

GPS Based Office Cab Monitoring System using RFID Technology

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Abstract: In this modern, fast moving and insecure world, it becomes a basic necessity to be aware of one's safety and convenience, especially women. Now a day's every Companies providing cab to their employees. There is a real necessity in designing a system that can track the vehicle and send the information like path and location of the vehicle as well as information about the person, like location where the person gets in and gets out of the vehicle. And this system is designed towards those objectives where there are three technologies has been used to achieve the same, GPS is used to track the path and location of the vehicle, RFID has been used to identify the person as well the information like where he/she gets in and gets out of the vehicle. GSM technology is used to transmit all the information's gathered by the module to the destined server. In addition to these a hardware setup is provisioned to perform automatic door open/close system.

Keywords: GPS, GSM, RFID, 89C51 Microcontroller, LCD.

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. In the last few decades, India has progressed at such an enormous rate that many companies have strongly established themselves here. These companies bring a huge amount of workforce with them. Arranging transportation to such a huge mass is a cumbersome task involving lots of intricacies. Due to recently happened mishaps such as burglary, rape cases etc., the employee safety, Even though the companies take good precautions to ensure that its employees are safe, there are some serious loop holes in the existing system. Firstly there is no full proof mechanism to track the outsiders. In order to deal with these problems, we have come up with the innovative solution of "GPS & GSM Employee Security System". This system will detect the outsiders as well as locate the cabs through RFID & GPS mechanisms. Wherever an employee finds himself/herself in trouble, he/she will press the button and an SMS will be sent to the nearest police station and the company's monitoring unit, so that they will take the necessary action.

II. EXISTING SYSTEM

GPS, GSM, GPRS technologies are used in this system. At present, one has to monitor the system continuously in the Security Room, to check cabs location. This system will track only the cabs position.

III. PROPOSED SYSTEM

Along with GPS and GSM, RFID is included. Easy to identify information about the Person travel in the cab by using RFID. Track the path and location of the vehicle using GPS System. GSM technology is used to transmit the information to the server.

IV. WORKING PRINCIPLE

The system is installed at the cab used for safe transportation. A separate RFID tag is provided to all employees those who use the cab. Each RFID tag will contain unique number. The RFID transmitter will send carrier signal to antenna. And antenna will convert carrier signal to modulated signal, this signal will be sent to RFID receiver. When the employee enters into cab the RFID reader will read the card and send it to the microcontroller. The microcontroller will verify the number to identify the person who enters into cab and their details who get in and get out are already stored in EEPROM which is connected to the microcontroller. The path of cab travelling is already predefined in the system using latitude and longitude position. When the cab starts, the GPS will automatically track the desired path by continuously monitoring them. In case of emergency if path of cab changed immediately it will send message to their parents or police station. If cab driver or any other persons try to misbehave with the employee a switch is provided at back of the driver seat. When the switch is pressed it lock both front doors and will leave back doors open which helps employee to escape from the cab.

V. RFID

RFID tag is a small device which stores and sends data to RFID reader. They are categorized in two types - active tag and passive tag as shown in Fig.1. Active tags are those which contain an internal battery and do not require power from the reader. Typically active tags have a longer distance range than passive tags. Passive tags are smaller and lighter in size than the active tags. They do not contain an internal battery and thus depend on RFID reader for operating power and certainly have a low range limited up to few meters. A rectangular passive RFID tag is shown in the above image. The passive tags are available in different shapes and sizes.



Fig.1. RFID Tag.

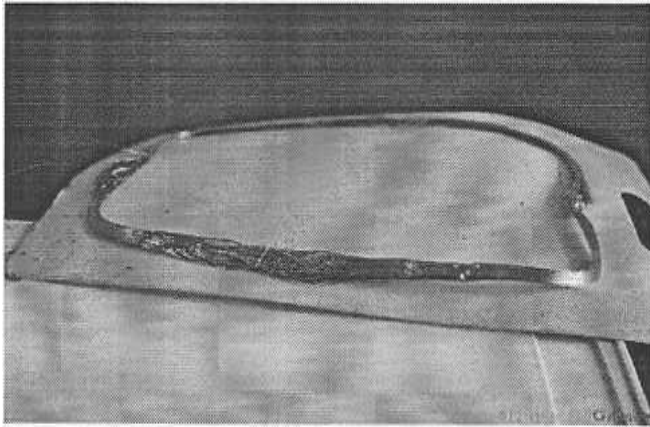


Fig.2. COIL.

The antenna/coil is shown in the Fig.2. The main function of the coil is to provide power to the chip as well as to work as an antenna to receive and transmit data as shown in Fig.3.

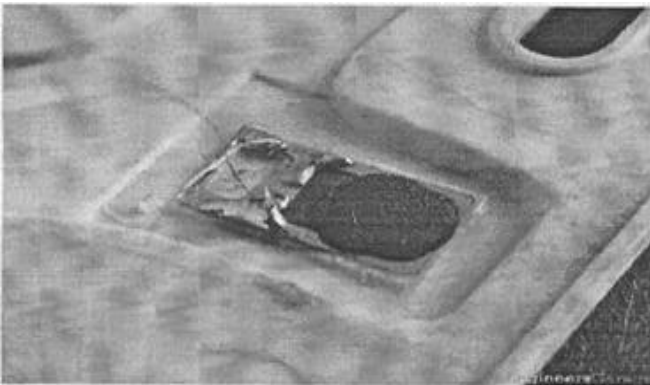


Fig.3. Power Coil.

The microchip stores the unique ID and incorporates the necessary logic circuitry for functioning of the tag. It has an internal EEPROM to store the unique ID.

