Implication of Automated Tracking and Locking System for Defaulters

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Abstract— **Based on GSM and GPS for sending information about the EMI from the lenders and also to track the vehicle when it exceeds the due date and then lock the vehicle system till the borrower settle the monthly EMI. This project consists of two sections transmitter and a receiver where pic microcontroller is used in both sections, the transmitter side i.e. (in bank) it have a RTC and switch, initially the switch is in the off condition. If the clock exceeds the due date then the switch is on and sends the information to the receiver side if the receiver not responds to the lender, then by using the GPS system it tracks the vehicle and lock the system. GSM module is used to intimate information between a sender and the receiver. This is mainly useful in banking sector.**

Index Terms—**GSM Modem, PIC16F877A, GPS, I2C, UART.**

I. INTRODUCTION

Creditors are faced with an obligation to prevent or minimize losses in loan relationship. Our focus on loss mitigation has resulted in successfully working with creditors to reduce the amount of damage and exposure to losses caused by a defaulted loan relationship here we mainly focuses on car loan creditors, to minimize this risk, tracking and locking system are used.

II. COMPONENTS & INTERFACINGS

a) PIC16F877A microcontroller
b) DC Power supply unit
c) 16x2 liquid crystal display (LCD)
d) Motor driver and motor
e) GSM Modem
f) Max232 line driver
g) GPS technology
h) RTC

III. DESCRIPTION

A. PIC16F877A

It is one of the most advanced Micro-controllers.It is low price, low power and high quality, high performance RISC CPU and maximum operating frequency is 20 MHz Data memory (bytes) is 368 and EEPROM data memory (bytes) is 256 3 timers and 2 CCP modules, PSP parallel communication port it have 2 serial communication ports (MSSP,USART) and 10 bit A/D module (8 channels).Different Types of addressing modes(direct, indirect, relative addressing modes)fully static design and wide operating voltage(2.0- 5.56)volts Universal synchronous asynchronous transmitter (USART) with 9 bit address detection.

B. DC POWER SUPPLY UNIT

The DC power supply unit is divided into 4 elements as below.

- 30v/12v step down transformer.
- Bridge Rectifier with 4 x 1n4007 diodes.
- 470µf/35v capacitor as a filter.
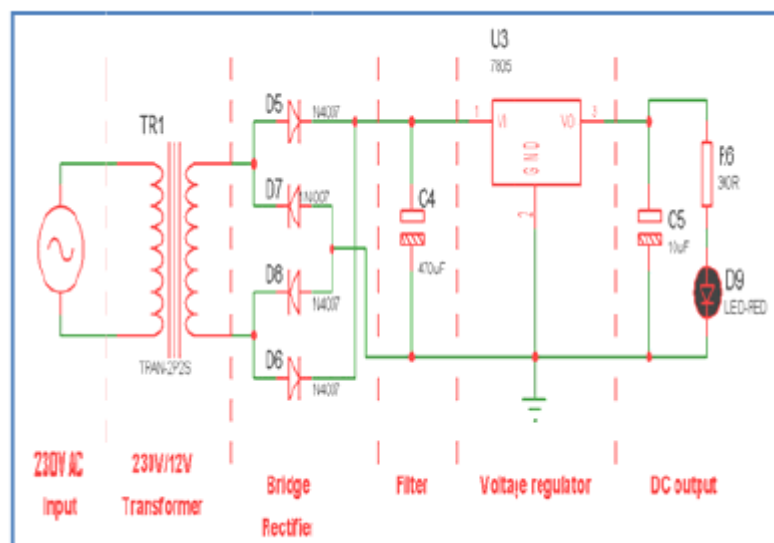- 7805 voltage regulator IC.

Fig. 1 Circuit diagram of power supply

This transformer steps down the incoming line voltage depending on n the needs of the power supply. This alternating voltage is then fed to the rectifier. The rectifier is a diode circuit that converts the ac to pulsating DC. This pulsating DC is then applied to the filter circuit. The filter is a circuit that reduces the variations of the DC voltage. Here the capacitor is s used as a filter. The filtered DC is then fed to a voltage regulator stage. The e voltage regulator is used to maintain a constant voltage at the power supply output. It also provides a further smoothing of the dc voltage .We are using an IC 7805 as voltage regulator to get 5v output voltage.

