

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

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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.

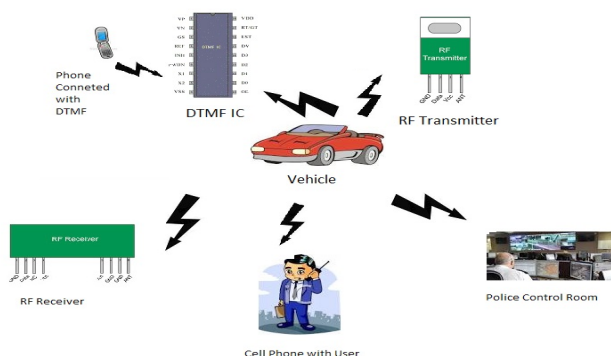


Fig. 1. Vehicle Tracking System Procedure

II. MOTIVATION

Vehicle Prevention System is a system which provides the effective, reliable and real time vehicle location. So many organization and researcher are working in the field of transportation system [1-3].

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 1. TABLE OF STOLEN VEHICLE AND ITS DETAIL

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

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.

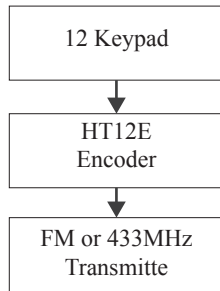


Fig. 2. Block diagram of RF transmitter

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.

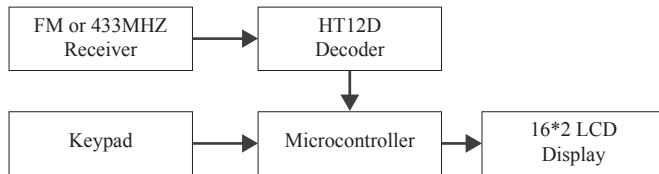


Fig. 3. Block diagram of RF receiver

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. HT12D 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

Pressed Mobile key	1	2	3	4	5	6	7	8	9	*	0	#
D3	0	0	0	0	0	0	0	1	1	1	1	1
D2	0	0	0	1	1	1	1	0	0	0	0	1
D1	0	1	1	0	0	1	1	0	0	1	1	0
D0	1	0	1	0	1	0	1	0	1	1	0	0

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"

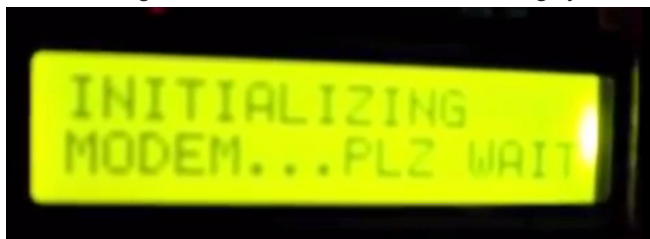


Fig. 6. Modem Initialization

If the vehicle passed through the RFID reader then LCD displays the position of vehicle and simultaneously a message sends to the mobile. This message displays on the mobile that "A vehicle name XY-0000 has been stolen and this is in your area". At another place if the vehicle is tracked then another message sends on 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.

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