A. Working Principle Of RFID

There are two important components of a RFID tag - A microchip and a coil (antenna). The antenna receives power and RF signals from the RFID reader and sends those signals to the chip. The chip receives those signals, computes them and sends back the data to RFID reader. We can figure out the precise working of a RFID tag through this Fig.4.

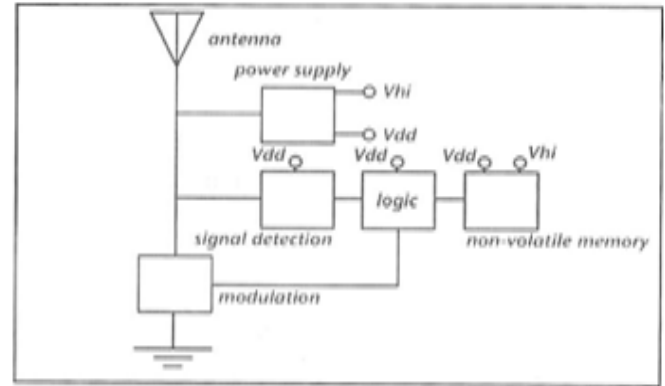


Fig.4. Working Principle of RFID.

To recognize the identity of an RFID tag, RFID reader sends radio signals which is captured by the coil (working as antenna) for the tag as shown in Fig.5. The coil receives these signals as alternating current and passes to the chip.

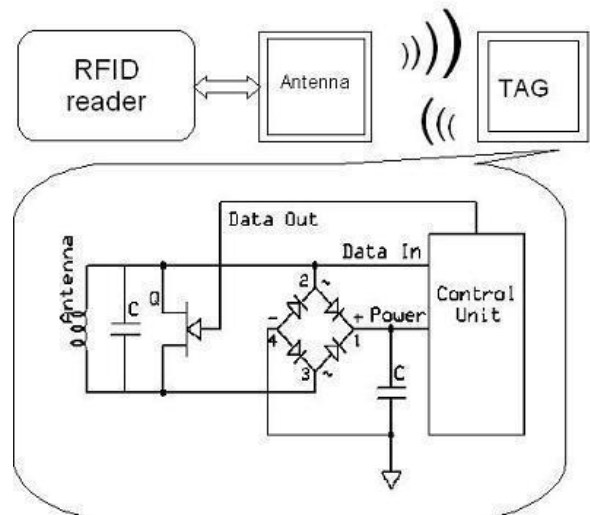


Fig.5. RFID reader.

The chip extracts both the power and the information from this alternating current. By communicating with the non volatile memory of the chip that stores unique id as well as other information, it sends back the required signal to the antenna which is then transmitted to the RFID reader.

VI. GLOBAL SYSTEM FOR MOBILE COMMUNICATION

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. The MODEM is the soul of such modules The United States Global Positioning System (GPS) is the first fully operational Global Navigation Satellite System (GNSS). Each satellite broadcasts a signal that is used by receivers to determine precise position anywhere in the world. The receiver tracks multiple satellites and determines a pseudorange measurement (a range

measurement based on time) that is then used to determine the user location. A minimum of four satellites is necessary to establish an accurate three-dimensional position.

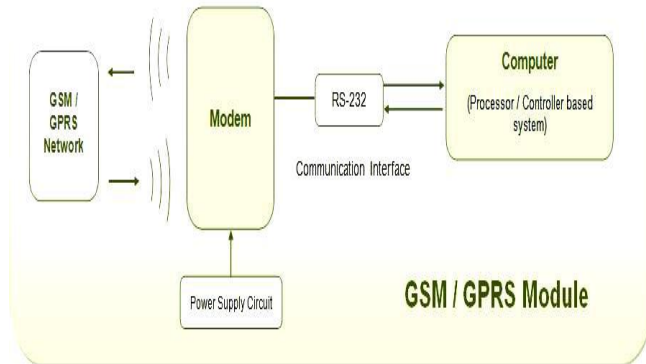


Fig.6. GPS.

The Department of Defence (DOD) is responsible for operating the GPS satellite constellation and monitors the GPS satellites to ensure proper operation as shown in Fig.6. Every satellite's orbital parameters (ephemeris data) are sent to each satellite for broadcast as part of the data message embedded in the GPS signal. The GPS coordinate system is the Cartesian earth-centred earth-fixed coordinates as specified in the World Geodetic System reference system 1984 (WGS-84). The GPS constellation of 24 satellites is designed so that a minimum of five is always observable by a user anywhere on earth. The receiver uses data from a minimum of four satellites above the mask angle (the lowest angle above the horizon at which it can use a satellite). The DOD declared Initial Operational Capability of the U.S. GPS on December 8, 1993. The FAA has granted approval for U.S. civil operators to use properly certified GPS equipment as a primary means of navigation.

VII. CONCLUSION

The GSM, GPS and RFID based Vehicle Tracking and Employee Security System is becoming increasingly important in large cities and it is more secured than other systems. Due to recently happened mishaps such as burglary, rape cases etc., the employee safety, esp. for the women employees, has become a number one priority for most of the companies, with this we can have a good control in it. RFID is used to identified information about the employee. The microcontroller is the brain of the system and the GSM modem controlled by AT commands facilitates data transmission over GSM network while the GPS module provides the location data. The system will provide accurate data in a timely manner such that it will enable the security company to know the location of the tracked car and facilitate an early recovery of the tracked car. Implementation of GPS in vehicles can certainly bring a revolutionary impact in transportation science in a developing country like India where there is an extremely high urban as well as rural vehicular transition every day. The system included two main components: a transmitting embedded module to interface in-vehicle GPS and GSM devices in order determine and send automobile location and status information via SMS. The second stationary module is a receiving module to collect and process the transmitted information to a compatible format with Google Earth to remotely monitor the automobile

location and status online. We can collect all data such as position of the car, employee information.

VIII. REFERENCES

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