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C. *LIQUID CRYSTAL DISPLAY (LCD) UNIT*

A 16x2 character line LCD module is a parallel port module. An 8051 program must interact with the outside world using input and output devices that communicate directly with a human being. One of the most common n devices attached to an 80 051 μc is an LCD display. LCD requires 3 control lines as well as 8 I/O lines for the data bus. So this LCD will require a total of 11 data lines.
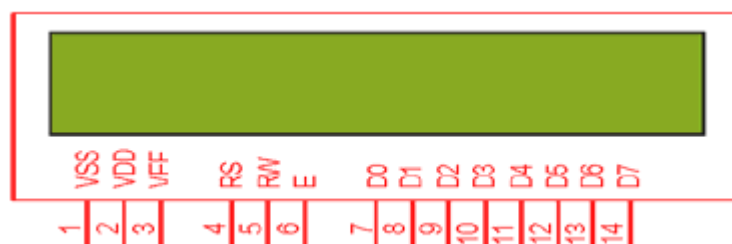

Fig. 2 Schematic diagram of LCD

The three control lines are referred to as EN, RS, and RW. The en line is called "enable". This control line is used to tell the LCD that you are sending it data. The Enable pin used by the LCD latches the information presented to its data pins. When data is supplied to data pins, high to low pulse must be applied to this "en" pin in order to latch the data present at the data pins. This pulse must be a minimum of f 450 NS wide. The RS line is the "register select" line. When RS is low (0), the data is to be treated as a command or special instruction (such as clear screen, position cursor, etc.). When RS is high (1), the data being sent is text data, which should be displayed on the screen. The RW line is the "read/write" control line. When RW is low (0), the information on the data bus is being written to the LCD. When RW is high (1), the program is effectively querying (or reading) the LCD. Some commands are given below for reference.

TABLE I LCD COMMAND CODES

Code (Hex)	Command to LCD Instruction Register
1	Clear Display of the screen
38	2 line, 5X7 Matrix
80	Force cursor to begin from 1st line
C0	Force cursor to begin from 2nd line

D. *L293D MOTOR DRIVER IC & DC MOTOR*

The purpose of using 4 no. of 12v dc motors is to drive the hardware kit just like an automobile. Since, MCU can interrupt the logic 1as 5v & 0 as 0v, so motor driver IC is used convert 5v logic to 12v logic to drive the motor efficiently with full rpm. Here used one IC to drive 2 motors. Accordingly there used two IC's for prototype model.

E. GSM MODEM

The GSM/GPRS modem comes with a serial interface through which the modem can be controlled using at command interface. Here e a simcom made(sim908) modem interfaced with the microcontroller operates s in 900 MHZ frequency .The Protocol used d by GSM modems for setup and control is based on the heat-command set. The GSM modem specific commands are adapted to the services offered by a GSM modem such as a text messaging, calling a given phone number, deleting memory locations etc. Since the main objective for this application is to show how to send and receive text messages, only a subset of the at-command set needs to be implemented. The following section describes the at-command set.

Fig. 3 GSM modem

TABLE II COMMAND SETS

Command	Description
AT	Check if serial interface and GSM modem is working.
ATE0	Turn echo off, less traffic on serial line.
AT+CNMI	Display of new incoming SMS.
AT+CPMS	Selection of SMS memory.
AT+CMGF	SMS string format, how they are compressed.
AT+CMGR	Read new message from a given memory location.
AT+CMGS	Send message to a given recipient.
AT+CMGD	Delete message

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F. MAX232 LINE DRIVER

A max232 chip is required to convert RS232 voltage levels to TTL levels, and vice versa.8051 has one transmitter (txd) and a receiver(rxd) for transferring and receiving serial data from the port (p3.0 and p3.1 1).They Require a line driver to make RS232 compatible. A line driver converts the r232's signals to TTL voltage levels that will be acceptable to 8051's txd and rxd pins.

G. GPS TECHNOLOGY

The global positioning system (GPS) is a satellite-based navigation system consists of a network of 24 satellites located into orbit. The system provides essential information to military, civil and commercial users around the world and which is freely accessible to anyone with a GPS receiver. GPS works in any weather circumstances at anywhere in the world. Normally no subscription fees or system charges to utilize GPS. A GPS receiver must be locked on to the signal of at least three satellites to estimate 2d position (latitude and longitude) and track movement. With four or more satellites in sight, the receiver can determine the user's 3d position (latitude, longitude and altitude). Once the vehicle position has been determined, the GPS unit can determine other information like, speed, distance to destination, time and other. GPS receiver is used for this research work to detect the vehicle location and provide information to responsible person through GSM technology.

