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RFID Based Call Centre Employee Tracking and Security System

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Abstract-*A GPS & GSM Based Vehicle Tracking and Employee Security System combines the installation of an electronic device in a vehicle with the purpose-designed computer software to enable the company to track the vehicle's location. For vehicle tracking, Global Positioning System (GPS) technology is used. The system also employs the RFID technology.*
All these systems work in collaboration with microcontroller LPC2138 to make the system work efficiently. The interfaced GSM module will receive the information of the employee stored in RFID card when it is swapped. After verification, if in case while moving if the employee finds himself/herself in a problem, he/she will press the emergency buttons provided. Microcontroller will detect the action & sends a signal to the GSM which will coordinate with to the company unit and police. Microcontroller will also send a signal to the relay which will turn off the car ignition & stop the car. Thus the proposed system provides more security to the employee compared to the earlier systems.

Keywords: *RFID, GSM, monitoring, GPS, tracking.*

I. INTRODUCTION

In today's world, security is a very important aspect for the working professionals. It is the company's utmost responsibility to take care of its employee's safety. Due to some recent mishaps such as burglary, rape cases etc., the employee safety, especially for women employees, has become a number one priority for most of the companies. Even though the companies take precautions to ensure that their employees are safe, there are some serious loop holes in the existing system. Firstly, there is no full proof mechanism to track the outsiders. The drivers of the cabs cannot be trusted. There exists no system on most of the vehicles to communicate and track the vehicle in danger. In order to deal with these problems, we have come up with the innovative solution of "GPS & GSM Vehicle Tracking and Employee Security System". This system will detect the outsiders as well as locate the cab through RFID & GPS mechanisms. Emergency buttons have also been provided for employee's safety. The proposed Vehicle Tracking and Employee Security System consists of a car unit, emergency buttons and a company unit. Car unit is placed inside the car. Emergency buttons are a part of the car unit. These buttons are placed at such suitable positions that employee can access them easily i.e. near the door unlocking handle, near the foot rest etc. Company unit is at the company and consists of GSM modem, RS232 cable & computer.

II. RELATED WORK

[1] Zhiyuan Fang, li Wei, Wei Chen, Yangjun explained in their paper that an RFID-based Kindergarten Intelligence Security System (RF-KISS) helps to achieve better children security control, as well as to improve security of school environment using RFID and IoT technologies. [2] C.Deenadayalan, M.MuraliL.R.Baanupriya explained in their paper the implementation of School Security System(SSS) via RFlD to avoid crime, illegal activates by students and reduce worries among parents using RFID, GPS/GSM technologies, image processing, WSN and web based development using Php, VB. net language apache web server and SQL [3] Ying Chen Yuntao Wang Li Gao Xiaokang Li explained an intelligent campus security tracking system (iCST) implemented based on the RFID and ZigBee network. [4] Miao Yu, Ting Deng, Jie Fu, the need for security of transportation in China using the technology of information management along with Radio Frequency Identification(RFID) and Global Positioning System (GPS) technology for dangerous goods.

III. METHODOLOGY OF THE SYSTEM

In this project we proposed RFID, GSM & GPS based system for Vehicle Tracking and Employee Security System. It consists of:
•Car unit (in this unit some emergency buttons are provided)
•Company unit.
Car unit is placed inside the car. When the car picks up the employee; he/she needs to swap the RFID card. The micro controller matches the RFID card no. with its database records and sends the employee's id, cab id & the cab position co-

ordinates to the company unit via GSM module. Emergency button is a part of car unit. There are three to four emergency buttons in the car. These buttons are placed at such positions that employee can access them easily i.e. near the door unlocking handle, near the foot rest and near the the seat of employee. If employee finds himself/herself in a problem, he/she will press the button. Microcontroller will detect the action & sends a signal to the GSM which will coordinate with to the company unit and police. Microcontroller will also send a signal to the relay which will turn off the car ignition & stop the car.

Company unit consists of GSM modem, RS232 cable & computer. The GSM Modem will receive the message through GSM. This message will then be transferred to the computer through the serial port. The employee name, employee id & cab position coordinates (longitude and latitude) get displayed on computer. The visual basic software reads the co-ordinates and displays the vehicle location. In this way the company unit keeps a track of the vehicle.

