RFID BASED AUTOMATED LOW COST DATA ACQUISITION SYSTEM FORPUBLIC TRANSPORT

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ABSTRACT

In public transport system, particularly in bus collecting ticket is really a problematic issue. Transport Company has to employ one or two personnel for this purpose. They have to knock everybody for this purpose. It is very common practice for few people to travel without ticket or do not give proper fare. Sometimes there is a rough argument during the journey regarding fare. Also bus personnel have to monitor whether a person has purchased ticket or not. Again having no government authority to take control or keep an eye over the whole scenario, the private sectors are creating a monopoly, taking control over the public transport and autocratic raise in bus fare. To overcome this problem, RFID technology can be used. RFID technology has long been recognized as an efficient method for identifying a single entity. RFID technology also provides for greater security in the system. The ticketing systems using RFID can be merged to solve the above mentioned problems.

This paper actually suggests a much more public friendly, automated system of ticketing with the use of RFID based tickets. This system is suitable for megacities like Kolkata where a large no of customers avail public transport system daily.

Keywords : RFID Reader, 8051 Microcontroller and Display Unit

I INTRODUCTION

Radio Frequency Identification (RFID) systems use radio frequency to automatically identify products. TheRFID system contains two parts, Reader and Tag. Ticket friend solution mainly proposed to overcome theproblems in traditional ticketing method liketransferring tickets from one person to anotherto avoid confrontation.This system introduces RFID technology.RFID technology has long been recognized as an efficient method for identifying a single entity. RFID technology also provides for greater security in the system. The ticketing systems using RFID can be merged to solve the above mentioned problems. Automated Fare calculation for Public transport system is an Economic and Management Approach for Transit system. This provides a wealth of resourceful information to everyone with interest in mass transit. All the conventional systems are prepaid system. Another disadvantage is

that the passenger has to carry a smart card and there is no scope of recharge at the bus. This system is postpaid system. So if anybody forgets to bring the card, he can ride the bus easily.

II. RFID SYSTEMFUNDAMENTALS

Basically, an RFID system consists of an antenna or coil, a transceiver (with decoder) and atransponder (RF tag) electronically programmed with unique information. There are many different types of RFID systems in the market. These are categorized on the basis of their frequency ranges. Some of the most commonly used RFID kits are low-frequency (30-500kHz), mid-frequency (900kHz-1500MHz) and high-frequency (2.4- 2.5GHz).

2.1 RFID Antenna

The antennaemits radio signals toactivate the tag and read/write data from/to it. It isthe conduit between thetag and the transceiver,which controls the system'sdata acquisition and communication.Theelectromagnetic field produced bythe antenna can be constantly presentwhen multiple tags are expected continually.If constant interrogation is notrequired, a sensor device can activatethe field.The readeremits radio waves in the range of 2.5cm to 30 meters or more, dependingupon its power output and the radio frequency used. When an RFID tagpasses through the electromagneticzone, it detects the reader's activationsignal. The reader decodes the dataencoded in the tag's integrated circuit(silicon chip) and communicates to thehost computer for processing.

2.2 RFID Tag

It comprises a microchip containingidentifying information about theitem and an antenna that transmitsthis data wirelessly to the reader. Atits most basic, the chip contains a serializedidentifier or license plate numberthat uniquely identifies that item(similar to bar codes). A key difference,however, is that RFID tags havea higher data capacity than their barcode counterparts. This increases theoptions for the type of information thatcan be encoded on the tag; it may includethe manufacturer's name, batchor lot number, weight, ownership,destination and history (such as thetemperature range to which an itemhas been exposed). In fact, an unlimitedlist of other types of informationcan be stored on RFID tags, dependingon the application's requirements.RFID tag can be placed on individualitems, cases or pallets for identificationpurposes, as well as fixed assetssuch as trailers, containers and totes.

2.3. Electronic product code (EPC) Tags :

EPC is an emerging specification for RFID tags, readers and business applications. It represents a specific approach to item identification, including an emerging standard for the tags—with both the data content of the tag and open wireless communication protocols.

2.4. RF transceiver

RF transceiver isthe source of RF energy used to activateand power the passive RFID tags.It may be enclosed in the same cabinetas the reader or it may be a separatepiece of equipment. When providedas a separate piece of equipment, thetransceiver is commonly referred to asan RF module. RF transceiver controlsand modulates the radio frequenciesthat the antenna transmits andreceives. The transceiver filters andamplifies the backscatter signal from apassive RFID tag.

III BLOCK DIAGRAM OF THE SYSTEM

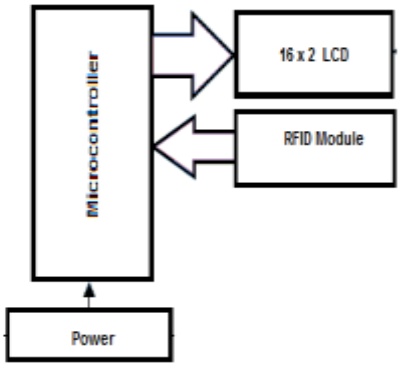


Fig 1

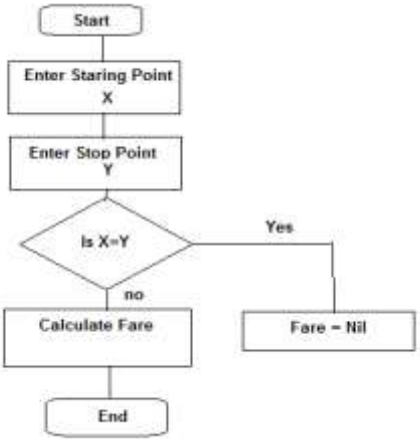
IV CIRCUIT OPERATION

The RFID tag is used as an identity for a particular user. If the identity (serial number of the tag) of the user is matched with the one already stored in this system, he gets the actual fare of the travelled distance. This RFID based is a secured access system with many additional features. For example, a new passenger's databasewill be installedinto the system. A registered passenger can also withdraw his entry from the system in case of mistake. These features can be accessed by pressing a tactile switch connected to the microcontroller.

