

Emi Due Based Automatic Vehicle Locking System

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ABSTRACT- The system is designed to lock the vehicle automatically when it exceeds the due date till the borrower settles EMI using GSM technology. People who purchase their vehicles on loan are lethargic in paying their EMI. Conflict between the creditors and lenders is resolved by tracking the vehicle when it exceeds the due date and then locking the vehicle system till the borrower settles the monthly EMI. Here, a warning message is sent by the EMI department through the GSM module to the lender about the due date. The microcontroller receives this message and the voice IC reminds the user. In case, if he fails to pay the EMI, the module receives a command from the EMI department to lock vehicle engine. Additionally, an GPS system is also included to check for the location of the vehicle to avoid any unexpected accidents, if the GPS location of the vehicle and the home matches then action is taken or else the module keeps on monitoring until the location matches to lock the vehicle.

Keywords: EMI,GPS,GSM,VOICE IC,MICROCONTROLLER

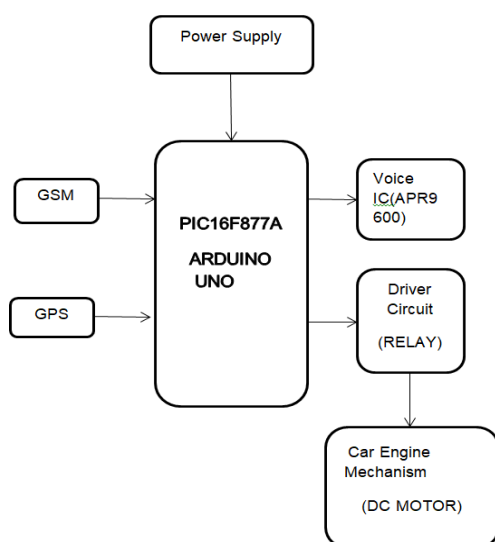


Figure 1: Circuit Diagram , TRACKING.

1. INTRODUCTION

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System

Emi Due Based Automatic Vehicle Locking

Creditors are faced with an obligation to prevent or minimize payment losses in loan relationships. Our system helps creditors to reduce the amount of damage and exposure to payment losses caused by a defaulted loan relationship. Here we mainly focus on car loan creditors, to minimize this risk; tracking and locking systems are used.

BLOCK DIAGRAM:

The arduino UNO consists of 14 pins. The operating voltage is (2V to 5V) and its Operating frequency is 20MHz. Global system for mobile communication (GSM) is used with operating frequency of 900MHz. The GSM is connected to PIC microcontroller through Universal asynchronous receiver transmitter (UART). Voice IC (APR9600) is a single chip IC and playback device. The DC motor (car engine) is connected with arduino through a relay circuit. Along with which GPS is used for detection of location

The software requirements are Embedded C, MP Lab and Proteus 7.8.

CIRCUIT DIAGRAM:

The Circuit diagram consists of ARDUINO, GSM, VOICE IC, DC MOTOR, RELAY CIRCUIT, GPS, and LCD. The arduino with the controller ATmega 328. It consists of 14 pins that are separated as analog and digital pins and are connected to relay, DC motor and voice IC is given an 3v supply and connected to the 2 and 3pin of the arduino respectively, further, it is connected to GSM modem to the arduino with the pin number 10 for tx and 11 for rx, which is connected to the power pin, and is connected to LCD. For location tracking the gps pins are given the 5v power supply and connected to 4 and 5 pin. J23 pin for the relay circuit