H. RTC

RTC is a real time clock (rtc1307). It counts seconds, minutes, hours, date, day, year and leap year to 2100.Automatic power management circuitry. It is low cost, miniature. Ultra-low power and high accuracy.
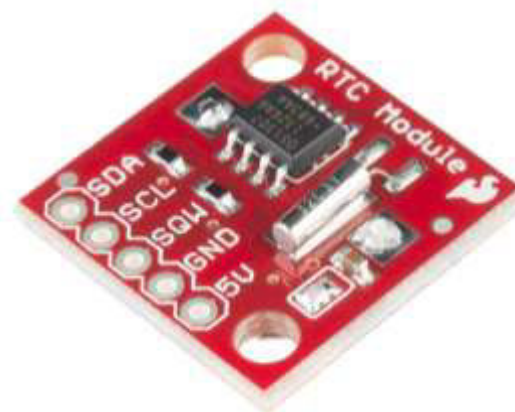

Fig. 4: Real Time Clock circuit

IV. SURVEY OF THE RELATED WORK

In [1], in this proposed work, a novel method of vehicle tracking and locking system used to track the theft vehicle by using GPS and GSM technology. This system puts into sleeping

mode while the vehicle handled by the owner or authorized person otherwise goes to active mode, the mode of operation changed by in person or remotely. If any interruption occurred in any side of the door, then the IR sensor senses the signals and SMS sends to the micro-controller. The controller issues the message about the place of the vehicle to the car owner or authorized person. When send SMS to the controller, issues the control signals to the engine motor. Engine motor speeds are gradually decreases and come to the off place. After that all the doors locked. To open the door or restart the engine, authorized person needs to enter the passwords. In this method, tracking of vehicle place easy and doors locked automatically, thereby thief cannot get away from the car.

In [2], the hardware and software of the GPS and GSM network were developed. The proposed GPS/ GSM based system has the two parts, first is a mobile unit and another is controlling station. The system processes, interfaces, connections, data transmission and reception of data among the mobile unit and control stations are working successfully. These results are compatible with GPS technologies.

In [3], a vehicle tracking system is an electronic device, installed in a vehicle to enable the owner or a third party to t rack the vehicle's place. This paper proposed to design a vehicle tracking system that works using GPS and GSM technology. This system built based on embedded system, used for tracking and positioning of any vehicle by using global positioning system (GPS) and global system for mobile communication (GSM). This design will continuously watch a moving vehicle and report the status of the vehicle on demand.

In [4], face detection system used to detect the face of the driver, and compare with the predefined face. The car owner is sleeping during the night time and someone theft the car. Then face detection system obtains images by one tiny web camera, which is hidden easily in somewhere in the car. Face detection system compared the obtained images with the stored images. If the images don't match, then the information sends to the owner through MMS. The owners get the images of the thief in mobile phone and trace the place through GPS. The place of the car and its speed displayed to the owner through SMS. The owner can recognize the thief images as well as the place of the car and can easily find out the hijackers image. This system applied in our day-to-day life.

In [5], this system provided vehicle cabin safety, security based on embedded system by modifying the existing modules. This method monitors the level of the toxic gases such as CO, LPG and alcohol within the vehicle provided alert information as alarm during the dangerous situations. The SMS sends to the authorized person through the GSM. In this method, the IR sensor used to detect the static obstacle in front of the vehicle and the vehicle stopped if any obstacle detected. This is avoiding accidents due to collision of vehicles with any static obstacles.

In [6], the remote monitoring system based on SMS and GSM was implemented. Based on the total design of the system, the hardware and software designed paper, the GSM network is a medium transmitting the remote signal. This includes two parts that are the monitoring center and the remote monitoring station. The monitoring centers consist computer and communication module of GSM. The Software-monitoring center and the remote monitoring station implemented by using vb. The result of demonstration shows that the system can watch and control the remote communication between monitoring center and the remote

monitoring station.