Fig. 1. Car Unit

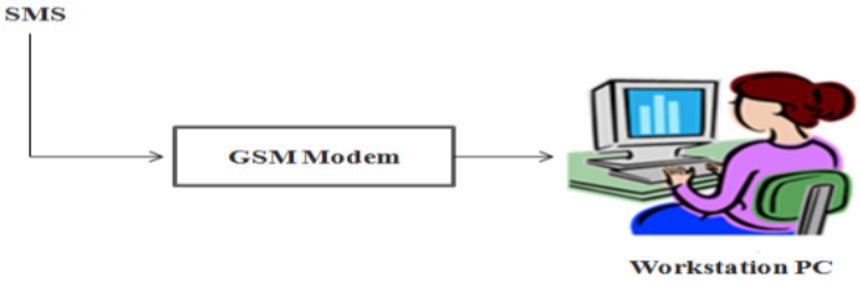
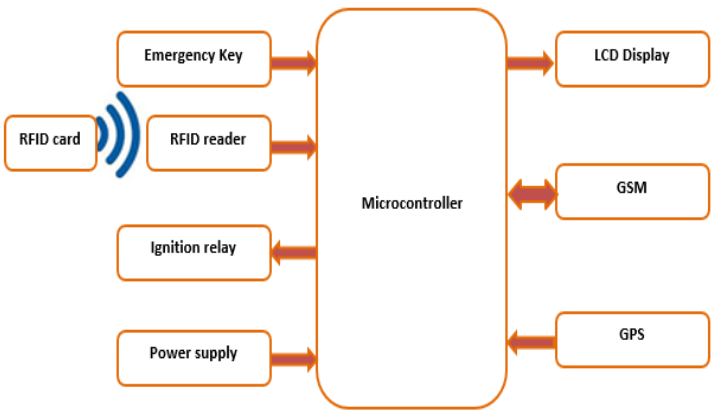


Fig. 2. Company Unit

As shown in Fig. 1 the tracking device which is attached to the moving automobile. This module consists of: a RFID reader, a GPS receiver, microcontroller and a GSM Modem. The RFID reader reads the information of the employee stored in card and sends to company unit. The GPS Receiver retrieves the location information from satellites in the form of latitude and longitude real-time readings. The Microcontroller has two main tasks: it processes the GPS information to extract desired values and to transmit this data to the server using GSM modem by SMS.

Fig. 2 shows a recipient GSM modem and workstation PC. The modem receives the SMS that includes GPS coordinates and employee id, cab id information. This text is processed using a Visual Basic program to obtain the numeric parameters, which are saved as a Microsoft Office Excel file and is further processed in order to get necessary information regarding employee.

IV. SYSTEM DESIGN



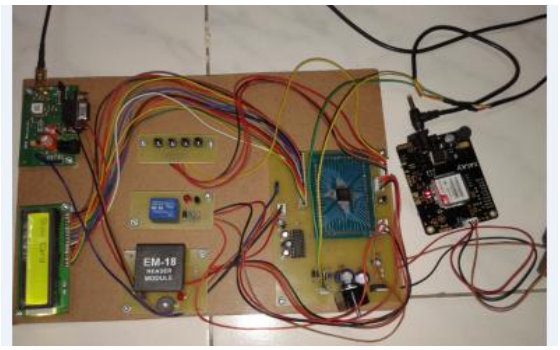


Fig.3 - Car Unit

- Kit Implementation

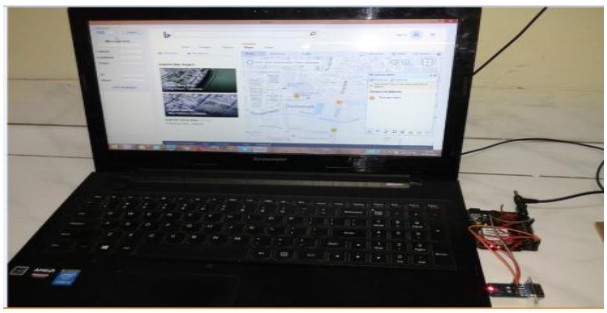


Fig.4 - Company Unit

- Software Implementation

4.1. RFID CARD: When the car picks up the employee; he/she needs to swap the RFID card. The micro controller matches the RFID card no. with its database records and sends the employee's id, cab id & the cab position co-ordinates to the company unit via GSM module.

4.2. RFID READER: Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's grouped under the broad category of automatic identification technologies.

