RFID BASED RAILWAY TICKET BOOKING SYSTEM WITH MOBILE BASED ARCHITECTURE

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ABSTRACT

In this project, This research paper is based on the concept of automatic ticket vending machine by using RFID and Zigbee technique. In order to ensure the passenger journey with no quarrels and mesh we employ this ticket friend solution that replaces the traditional paper ticketing by RFID tickets and vouchers, vended through automated machine using smart cards, which improves the convenience and security of transaction. Ticket friend solution through automated machine enables the passenger to predetermine the transport details. In this automated system we replace the traditional ticket system by smart card that contains all details of the user including bank account information. This is similar to the atm card. This automatic ticket vending machine consists of display which shows the availability of trains for all destinations. The person can find out the destination place by pressing the buttons available on that machine with the help of zigbee. If the location is selected then the availability of trains along with the time is displayed. If the people confirm to go in certain train, by using smart card the person can receive the tickets employing RFID technique and by showing the ticket in front of the train the door opens automatically and after some predetermined seconds it gets closed

Keywords— RFID, GSM, ARM.

INTRODUCTION

This paper presents an introduction to if any passenger is travelling without any ticket. Railway ticket booking through RFID is better than other technologies.Globalsystemfor mobile communication (GSM) modules and latest high speed Microcontrollers to achieve the desired results. Thus, we have built our system using RFID transponders and readers. The advantage of RFID is that it is a cost effective system which will provide uninterrupted communication in our network even in bad weather conditions.
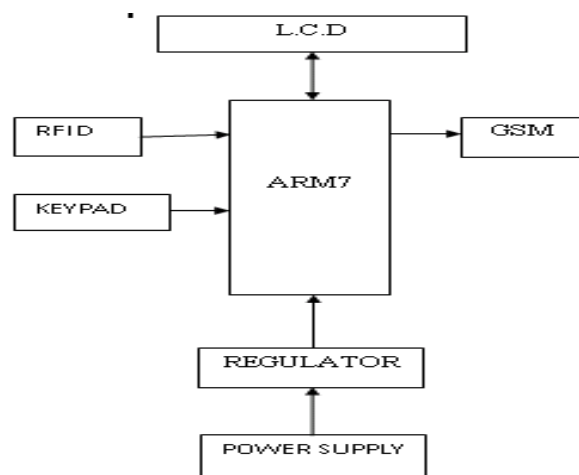
BLOCKDIAGRAM AND OVERVIEW
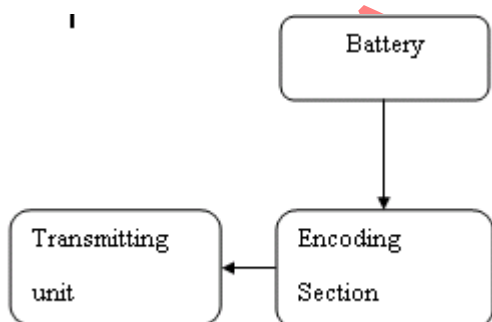
Fig. 1.Block Diagram

CARD SECTION

Fig. 2. Card Section

A.   RFID READERS

High frequency RFID readers are installed above the roads prior to every traffic light system in all directions in such a manner that the entire area comes under the range of RFID reader.

B.   ARM7 HARDWARE

The ARM7 family includes the ARM7TDMI, ARM7TDMI-S, ARM720T and ARM7EJ-S processors. The ARM7TDMI core is the industry's most widely used 32-bit embedded RISC microprocessor solution. Optimized for cost and power-sensitive applications, the ARM7TDMI solution provides the low power consumption, small size, and high

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performance needed in portable, embedded applications. The ARM7TDMI core uses a three-stage pipeline to increase the flow of instructions to the processor. This allows multiple simultaneous operations to take place and continuous operation of the processing and memory systems. The ARM7TDMI core has seven modes of operation:

- User mode is the usual program execution state
- Interrupt (IRQ) mode is used for general purpose interrupt handling
- Supervisor mode is a protected mode for the operating system
- Abort mode is entered after a data or instruction pre fetch abort
- System mode is a privileged user mode for the operating system
- Undefined mode is entered when an undefined instruction is executed.

The interrupt setting of ARM supports the DHLS to response to the interrupt coming from the server section.

UART communication

Serial data communication uses two methods, asynchronous and synchronous. The synchronous method transfers a block of data (characters) at a time while the asynchronous transfers a single byte at a time. It is possible to write software to use either of these methods, but the programs can be tedious and long. For this reason, there are special IC chips made by many manufacturers for serial data transfer communications. These chips are commonly referred to as UART (Universal Asynchronous Receiver-Transmitter) and USART (Universal Synchronous-Asynchronous Receiver-Transmitter). The ARM chip has a built-in UART.

Data transfer rate

The rate of data transfer in serial data communication is stated in bps (bits per second). Another widely used terminology for bps is baud rate. The baud rate used in this DHLS for data transmission is 9600.

RS232 standards

RS232 is the most widely used serial I/O interfacing standard. This standard is used in PCs and numerous types of equipment. However, since the standard was set long before the advent of the TTL logic family, its input and output voltage levels are not TTL compatible. In RS232, a 1 is represented by -3 to -25V, while a 0 bit is +3 to +25V, making -3 to +3 undefined. For this reason, to connect any RS232 to a microcontroller system we must use voltage converters such as MAX232 to convert the TTL logic levels to the RS232 voltage level, and vice versa. MAX232 IC chips are commonly referred to as line drivers.