V. BLOCK DIAGRAM FOR PROPOSED PROJECT

The implication of automated tracking and locking for defaulters is shown below fig. It consist of micro-controller, switch, RTC, LCD, GSM module, GPS module, motor driver and the motor.
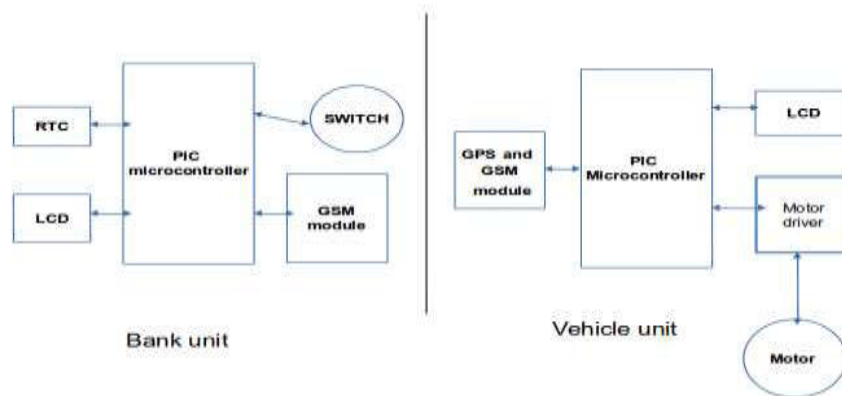

Fig. 5 Block diagram for proposed model

The GSM sends the warning message to the vehicle unit before the due date and if the due date is over then it gives another warning message to that vehicle, if the receiver not responds to that then the engine is locked.

VI. IMPLEMENTATION AND SIMULATION

The simulation and the result are given below, in simulation Proteus software is used and for the hardware dumping mplab software is used.
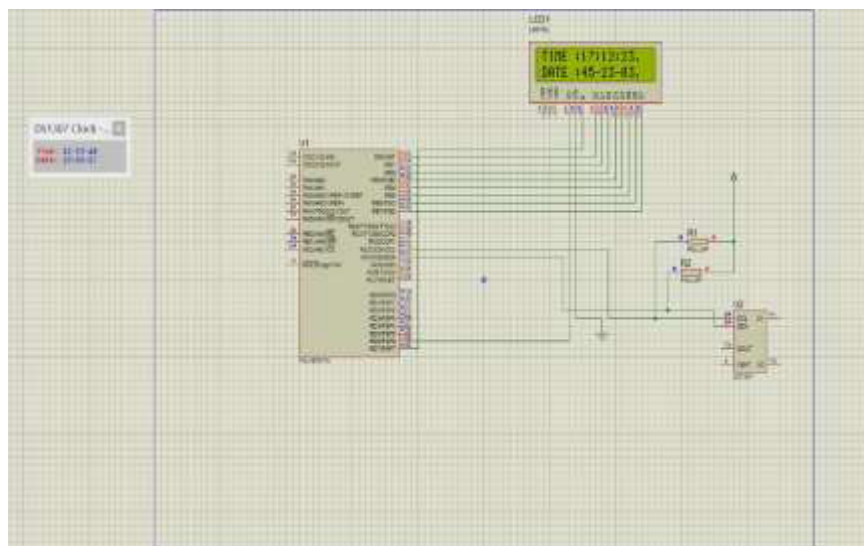

Fig. 6 Transmitter side simulation

In this receiver side simulation, the RTC time and date is displayed in the LCD. Then for
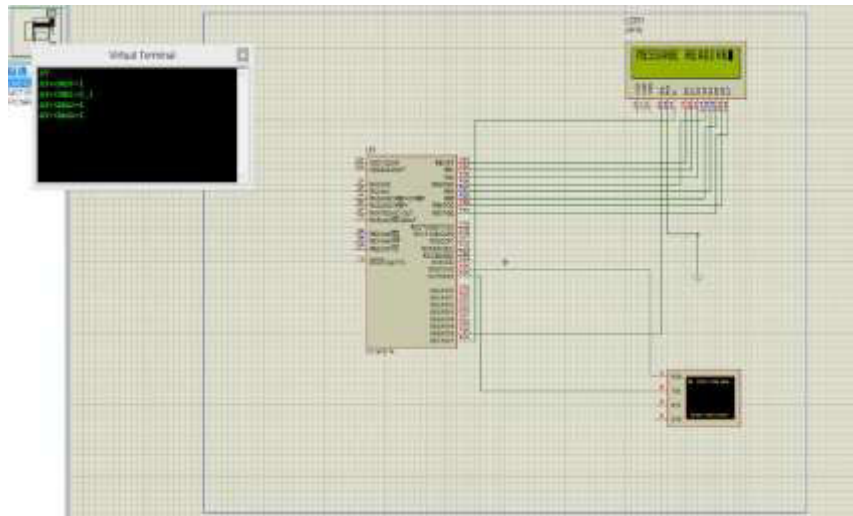
GSM hyper terminal is used.

