

Advanced Traffic Management System

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Abstract— This paper proposes the Advanced Traffic management system. This system mainly consists of an Ambulance clearance system and stolen vehicle theft detection system. High speed Arduino Uno provides smooth and clear flow of traffic for emergency vehicle to reach their destination on time. Each vehicle has special radio frequency identification tag which cannot be removed. RFID tag counts number of emergency vehicles passing on specified path for specified duration. In ambulance clearance system, information of emergency vehicle is send to traffic system by RF transmitter and receiver system, for automatically controlling traffic light until the emergency vehicle passes through. In stolen vehicle detection system, it detects stolen vehicle passing through particular path. And the information is sent to traffic control room through GSM for immediate action.

Index Terms— Arduino Uno, GPS module, GSM module, RFID reader.

I. INTRODUCTION

In daily life we are facing accidents that cause loss of many lives. And now-a-day it is difficult to maintain and control the roads, traffic as well as congestion. Migration of population from rural to urban and sub-urban areas makes the condition more difficult. So that the number of road accidents also increases to a great extent. To recover this problem, it requires a traffic control solutions, which are different for the different Countries. In recent years, wireless networks are widely used because they are very cost effective. RFID is a wireless technology that uses radio frequency electromagnetic energy to carry information or signal between the RFID tags And RFID reader. RFID systems have the ranges in inches or centimeters, while others may work for 100 meters or more [1].

The non-lane based Indian traffic makes it difficult for the ambulance to reach the destination on time. In order to avoid

this excess time consumption an intelligent traffic control system is used which turns the signal in the path of the Ambulance to green as well as estimate the congestion in the Signal junction and sends it to ambulance through GSM, So that the driver can decide whether he should take that path or not. The same system is also used to detect stolen vehicle.

Tracking and positioning of the vehicle is already been known in the modern world. Normally GPS installed in vehicle detects the position of the vehicle. Most of the vehicles are being stolen and/or damaged when they are parked in the shopping malls, train station and other parking area. The vehicle tracking and positioning system allows the owner to view status of their vehicle via their portable mobile device. GSM based system that works on the GSM technology can be used with GPS for the positioning of the vehicle. If the vehicle is stolen or lost, the place can be identified by using the GPS and will send the message to the owner of the vehicle. The purpose is to design a system that will make an owner fearless of any robbery happened to the system and if the vehicle is theft this system will keep the owner updated about the vehicle which then can be recovered.

II. PROPOSED SYSTEM

A. GPS:

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

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Fig 1: working of GPS Module

B. GSM:

GSM/GPRS Modem-RS232 is built with Dual Band GSM/GPRS engine- SIM900A, works on frequencies 900/ 1800 MHz's. The Modem is coming with RS232 interface, which allows you connect PC as well as microcontroller with RS232 Chip (MAX232). The baud rate is configurable from 9600-115200 through AT command. Using this modem, you can make audio calls, SMS, Read SMS; attend the incoming calls and internet etc through simple AT commands. For point to point or for point to multipoint communication applications GSM technology can be used to transfer data as well as up load and download programs.



Fig 2: GSM SIM 900A Module

C. RFID Module:

The RF module, as the name suggests, operates at Radio Frequency. The frequency range varies between 30 kHz & 300 GHz. In this RF system, the digital data is represented as variations in the amplitude of carrier wave. This kind of modulation is known as Amplitude Shift Keying (ASK). This RF module comprises of an RF Transmitter and an RF Receiver. The transmitter/receiver (Tx/Rx) pair operates at a frequency of 434 MHz's. An RF transmitter receives serial data and transmits it wirelessly through RF through its antenna. An RFID tag uses small radio frequency identification devices for identification and tracking purposes .The tagging system includes the tag, a read/write device, and a host system application for data collection, processing, and transmission. . RFID reader transmits an encoded radio signal to interrogate the tag. The RFID tags receive the message and respond with its identification and other information. This may be unique tag serial number or other specific information.

