters and graphics.

LCD is used to display what are the commands we are running on the controller.

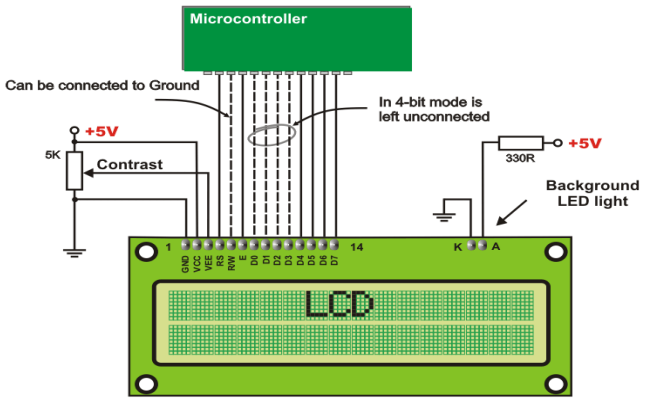


Fig 3. LCD Interfacing.

E. Software:

This project is implemented using the following software's:

- Keil µVision
- Flash Magic

- **Keil µVision:** The simulator/ debugger in KEIL can perform a very detailed simulation of a micro controller along with external signals. It is possible to view the precise execution time of a single assembly instruction, or a single line of C code, all the way up to the entire application, simply by entering the crystal frequency. The contents of all the memory areas may be viewed along with ability to find specific variables. In addition, the registers may be viewed allowing a detailed view of what the microcontroller is doing at any point in time.
- **Flash Magic**: It is used to view the values of LDR in the monitoring PC by entering or by selecting the appropriate baud rate i.e. 9600 and the COM port to which the RFID transreceiver is connected to.

IV. WORKING MODEL

Automatic Gate Control System: In this module, for experiment purpose, we have used passive RFID tags and RFID reader with frequency 125 KHz. RFID tag, when vehicle comes in the range of the receiver will transmit the unique RFID to the reader. The microcontroller connected to the RFID reader will detect whether the vehicle is authorized or not. As every indicial vehicle has a unique identification tag number. If the reader founds that it is an authorized vehicle, then the gate will automatically open and allow the vehicle in to the campus. Unauthorized vehicle entry will be done using the switch provided. Wireless camera is fixed at the premises of the campus so that it can keep on tracking the vehicles that will enter in to the campus by that we can track any unauthorized vehicle. Fig 5 is used to explain about the working model of the system.

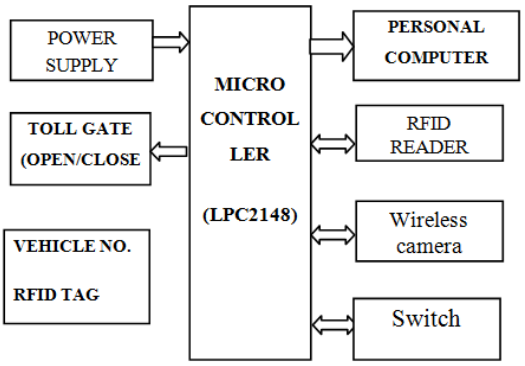


Fig 4. Block diagram of working mode.

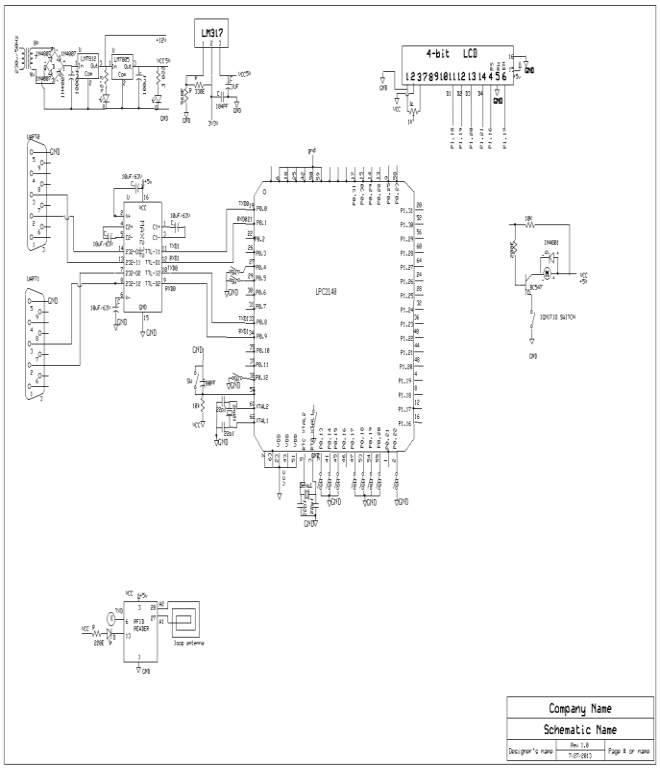


Fig 5. Pin diagram of the working model system.