In beginning, the user is prompted to scan his tag or ID which will be given to him through a smart card. The information regarding starting of the journey will be stored into the system.At the end of the journey, passenger has to produce the smart card to the system. The serial code of the tag is identified by the reader module and is sent to AT89C51 for checking. If the ID is matched by the microcontroller, the user will the amount of the total fare .

A new passenger needs to press the switch to register after which his identity is verified twice with RFID tag. The new record is stored by the microcontroller. Again the verification is carried out and the user is deleted after his journey will be over.

V RESULT



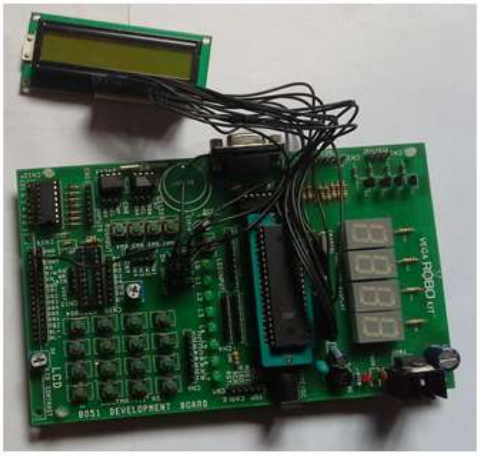
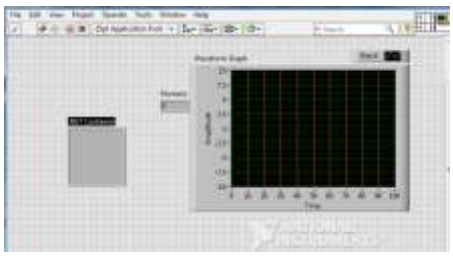


Fig 2 BLOCK DIAGRAM **Fig 3 PART OF THE CIRCUIT**

Passengers have to carry a RFID based card that will have a unique ID number. Information regarding starting point will be stored into the card. According to the route distance between departure & destination as well as considering bus type, it will calculate the ticket fare. If a passenger is given the card mistakenly (passenger‘s destination is not in the same route, then no fare will be calculated. The passenger has to submit the card immediately). During get down, passenger has to submit the card. The information regarding fare will be displayed based on total distance travelling. Data regarding bus stoppage will be updated after every stoppage. This is a postpaid system. After the days trip, from the system the total amount of money collected will be displayed.

VI ANALYSIS



Siimulation in LABView 2014

The program is written in C language. Then it is converted into hex file using KEIL software. For simulation part, I have used LABView 2014 evaluation version whose picture is shown above.

VII CONCLUSION

All the conventional systems are prepaid system. Another disadvantage is that the passenger has to carry a smart card and there is no scope of recharge at the bus. This system is postpaid system. So if anybody forgets to bring the card, he can ride the bus easily. The manual fare collection system has many issues which are overcome by our proposed system. Automated fare collection system for public transport is an innovative idea which reduces man power.Itis believed that by implementation of these system problems such as underutilization of buses fleet will be reduced. So bothpassenger and bus station administrators will benefit fromthe system as Real time information are provided. The ticketing systems using RFID can be merged to solve the above mentioned problems. This project actually suggests a much more public friendly, automated system of ticketing with the use of RFID based tickets. This system is suitable for megacities like Kolkata where a large no of customers avail public transport system daily.

REFERENCES

Journal

[1] Qing-Jie Kong, Yikai Chen, and Yuncai Liu,(2009) "A fusion-based system for road-network traffic state surveillance: a case study of shanghai," IEEE Intelligent Transportation Systems Magazine, vol. 1, no. 1, pp. 37-42.

[2] Sheng, Q.Z., Li, X. and Zeadally, S. (2008) “Enabling Next-Generation RFID Applications: Solutions and Challenges”, IEEE Computer, Vol 41 No 9, pp 21-28.

[3] S.ArchanaMala ,Mrs.N.Leela – “ Automated Fare Collection System for PublicTransport Using GPS ” – IJIRSET , Volume 3 ,January 2014

Conference Proceedings

[1] Ben AmmarHatemHamamHabib ,” Bus Management System UsingRFID In WSN”,European and Mediterranean Conference on InformationSystems 2010(EMCIS2010) April 12-13 2009, Abu Dhabi, UAE

[2] Md. FoisalMahediHasan, GolamTangim, Md. Kafiul Islam, Md.RezwanulHaqueKhandokar,ArifUlAlam,” RFID-based Ticketing forPublic Transport System: Perspective MegacityDhaka”.

[3] Ran HeeJeong, and Laurence R. Rilett (2004) “The Prediction of BusArrival Time Using AVL Data”, Transportation Research Board 83rd Annual Meeting, Washington D.C.