Fig .7 Receiver side simulation

In the receiver side simulation for GSM hyper terminal is used .here the warning message is displayed in the LCD.

VII. RESULTS

The hardware bank unit and vehicle unit also shown below fig.This project consists of two sections transmitter and a receiver where pic microcontroller is used in both sections .., the transmitter side i.e. (in bank)it have a RTC and switch , initially the switch is in the off condition.
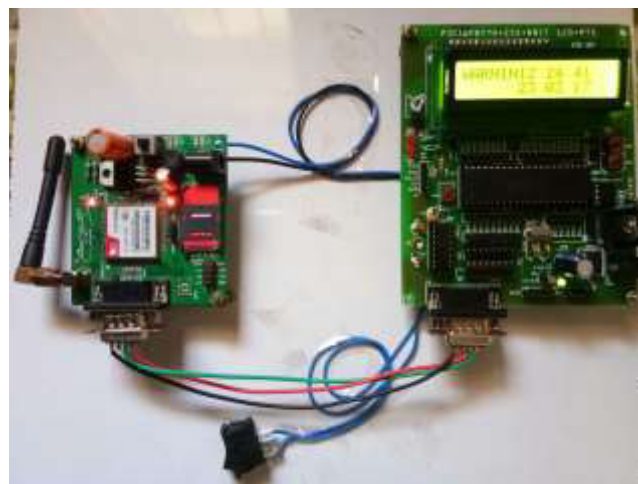

Fig. 8 Bank unit

If the clock exceeds the due date then the switch is on and sends the information to the receiver side if the receiver not responds to the lender, then by using the GPS system it tracks the vehicle and lock the system.

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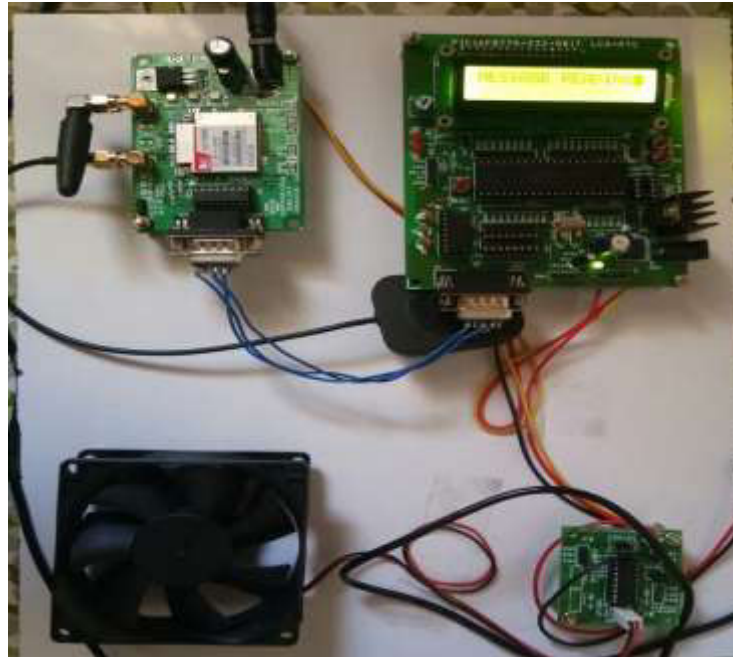
Fig. 9 Vehicle unit

These are the results of hardware prototype model, here it displays RTC time and the warning message in LCD and also it stops the engine when LOCK message is triggered.

VIII. CONCLUSION

In this paper, proposed a model for tracking and locking using GPS and GSM. Based on GSM and GPS for sending information about the EMI from the lenders and also to track the vehicle when it exceeds the due date and then lock the vehicle system till the borrower settle the monthly EMI. This project consists of two sections transmitter and a receiver where pic microcontroller is used in both sections .., the transmitter side i.e. (in bank) it have a RTC and switch, initially the switch is in the off condition. If the clock exceeds the due date then the switch is on and sends the information to the receiver side if the receiver not responds to the lender, then by using the GPS system it tracks the vehicle and lock the system. GSM module is used to intimate information between a sender and the receiver. This is mainly useful in banking sector. In future work it is going to be a combination circuit it consist of combination of these three specifications, first it to avoids drunken-drive and second is theft control and third is for defaulters

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