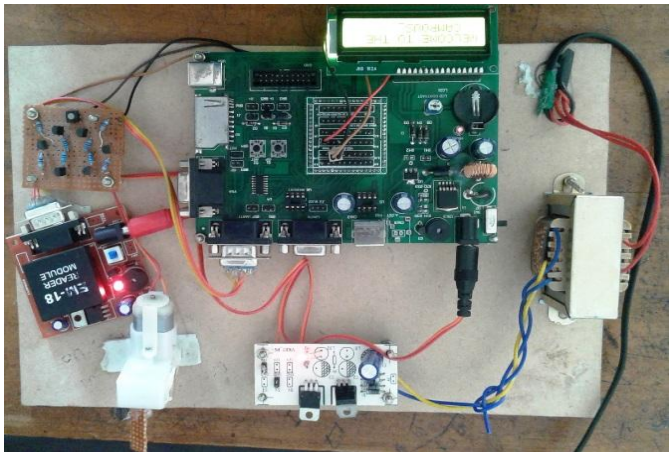


Fig 6. Welcome to the campus.

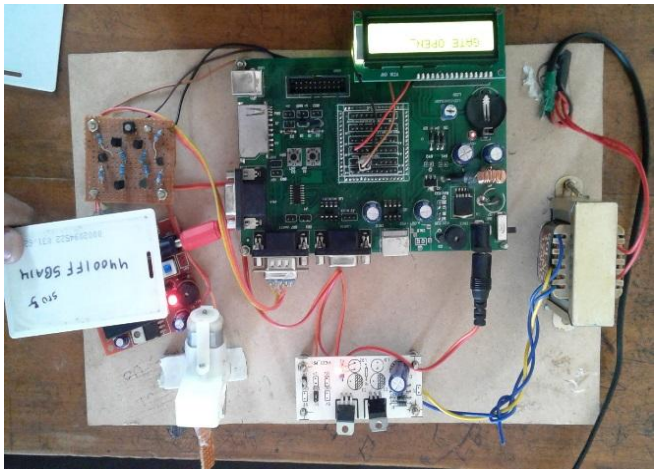


Fig 7. Authorized vehicle entry: Gate open.

In case of authorized vehicle the gate will automatically open when it reads the RFID tag. And after some time delay it will automatically close.

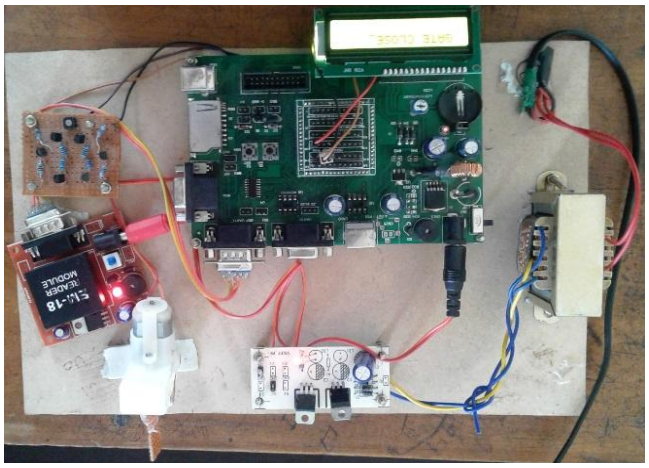


Fig 8. Authorized vehicle entry: Gate close.

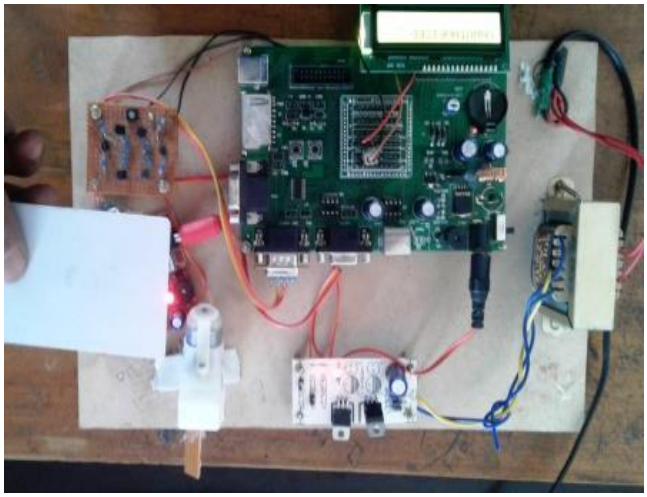


Fig 9. Unathurozied Vehicle.

