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Real Time Vehicle Monitoring and Tracking System Based On PIC Microcontroller Using GSM and GPS Technology

Mr. K. Rajarajan B. E[1], Miss. M. Tharangini M.E[2]

[1]Student, Department of Electronics and Communication Engineering Arjun College of Technology, Coimbatore

[2]AssistantProfessor, Department Of Electronics and Communication Engineering Arjun College Of Technology, Coimbatore

Abstract: An advanced vehicle monitoring and tracking system based on PIC Microcontroller using GSM and GPS Technology is designed and implemented for monitoring the school and college vehicle from one location to another location in real time. The proposed system would make use of new technology that is based on PIC microcontroller and it works on GPS/GSM SIM800C Module. The GPS module is used to detect the current location of the vehicle and GSM is used to send an alert message to the students and staff members. A database containing various location details is stored in the memory of microcontroller. This database is used in locating exact location of the bus. If the drivers start the bus then the information is send to the people at various stops, indicating that the bus has been started from the current location. Once, if it reaches the next stop then the alert message is being sent. Suppose if there is a breakdown, then the driver can trigger a button indicating about the breakdown and time taken to recover it. If the drivers chooses an alternate path instead of usual path then the alert message will be send to all the people present in various stop indicating that the route has been changed.

Keywords: PIC Microcontroller, GSM, GPS, SIM8000C.

I. INTRODUCTION

Embedded system is a dedicated function within a larger mechanical or electrical system.It is embedded as part of a complete device often including hardware and mechanical parts. Embedded systems control many devices in common use today. Embedded   system sare designed to do some specific task rather than be a general-purpose computer for multiple tasks. Some also have real-time perfor mance constraints that must be met for reasons such as safety and usability. Others may have low or no performancerequirements, al lowing the system hardware to be simplified to reduce cost. Embedded systems range from portable devices such asdigital watches a nd MP3 players, to large stationary installations like traffic lights,factory controllers, and largely complex systemslike hybrid vehicl es, MRI, and avionics. Complexity varies from low, with a single microcontroller chip, to very high with multiple units,peripherals a nd networks mounted inside a large chassis or enclosure.

II. PROPOSED SYSTEM

This approach is used for the vehicle when it reaches the toll plaza this is detected by using infrared sensor. Fuse the identification number using RFID modules into the driver's license.This method is also used to find the validity of license.If anyone a car without having license, or traveling with an expired license, they can't cross the toll gate The automatic toll e-ticketing system is the approach used for the vehicle when it reaches the toll plaza, this is detected by using Infrared Proximity Sensor. RFID tags are used to read each vehicle with the help of RFID reader.

An IR receiver is used to receive these pulses and sends it to a controller, which then transmits the vehicle number through the RF transmitter located in vehicle. We assume that vehicles have 16-bit identification numbers. The RFID tags to readers read the signal and information about vehicles owners. These RF signals are received by an RF receiver at the toll plaza, which send data to a computer's parallel port. A software program running on the computer retrieves vehicle details from its vehicle database. Depending on this information, appropriate toll tax is deducted from the pre-paid account of the vehicle's owners.

The owner receives an SMS message on his/her mobile about the details of the payment. If the balance in the owner's account is lo w or if the vehicle is not equipped with an RF system, the toll gate remains close. Next method proposes a very simple method for e nhancing the performance of infrared electronic-toll-collection systems, in such a case, the vehicle owner will have to pay the toll ta

x in case and collect the receipt. We need a system for handling violation and acknowledgement when a vehicle does not have an R FID module installed, a vehicle's ID number is not found in the database, or a driver has insufficient funds to pay toll. If an acknowl edgement is not received in a predefined time from the database, the toll plaza gate remains closed.

Fig 1.1 shows the block diagram of toll collection consist of a

A. Microcontroller
B. RFID reader
C. IR transmitter
D. IR receiver
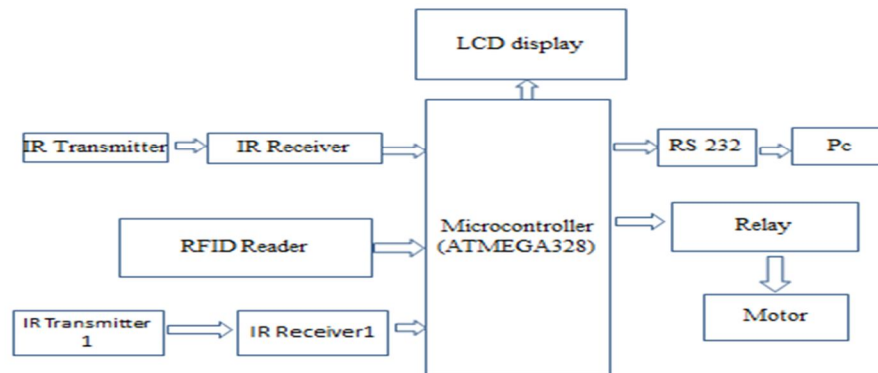E. RS232
F. Motor
G. Relay
H. LCD display
I. Pc

FIG1.1 Block diagram of toll collection

A. *Microcontroller(Atmega 328)*

A microcontroller is a small computer on a single integrated circuit containing a processorcore, memory, and programmable input/o utput peripherals. Program well as a typically small amount of RAM. Microcontrollers are designed for embedded applications, inco ntrast to the microprocessors used in personal computers or other general purpose applications.

