A Real Time Approach to Theft Prevention in the field of Transportation System

Vartika Mehta¹, Deepak Punetha², Vishwanath Bijalwan³

¹Department of Electronics & Communication Engineering, SIT, Pithoragarh
²Department of Electronics & Communication Engineering, Tula’s Institute, Dehradun
³Department of Electronics & Communication Engineering, IT, Gopeshwar

Abstract — This paper report discusses a theft prevention system, which can prevent the theft and also can be track the object. This system is capable to tracking the vehicle as well as theft prevention. An R.F. module is use to exchange the information regarding vehicle and owner of the vehicle with police control room or SOS services. The vehicle can be track with the help of R.F. receiver. A DTMF based fuel lock has been attached in this system. A cell phone with SIM card has been attached with DTMF IC. The fuel flow in the vehicle can be controlled by give a call to this cell phone. This system has been controlled by a microcontroller which can make the system cost effective, low power consumption, effective and reliable.

Keywords — Theft Prevention, Tracking, RF module, DTMF, Microcontroller, Mobile Phone.

I. Introduction

Vehicle Prevention System is primary concern for everyone to prevent robberies of vehicle. Research shows that there are thousands of vehicles have stolen every year. These crimes are increasing day by day. In this paper report a system has been developed by use of RFID and DTMF. This process is called Dual Tone Multiple Frequency based Vehicle Prevention System using RFID.

There are two type of prevention system exist “Active system and Passive system”. Active System transfers all information about the vehicle to police control room via cellular. Passive devices are used for knowing about the location and it is also used as trigger for ON/OFF the fuel or door of the vehicle.

Vehicle Prevention System is the solution to overcome this problem. By using RFID people can know about the location of the vehicle and with the help of Dual Tone Multiple Frequency people can lock the fuel of vehicle.

![Fig. 1. Vehicle Tracking System Procedure](image)

II. Motivation

Around the world thousands of vehicles theft occur because of low security. If the people go somewhere in its vehicle due to some work then they want to their vehicle should be safe. For every problem RTO is making the case study. Research shows that above from thousands vehicle has been stolen in one state. Because of Lake of awareness the crime is increasing day by day. Report of government shows the robberies occurs in Haryana state. Following table is showing the detail of vehicle which has been stolen.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of vehicle</th>
<th>Make</th>
<th>Regd. Num</th>
<th>Place of occurrence</th>
<th>Date of occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>M/CYCLE</td>
<td>SPL</td>
<td>HR07M-4915</td>
<td>COMMERCIAL AREA</td>
<td>04-05-15</td>
</tr>
<tr>
<td>2</td>
<td>M/CYCLE</td>
<td>SPL+</td>
<td>HR02U-7402</td>
<td>COMMERCIAL AREA</td>
<td>14-05-15</td>
</tr>
<tr>
<td>3</td>
<td>CAR</td>
<td>MARUTI DESIRE</td>
<td>D13A1604344</td>
<td>COMMERCIAL AREA</td>
<td>25-05-15</td>
</tr>
<tr>
<td>4</td>
<td>CANTER</td>
<td>TATA 407</td>
<td>HR46A-4057</td>
<td>COMMERCIAL AREA</td>
<td>26-05-15</td>
</tr>
<tr>
<td>5</td>
<td>TRACTOR</td>
<td>MAHINDRA 605</td>
<td>RAR5603</td>
<td>COMMERCIAL AREA</td>
<td>26-05-15</td>
</tr>
<tr>
<td>6</td>
<td>JEEP</td>
<td>PICK UP</td>
<td>M28984</td>
<td>COMMERCIAL AREA</td>
<td>26-05-15</td>
</tr>
</tbody>
</table>

III. Problem Definition

The strategy of solving these problems is use the tracking system the vehicle. This tracking system should inbuilt in the vehicle. Stolen vehicle can be track easily by its area of police station. According to govt. report robberies is increasing very fast. Further reducing these issues government will take the step to use this system.