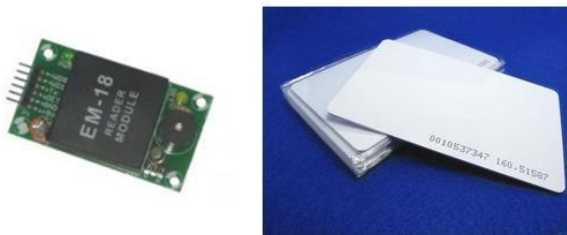


Fig 3: RFID Tag and Reader

D. Arduino Uno:

The Adriano Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter. Arduino is open source hardware and software, which are license under the GNU lesser General public license, which is permitting the manufacture of Arduino board and software distribution by anyone. The Arduino are programmed using a dialect of feature from programming language C and C++.



Fig 4: Arduino Uno board

III. PROPOSED METHODOLOGY

A. Ambulance Clearance System:

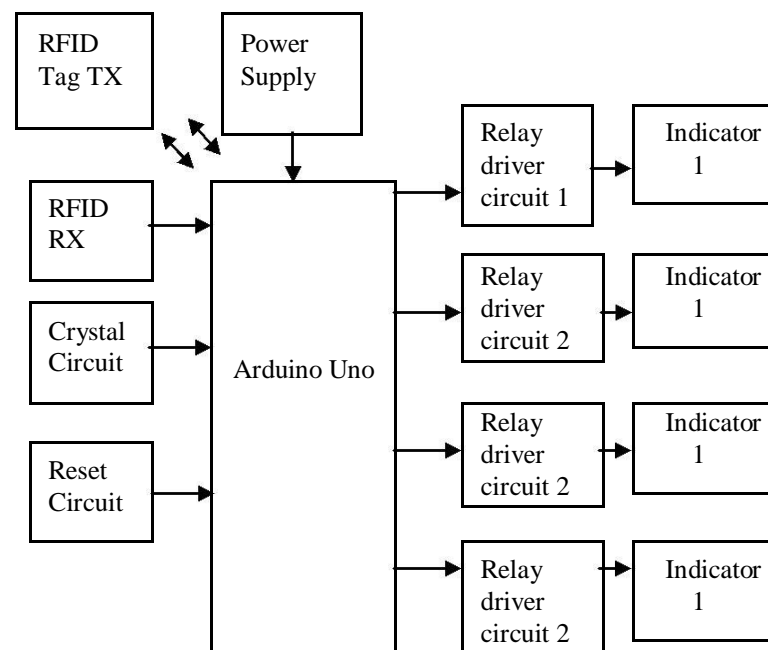


Fig 5: Block Diagram for Ambulance Clearance System:

• Flow chart of Ambulance Clearance System:

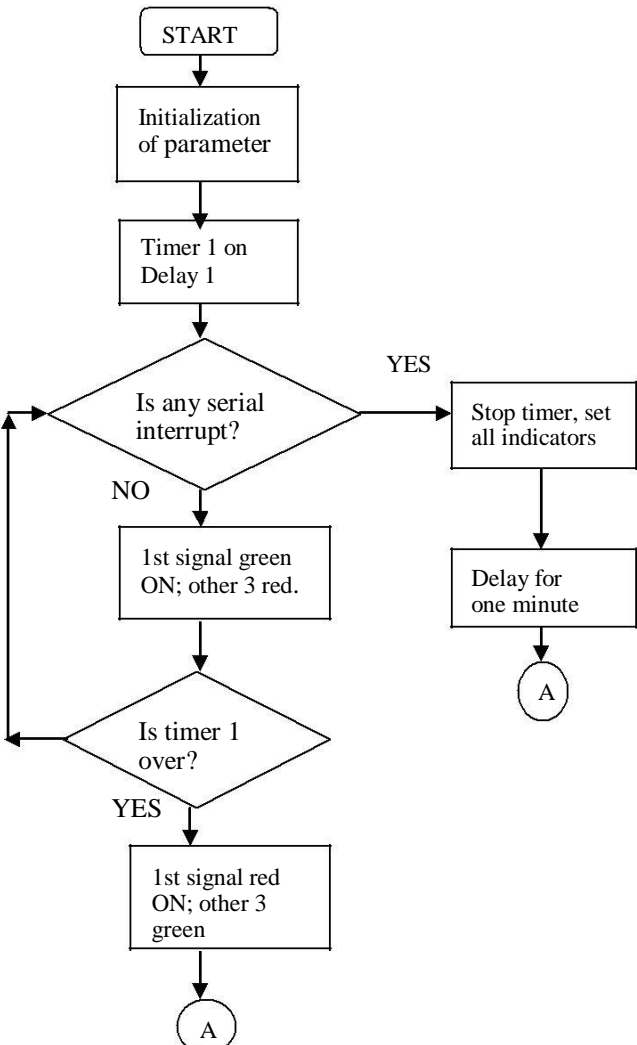


Fig 6: Flowchart of ambulance clearance system

In ambulance clearance system, solving the current problem section, we have implemented the Intelligent Traffic control System. This system consists of three sections. In the first part we are detecting the emergency vehicle passing through the specified path. This is practically implemented using RFID reader, RFID tag. The RFID reader connected to ARDUINO reads the tag positioned in the emergency vehicle. This information on detecting the vehicle is sent by the RF transmitter to the RF receiver connected to the ARDUINO of the traffic control system. The traffic turns to green light for the emergency vehicle to pass the junction and then the traffic turns normal. So the ambulance can reach their destination on time without wasting time on road because of traffic congestion problems. Like this the precious life of the human are saved. This can implemented as shown in Fig 7.using RFID transmitter and Receiver, and Arduino.

B. Stolen Vehicle Theft Detection System:

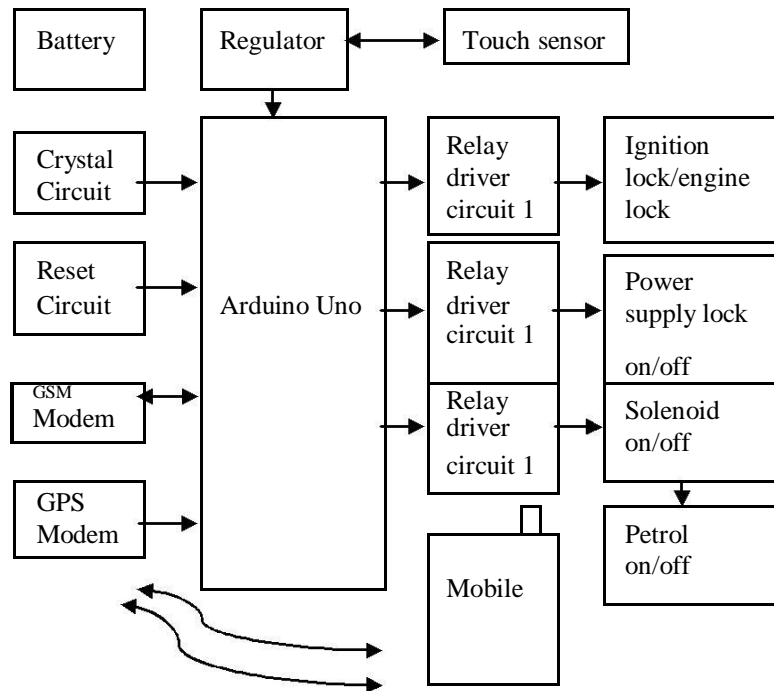


Fig 7: Block Diagram for Vehicle Theft Detection System

• Flow chart of Vehicle Theft Detection System:

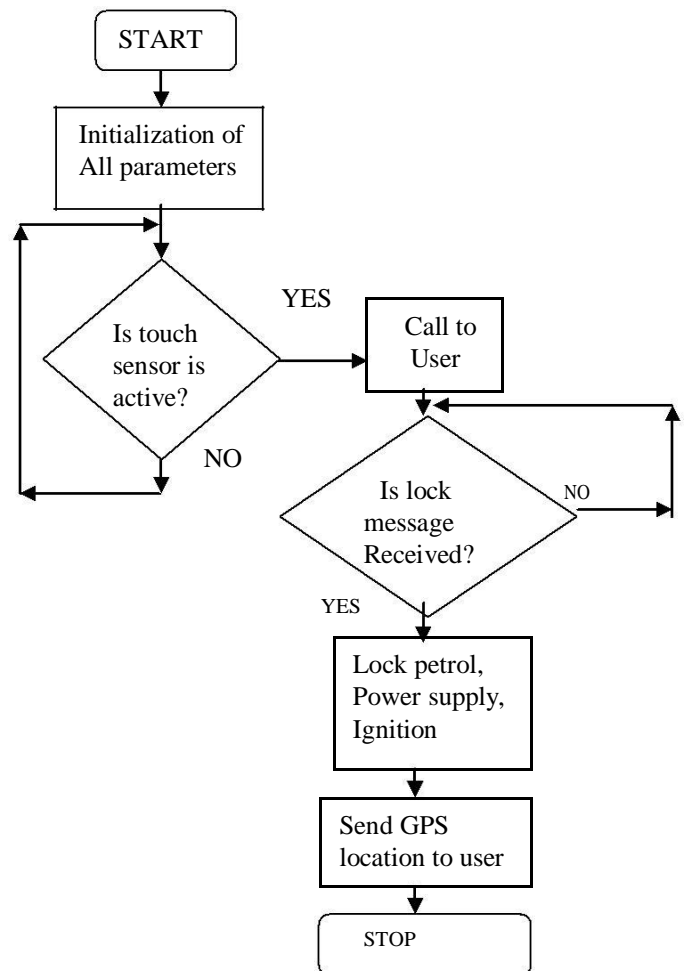


Fig 8: Flowchart of stolen vehicle theft s detection system

A. SOFTWARE IMPLEMENTATION:

The software part programming through Arduino Uno software (IDE). It is easy to write code and upload it to the board. C and C++ language are used for programming.

B. HARDWARE IMPLEMENTATION:

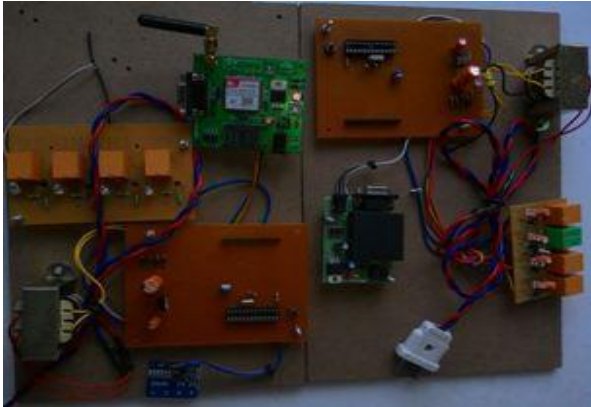


Fig 9: Hardware implementation of project

IV. PROJECT RESULT

From this project, we are able to detect the stolen vehicle using RFID reader and tag within shortest time. The RFID tag of the stolen vehicle should be saved in the database so that when it is detected in any signal junction by using GPS, an SMS is sent to the control room to take immediate action. Along with this the user can lock the vehicle by using GSM module. And also this system helps the emergency vehicle like ambulance, fire truck to reach their destination on time.

V. REFERENCES

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VI. CONCLUSIONS

With this project we automatically detect stolen vehicle present at the junction. Also Police can catch the stolen vehicle at the next possible junctions. 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 [1]. Emergency vehicles like ambulance, fire trucks reach to their destinations at the earliest. And a precious life of many people saves. In Ambulance clearance system, the traffic signal turns to Green until the emergency vehicle passes through the particular path. And when emergency vehicle passes, then signal becomes red. Emergency vehicles like ambulance, fire trucks reach to their destinations at the earliest. And a precious life of many people saves. Here we have implementing this system on only one road. We can implement it on multi road junction by improving the system.

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