Transmitting and receiving

Full duplex or simultaneous two-way
Operation is not possible with these modules. If transmit and receive module are in close proximity and data is sent to a remote receive module while attempting to simultaneously receive data from a remote transmit module, the receiver will be overloaded by its close proximity transmitter. This will happen even if encoders and decoders are used with different address settings for each transmitter and receiver pair. If two way communications is required, only half duplex operation is allowed.

Max232:

MAX232 is compatible with RS-232 standard, have dual transceiver. Each receiver converts TIA/EIA-232-E levels into TTL/CMOS levels. Each driver converts TTL/CMOS levels into TIA/EIA-232-E levels. The MAX3232 is characterized for operation from -40°C to +85°C for all packages.MAX3232 is purposed for application in high-performance information processing systems and control devices of wide application.

.C.   *LCD DISPLAY*

LCD MODULE (2X 16 CHARACTERS)Dot matrix LCD modules is used for display the parameters and fault condition.16 characters 2 lines display is used. It has controller which interface data's and LCD panel. Liquid crystal displays (LCD's) have materials, which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal.

  One each polarizer's are pasted outside the two glass panels. These polarizer's would rotate the light rays passing through them to a definite angle, in a particular direction When the LCD is in the off state, light rays are rotated by the two polarizes and the liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent. When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned on a specific direction. The light rays passing through the LCD would be rotated by the polarizes, which would result inactivating /highlighting the desired characters.


Fig. 3. LCD Diagram

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The LCD's are lightweight with only a few millimeters thickness. since the LCD's consume less power, they are compatible with low power electronic circuits, and can be powered for long durations .The LCD's don't generate light is needed to read the display. By using backlighting, reading is possible in the dark .The LCD's have long life and a wide operating temperature range. One of the most popular output devices for embedded electronics is LCD. The LCD interface has become very simple. This is due to the availability modules for LCDs. The LCD along with necessary controller (LCD Controller) and mounting facility is made available in the module itself. The LCD controller takes care of everything necessary for the LCD. We communicate with the LCD controller with the help of a command set provided by the manufacturer.

D.   *GSM NETWORK*:

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz.

THE GSM NETWORK:

GSM provides recommendations, not requirements. The GSM specifications define the functions and interface requirements in detail but do not address the hardware. The reason for this is to limit the designers as little as possible but still to make it possible for the operators to buy equipment from different suppliers. The GSM network is divided into three major systems: the switching system (SS), the base station system (BSS), and the operation and support system (OSS). The basic GSM network elements are shown in below *figure*
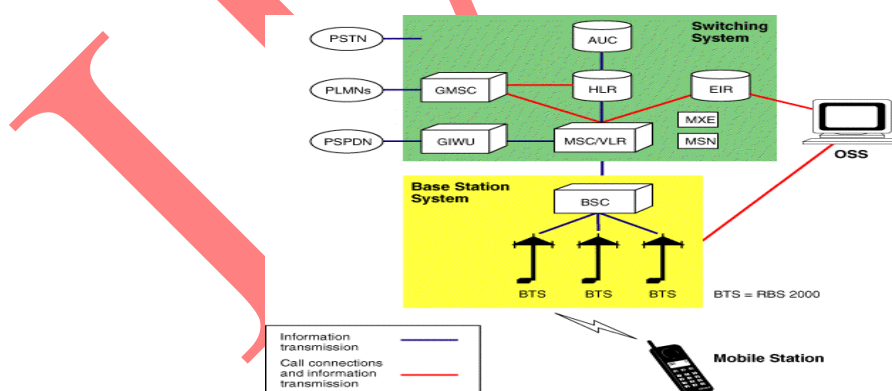
A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves.

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A GSM modem can be an external device or a PC Card / PCMCIA Card. Typically, an external GSM modem is connected to a computer through a serial cable or a USB cable. A GSM modem in the form of a PC Card / PCMCIA Card is designed for use with a laptop computer. It should be inserted into one of the PC Card / PCMCIA Card slots of a laptop computer. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate.

As mentioned in earlier sections of this SMS tutorial, computers use AT commands to control modems. Both GSM modems and dial-up modems support a common set of standard AT commands. You can use a GSM modem just like a dial-up modem.

In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. With the extended AT commands, you can do things like:

- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.

HARDWARE IMPLEMENTION

In our prototype implementation we have used ARM7 microcontroller along with low frequency RFID reader (125 kHz).LCD is interfaced with the microcontroller to display the category of the places from which place to which place. The RFID readers read the information from the tag; this information is fed into the microcontroller unit for the further processing.

RESULT AND CONCLUSION

This paper presents an introduction to if any passenger is travelling without any ticket. IR sensors are used to count the number of persons entering in to train. Each passenger has to be show his/her ticket (RFID) while entering in to train. Controller calculates how many persons are entering in to train having with and without tickets. Person count, who doesn't take tickets, will be sent to internal ticket vending machine. One key pad is provided with Ticket vending machine. Passenger can buy a ticket inside the train by using this machine. Our machine waits for predefined time. After citrine delay, if each and every person having tickets; our machine just ignores it, if it detects any ticket less person automatically message will be forwarded to corresponding T.C with that bogie information and If the person is supposed to consume alcohol that is detected with the help of alcohol sensor and that person is not permitted inside the train.

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