IV. Related Work

Montaser N. Ramadan et. al describe the anti-theft system, which can detect the location of vehicle by using GPS module. It gives approximately 10 meter difference to detect object from exact location. Detecting location using GPS is also very costly [3]. K. P. Kamble elaborate the system which can save petrol, gas, time and also optimize the driver route and can control the function of vehicle. The accuracy
of this system is not good [4]. D. Narendar Singh et.al illustrate real time vehicle theft identity for recognize the face of driver of vehicle by using PCA. With the help of face detection people can detect the face of thief but in case of wearing mask PCA can't detect the face [5]. Some system describes the study of auto theft prevention in which system makes use of microcontroller and it is connected to interfacing GSM for controlling the theft of vehicle. GSM work on AT command, sometime GSM can’t read these commands and can’t work properly [6-9]. A methodology defined the Vehicle Accident Alert and Locator which can detect the vehicle when it meet with accident. This system is reliable for people. It can detect vehicle when there will be a little vibration in vehicle [10]. Some systems present concise overview of detecting and tracking of vehicle. This system plays a vital role in civilian and military environment such as in management and urban traffic planning, highway traffic surveillance control by video. In this system protection of camera is very important [11-14]. Many systems have been proposed which can detect the crash detection and a lot of work done in the field of transportation system.

V. SYSTEM OVERVIEW

This system can give the great contribution in the field of vehicle tracking in army, navy and somewhere in police department. This system contains the RF module, DTMF, cell phone and controlled device [16-18].

A. RF module

The RF transmitter is able to transmit the radio frequency containing the information about the vehicle.

1. Keypad
   - HT12E Encoder
   - FM or 433MHz Transmitter

Fig. 2. Block diagram of RF transmitter

HT12E encoder and HT12D decoder is used by RF transmitter and RF receiver respectively. Operating voltage of these encoder and decoder is 2.4V to 12V.

1. Keypad
   - FM or 433MHz Receiver
   - HT12D Decoder

Fig. 3. Block diagram of RF receiver

B. DTMF

DTMF stand for Dual Tone Multiple Frequency. Moving object can be control by using mobile phones. This system requires two phones. Amongst them one with SIM card connected with RF transmitter and another phone will keep the vehicle owner. Phone connected with RF transmitter is put in such a mode that it automatically picks up the call. When the owner will call on that number, the call can activate automatically and owner can lock the fuel with help of DTMF. Solenoid can use for locking the fuel.

Fig. 4. DTMF Transmitter and DTMF based fuel lock.

C. System Setup

This system is defined as the tracking of moving object. The proposed system contains RFID which has a specific range. It can be categorized in different sections such as RF transmitter, RF receiver and DTMF fuel lock. RF transmitter can attach with the vehicle. Transmitter uses the HT12E encoder and transmits the 12 bit code. This encoder is the series of CMOS LSIs and also capable for encoding data. These data have N numbers of address bit and 12 data bit. The programmed address/data are conveyed together. Its operating voltage is 2.4V to 12V. The second section in this system is RF receiver. HD12D uses in the receiver section. It is a series of CMOS LSI and receives serial address and data and compares it continuously with local address. If there are any unmatched code then the input data code are decoded and transfer it to output pin. DTMF based fuel lock is the third section of this system which installed in vehicle which can be activated and deactivated by mobile. It encoded the hybrid frequency DTMF code, IC 8870 decode it and transform it into BCD code [15].

TABLE 2. ENCODED OUTPUT

<table>
<thead>
<tr>
<th>Pressed Mobile key</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>*</th>
<th>0</th>
<th>#</th>
</tr>
</thead>
<tbody>
<tr>
<td>D3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>D0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

VI. EXPERIMENT RESULTS

For explaining this project first of all sees the hardware part. There is a power supply which consist of two pin connector, four diode that is also called bridge rectifier, one ON OFF switch, capacitor is of 1000 µF, voltage regulator is of 5V and 12V and LED is also be there. Next is basic circuit of microcontroller which consists of 89S52 microcontroller, a reset circuit and a crystal oscillator. Reset circuit consists of 10 µF capacitor and 10KΩ register. Crystal oscillator provides a clock frequency to microcontroller. After seeing the Fig. there is a GSM modem which is connected to microcontroller through serial port.