In case of unauthorized the gate will not open. It will open after pressing the switch.

Video Capture: Video capturing is used for continues monitoring purpose and it can be done as follows.

- Install the ULead video studio software.
- Then select any one of the two options video studio editor/movie wizard.

Fig 10. Video studio monitoring software.

- After selecting the video studio editor option we will get this page and then go to the capture option and you will get the below screen.
- We can capture the video and images also by clicking the options capture video/capture image.
- Select the source option camera device which we have connected and the format accordingly.
- The data will be automatically saved in the "capture folder".

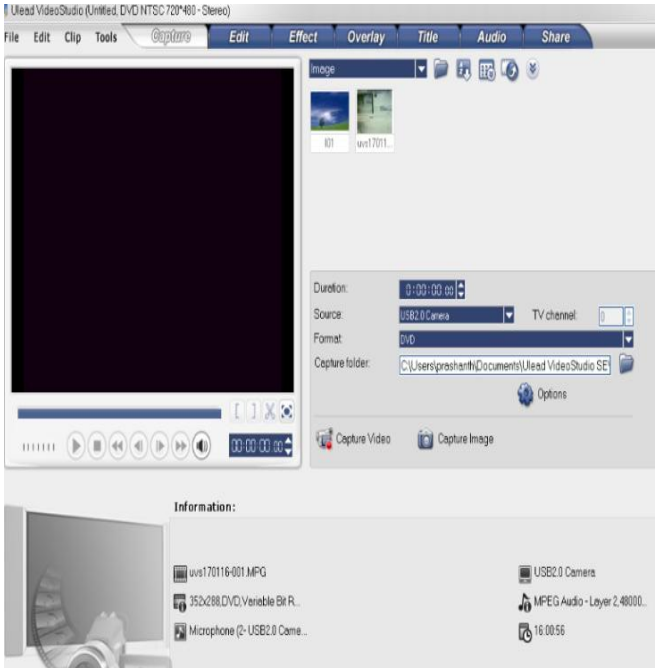
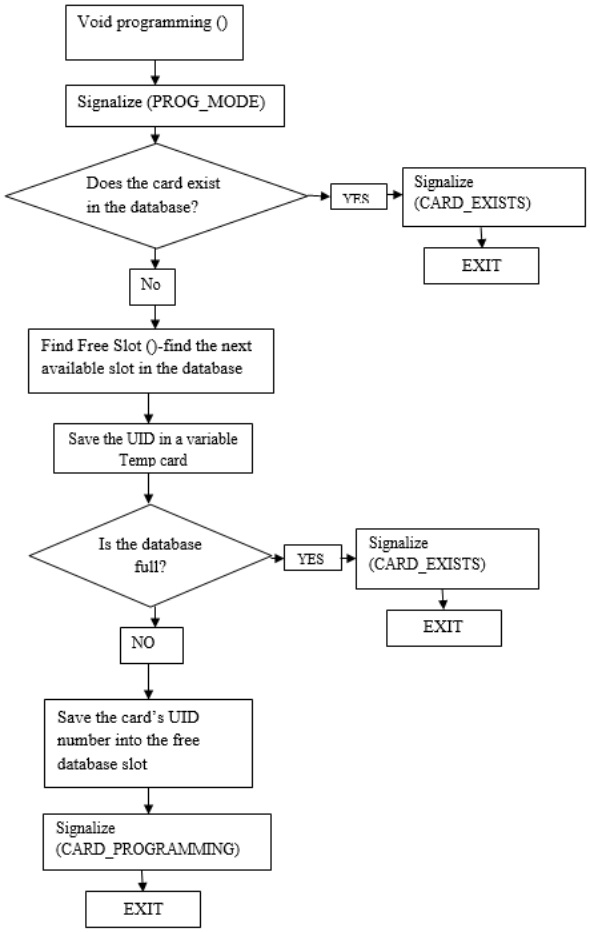


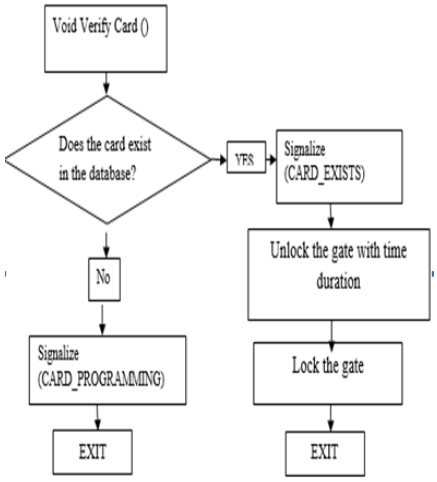
Fig 11.Capturing images and video.