4.3. GPS: A GPS tracker essentially contains GPS module to receive the GPS signal and calculate the coordinates. For data loggers it contains large memory to store the coordinates, data pushers additionally contain the GSM/GPRS modem to transmit this information to a central computer either via SMS or via GPRS in form of IP packets. A GPS tracking unit is a device that uses the Global Positioning System to determine the precise location of a vehicle, person, or other asset to which it is attached and to record the position of the asset at regular intervals. The recorded location data can be stored within the tracking unit, or it may be transmitted to a central location data base, or internet-connected computer, using a cellular (GPRS or SMS), radio, or satellite modem embedded in the unit. This allows the asset's location to be displayed against a map backdrop either in real time or when analyzing the track later, using GPS tracking software.

4.4. MICROCONTROLLER- LPC2138: It is heart of the system. All the controlling actions are implemented by microcontroller LPC2138 with the help of software program. In this project it is basically used for interfacing RFID, GPS, GSM, emergency keys at car unit and communicating one way with the company unit. It processes the signal sent by the GPS receiver and commands the GSM to send the coordinates to the company unit. Thus enabling continuous monitoring and tracking of the car.

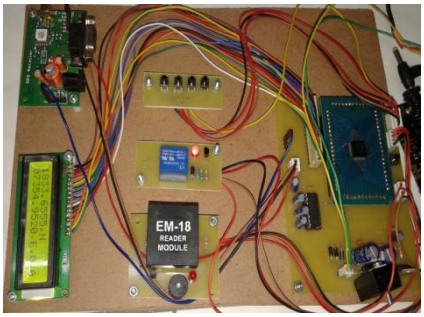
4.5. LCD DISPLAY UNIT: Here we are using a 16 character by 2-line display in our project. The main objective to use LCD is to display the various parameters of the project.LCD (Liquid Crystal Display) screen is an electronic display module A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has two registers, namely, Command and Data.The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

4.6. MAX232: MAX232 IC chips are commonly referred to as line drivers. The voltage levels of MAX 232 are 0 to +5 volts. The MAX 232 is TTL to CMOS converter and also CMOS to TTL converter and thus making the system compatible with PC.MAX232 is used for the serial communication between other devices and microcontroller. In proposed system MAX232 is used to connect RFID reader serially with ARM7.

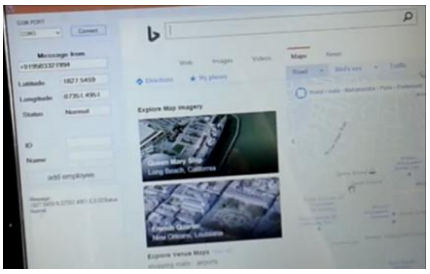
4.7. GSM MODEM: GSM (Global System for Mobile communication) is a digital mobile telephony system. With the help of GSM module interfaced, we can send short text messages to the required authorities as per the application. GSM module is provided by SIM uses the mobile service provider and send SMS to the respective authorities as per programmed. This technology enables the system a wireless system with no specified range limits. It operates at either the 900 MHz or 1800 MHz frequency band. The core of data communication about this system lies in wireless communication control terminals that uses GSM Modules to transfer long-distance data extensively and reliably. It Support instructions of AT commands. SIM300 can be integrated with a wide range of applications. SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz SIM300.

VI. EXPERIMENTAL RESULTS

1) Switching on of the vehicle and Location indicated by the GPS reciever upon reading the valid card using RFID card reader

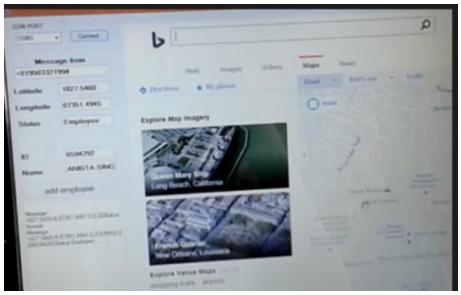


2)Software status

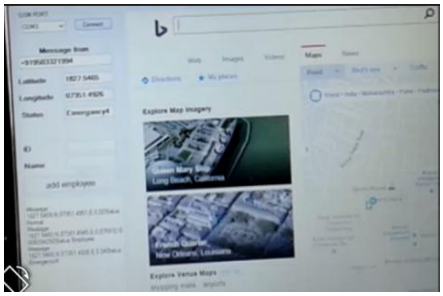


3)Switching off of the relay upon pressing any emergency key

4)Software Status When any employee Scan the card to Sit in the car and is in normal condition



5)Software Status under Emergency Condition



6)After consulting with the employee regarding the reason of pressing emergency button, the company person sends a message saying 'R1 ON' the car is again started and the employee status again comes to Normal.

VII. CONCLUSION

Thus the aim with which the project was designed is fulfilled and hence ensure the safety of employee.

VIII. REFERENCES

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