Fig. 5. Snapshot of the device
First of all connect power supply to the circuit for initializing the modem. After connecting the power supply it takes some moment for initialization and sends an acknowledgement on the mobile. Mobile receives a message which is “Welcome to Vehicle Tracking System”. The initial screen display of the modem is shown in Fig. 6. After initialization of the modem, a message is displayed on the mobile that “A vehicle name XY-0000 has been stolen and this is in your area”. On seeing this message, the user can click on the message, and he will be redirected to the next page. In this page, the mobile will display the position of the vehicle and simultaneously a message sends to the mobile.

**VII. Conclusion**

Tracking system is becoming important in countries. This system is integrated in vehicle. This system is very fast, accurate and robust. It is very securing then other system. Once it will integrate in the vehicle then tracking can be very easy. After stolen the vehicle this system is capable to find the area of the vehicle where it has located with the help of RFID. Receiver part is placed in police station of every area. After tracking the vehicle first it lock the fuel by DTMF then find out the vehicle. With the help of this system vehicle can be tracked very easily.

**References**


Ms. Vartika Mehta is serving SIT, Pithoragarh as an Assistant Professor in E.C.E. department. He has an experience of more than 4.5 years in teaching and Software companies. She has completed her B.Tech in ECE from Dehradun Institute of Technology and M.Tech in Communication System from Graphic Era Hill University, Dehradun, Uttarakhand, India. Signals and Systems. She has published so many research papers in various National and International conferences and journals. She is also the member of many research organizations. Her area of interest is Joomla, Opencart frame work, Executing test cases, Imeter tools, Xampp server, Wireless Communication.

Mr. Deepak Punetha is serving Tula’s Institute, Dehradun as an Assistant Professor in E.C.E. department. He has an experience of more than 5.5 years in teaching and research (Including research experience in CDAC, Mohali). He has completed his B.Tech in ECE from Dehradun Institute of Technology and M.E. (8.5 CGPA) in EPDT from PEC University of Technology, Chandigarh. His area of interest is Electronics Product Design and Technology, Face Recognition and Compression, Radiation Pattern analysis of different Antennas, Navigation and Emergency Alerting System, Robotics and Embedded Systems. He has published more than 35 research papers in reputed conferences and International Journals. He is the member of reviewing and technical program committee of IEEE Explorer, Springer (Journal of Intelligent & Robotics Systems), Hindawi and various international Journals. He is also an active member of different National and International Association of Electronics and Communication Engineers and Editorial Boards.
Mr. Vishwanath bijalwan obtained his B.Tech degree in ECE, from Dehradun Institute of Technology (UPTU) in 2009. He received his M.TECH degree from Uttarakhand Technical University in Digital Communication stream in 2012. Currently he is working as an Assistant Professor & head of the department ECE at IT, Gopeshwar (State Government Institute). Besides this he has been also serving some more academic duties of Examination controller, & Dean Student’s welfare at IT Gopeshwar. He has more than 5 years of teaching experience and 1 year industry experience. He has worked for various organizations, such as HCL Info system, Doon Institute of Engg. & Technology Rishikesh, Uttarakhand University Dehradun, and Institute of Technology, Gopeshwar. In Research domain he has published various research papers in international journals. His research area of interest is Wireless adhoc network, IEEE 802.15.4, & Machine learning. He has served as a PC member for many national & International conferences in the region; he is also serving as a reviewing board member for various international journals like OMICS group and various IEEE conferences. He is also an active member of IAENG, UACEE. His teaching area of Interest is Digital Electronics, Electromagnetic field theory, Antenna & wave propagation & digital signal processing.