V. CONCLUSION AND ENHANCEMENTS

Procedure for programming new cards in to the database:

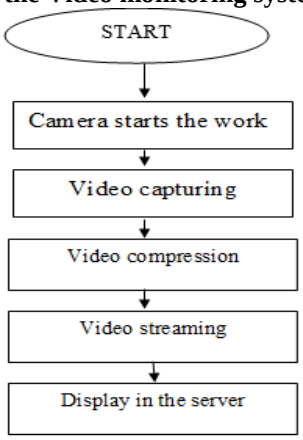


Procedure for Decision access of the card:

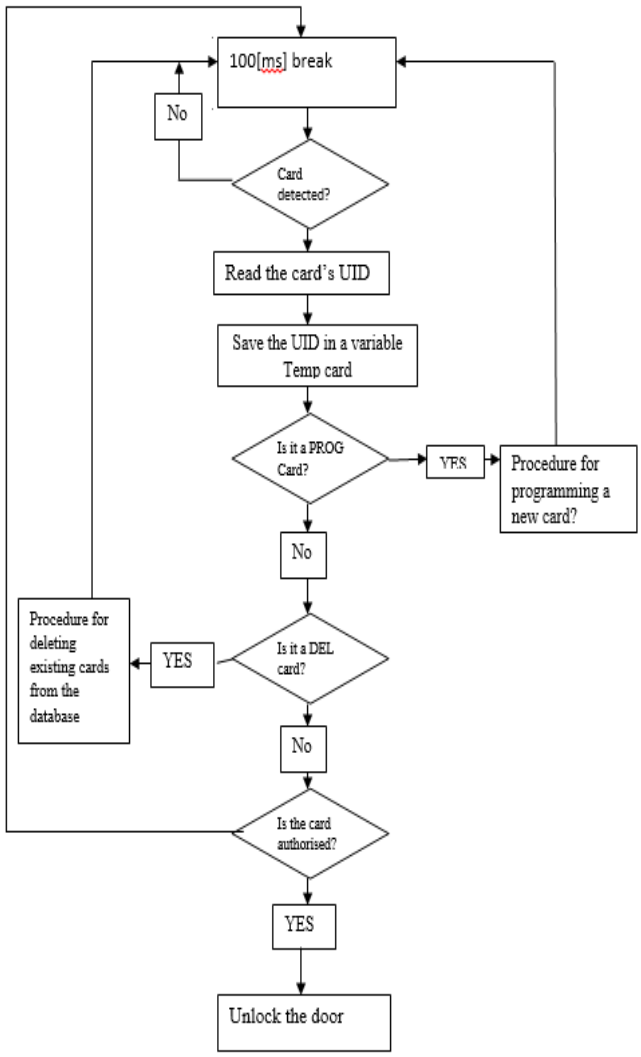


By using this model, we have implemented an intelligent vehicle monitoring system for the educational institutions Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented. In future, more advances in the technology can improve the level of super vision of the system. And at the same time we can also use the RFID tags with high ranges. This makes less human intervention.

Procedure for the Video monitoring system:



Procedure for the complete working model:



VI. REFERENCE

[1] G. Varaprasad and R. S. D. Wahidabanu, "Flexible routing algorithm for vehicular area networks," in Proc. IEEE Conf. Intell. Transp. Syst. Telecomm. Osaka, Japan, 2010, pp. 30–38.
[2] http://www.philips.com
[3] B. P. Gokulan and D. Srinivasan, "Distributed geometric fuzzy multi agent urban traffic signal control," IEEE Trans. Intell. Transp. Syst., vol. 11, no. 3, pp. 714–727, Sep. 2010.
[4] http://www.semiconductors.philips.com.
[5] 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.
[6] ARM7TDMI datasheet ARM.
[7] http://www.keil.co.uk.
[8] 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.
[9] http://ieeexplore.ieee.org.
[10] ARM System developers guide Andrew N. Sloss, Domonic Symes,
[11] ZigBee Specifications, ZigBee Alliance IEEE Standard 802.15.4k2013, 2014. [Online]. Available: http://www.zigbee.org/Specifications.aspx.
[12] Traffic Congestion in Bangalore—A Rising Concern. [Online]. Available: concer 27238.html, accessed 2013.
[13] 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.
[14] LPC2119/2129/2194/2292/2294 User Manual Philips.
[15] 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.
[16] 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.
[17] G. Varaprasad, "High stable power aware multicast algorithm for mobile ad hoc networks," IEEE Sensors J., vol. 13, no. 5, pp. 1442–1446,May 2013.
[18] Traffic Solution. [Online]. Available: http://phys.org/news/2013–05- physics-green-city-traffic-smoothly.html, accessed 2013.
[19] 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.