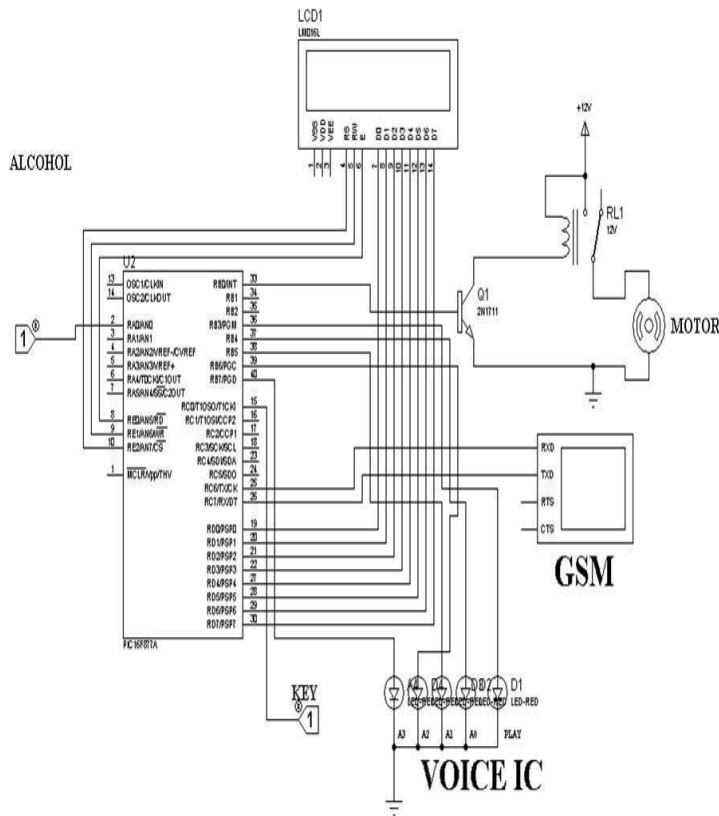


Figure-2: Circuit Diagram

2. METHODOLOGY:

If a person failed to pay his EMI, an intimation message is sent to the particular person. If the EMI is not paid on the due date, the vehicle is seized by the bank through his agent. It is a tedious process to the creditor as well as agent, as it consumes time and money. Also the credit score of the lender is reduced. This disadvantage is overcome by our system.

Before the last day of the EMI payment, this system automatically sends the warning message to the person by GSM module. When the intimation is received, the microcontroller will provide the voice message through voice IC. If the person fails to pay the EMI even after the last day, the module receives a message from the EMI department to lock the vehicle engine. Along with this an GPS is also featured to check for the location of the vehicle to avoid any unexpected accidents, if the GPS location of the vehicle and the home matches then action is taken or else the module keeps on monitoring until the location matches to lock the vehicle.

OPERATION DESCRIPTION

Before the due date, this system sends a warning message to the person by GSM saying 'PAY YOUR EMI'. When the Intimation is received; the microcontroller intimates the user through voice IC. If the person fails to pay the EMI even after the due date, the module receives a message from the EMI department to lock the vehicle engine.

3. HARDWARE DESCRIPTION

The hardware consists of Arduino UNO, GSM900, VOICE IC , RELAY, GPS, DC MOTOR.

Arduino UNO:



Figure-3: Arduino UNO

The arduino 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 crystal oscillator, 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 Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduno, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform.The arduino serves more purposes in performing all types of embedded projects in real time with just connections. It can be used as an iot project with few improvements.

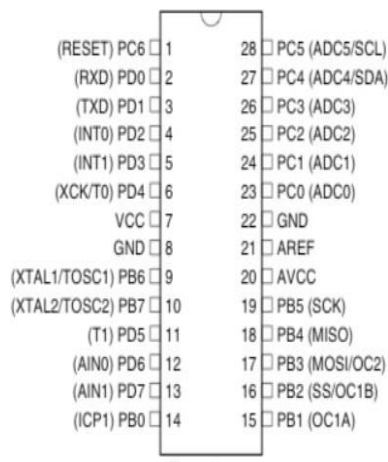


Figure 4: Arduino pin diagram

GSM:

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. GSM differs from first generation wireless systems in that it uses digital technology and Time Division Multiple Access (TDMA) transmission methods. It operates at 900 MHz



Fig-5: GSM900

VOICE IC (APR9600)

An APR9600 is a single chip voice recorder and playback device from A plus integrated circuits. It has a 28 pin DIP package, operates at 5V. This chip used flash non volatile memory to store up to 256 voltage levels.