B. *RFID*

It is an automatic identification method, relying on storing and remotely retrieving data using devices called RFID tags or transpond ers. The technology requires some extent of cooperation of an RFID reader and an RFID tag.An RFID tag is an object that can be ap plied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves.

C. *Ir Transmitter And Receiver*

The way by which IR transmitter and receiver works is that, one component flashes an infrared Transmitter and receives the signal t hat is present in many different devices, as they are most commonly found in consumer electronics devices. Red light in a particular Pattern, which another component can pick up and translate into an instruction.

D. *RS232*

Recommended Standard - 232 is at telecommunication standard for binary serial communications between devices. It supplies the ro admap for the way devices speak to each other using serial potrs. The devices are commonly referred to as a DTE (Data Terminal E quipment) and DCE (Data Communications Equipment); for example, a computer and modem, respectively.

E. Dc Motor

A brushless DC motor (BLDC) is a synchronous electric motor which is powered by direct-current electricity (DC) and which has a n electronically controlled commutation system, instead of a mechanical commutation system based on brushes. In such motors, cur rent and torque, voltage and rpm are linearly related.

F. Relay

A relay is an electrically operated switch. Current flowing through the coil of the relay creates a magnetic filed which attracts a lever and changes the switch contact. Relay allow one circuit which can be completely separate from the first. For example a low voltage battery circuit can use a relay to switch a 230v AC mains circuit. There is no electrical connection inside the relay between the twoci rcuits, the link is magnetic and mechanical.

G. LCD Display

Liquid crystal display have material,which combine the properties of both liquids and crystals.Rather than have a melting point they have a temperature range within which the molecules are almost as they would be in a liquid but are grouped together in an order fro m similar to crystal.

H. PC

personal computer is fastest electronic calculating machine. Only PC get the binary sequence o and 1

III.   SOFTWARE DESCRIPTION

A. Docklight
1) Simulating serial protocolDocklight can send out user defined sequence according to the protocol used and it can react to incom ing sequence.this makes it possible to simulate the behaviour of a serial communication device,which is particularly useful for generating test condition that hard to reproduce with the origianl device.
2) Logging Rs232 Data All serial communication data can be logged using two different file formats:useplain text format for fast logging and storing huge amount of data or create a HTML file with styed text that lets you easily distinguish between incomin g and out going data or additional information.
3) Detecting Specific Data Sequence In many test cases you will need to check for a specific sequence with in the RS232 data that indicates a problem condition. Docklight manages a list of data sequences for you and is able to perform user defined action aft er detecting a sequence

IV.   RESULTS
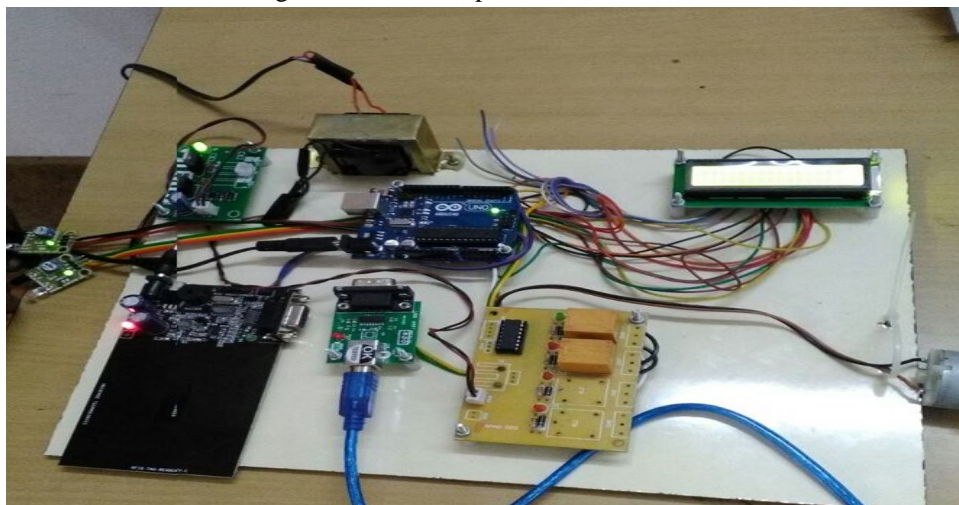Fig 1.2 shows an output of toll collection,

Fig 1.2 overall output of toll collection

V. CONCLUSION

The proposed system is completely digitalized and more efficient to control the traffic at toll plaza so that manual works beingreduced and no one can cross the toll gate without license.

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