I.e. for 32 to 60 seconds.



Figure 6: Voice IC

Voice IC Speaker

Audio amplifier ICs (integrated circuits) are devices used within electronic circuits for audio applications.IC

Audio amplifiers are useful because they can vastly decrease the size of amplification devices, making it possible to create sophisticated amplification within a small package. Audio amplifier ICs (integrated circuits) are devices used within electronic circuits for audio applications. IC audio amplifiers are useful because they can vastly decrease the size of amplification devices, making it possible to create sophisticated amplification within a small package. Relays are the most commonly used switching device in electronics. Let us learn how to use one in our circuits based on the requirement of our project. There are two important parameters of the relay. One is the Trigger Voltage, this is the voltage required to turn on the relay that is to change the contact from Common->NC to Common->NO. Our relay here has 5V trigger voltage, but you can also find relays of values 3V, 6V and even 12V so select one based on the available voltage in your project. The other parameter is your Load Voltage & Current, this is the amount of voltage or current that the NC, NO or Common terminal of the relay could withstand, in our case for DC it is maximum of 30V and 10A. Make sure the load you are using falls into this range. The purpose of the diode is to protect the switch from high voltage spikes that can be produced by the relay coil. If connected to NO the load remains disconnected before trigger and if connected to NC the load remains connected before trigger.



Figure 7 Speaker

DRIVER CIRCUIT (RELAY)

The ULN2003 is a monolithic high voltage and high current Darlington transistor arrays. It consists of seven NPN Darlington pairs that feature high-voltage outputs with common-cathode clamp diode for switching inductive loads. The collector-current rating of a single Darlington pair is 500mA. The Darlington pairs may be paralleled for higher current capability. Applications include relay drivers, hammer drivers, lamp drivers, display drivers (LED gas discharge), line drivers, and logic buffers.

The ULN2003 has a 2.7kW series base resistor for each Darlington pair for operation directly with TTL or 5V CMOS devices.

GPS

GPS is a system. It's made up of three parts: satellites, ground stations, and receivers. Satellites act like the stars in constellations. We know where they are supposed to be at any given time. The ground stations use radar to make sure they are actually Where we think they are. A receiver, like you might find in your phone or in your parent's car, is constantly listening for a signal from these satellites. The receiver figures out how far away they are from some of them. Once the receiver calculates its distance from four or more satellites, it knows exactly where you are. Presto! From miles up in space your location on the ground can be determined with incredible precision! They can usually determine where you are within a few yards of your actual location.



Figure 8: GPS

DC MOTOR



Figure-9: DC MOTOR

The direct current (DC) motor is one of the first machines devised to convert electrical power into mechanical power. 60RPM 12V DC motor is used. Permanent magnet (PM) direct current converts electrical energy into mechanical energy through the interaction of two magnetic fields. One field is

produced by a permanent magnet assembly; the other field is produced by an electrical current flowing in the motor windings. These two fields result in a torque which tends to rotate the rotor. Brushed DC motors are currently the most commonly used because they are easy to miniaturize and provide good control of rotation together with high efficiency.

Brushless DC motors, on the other hand, benefit from long life, ease of maintenance, and low noise because they do away with the brushes and commutators, which are the downsides of brushed DC motors.

4. SOFTWARE DESCRIPTION

The software that we used for the process is arduino IDE platform. The platform was used to run the code and compile. This software is particularly used to support the arduino. The code for GSM and GPS were successfully compiled. The output can be viewed in the serial port.



Figure 10: Arduino IDE

5. CONCLUSION

In this paper, proposed a model for locking vehicles using GSM and GPS for monitoring location. It reminds the user automatically about the due date and when the due date is exceeded then the vehicle is locked till the borrower settles the monthly EMI. GSM module is used for intimating information between a sender and the receiver. This is mainly useful in the banking sector. In future work it is going to be a combination circuit. With the help of the GPS this due payment is handled in the right way possible.

6. REFERENCES

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