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AUTOMATIC BUS FARE COLLECTION SYSTEM USING RFID

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Abstract— Automatic Fare Collection System implemented by RFID /Smart card . RFID card is given to the passenger and when passenger gets into the bus he has to swipe the card in the RFID reader and he has to a destination point in the device will automatically calculates the fare and deduct the money automatically .Hence people do not have to carry the money and they don't have the problem in giving the right change to conductor. Conductor also feels free in collecting the money from the people. All the record will updated automatically in the server continuously. When more people are travelling than it's also easy to give the ticket. A based web-page monitors the bus for amount path taken bus status number of passengers distance information . It overcomes all the problems faced in bus with IOT based web-page monitor system.

Index Terms: Internet Of Things(IOT),Network Security,Radio Frequency Identification(RFID).

I. INTRODUCTION

Automated fare collection (AFC) systems are used in many urban public transport systems around the world. As the designation suggests, these are typically designed with the specific purpose of automating the ticketing system, easing public transport use for passengers and adding efficiency to revenue collection operations. In addition, AFC systems are used to enable integrated ticketing across different public trans-port modes and operators in urban areas. This chapter gives you an introduction about the Internet of Things and its real time applications. The main idea behind this project is to collect the fare automatically using the Internet of Things in a cost efficient manner.Internet of Things allows objects to sensed and controlled remotely across existing network infrastructure.

II. LITERATURE REVIEW

Literature review was carried out throughout the whole project to gain knowledge and improve the skills needed to complete this project. The main sources for this project are previous related projects, research thesis, books, journals and online tutorials. This chapter focuses on the basic concepts and all fundamental theories which related to this project and the drawbacks of the current system.

III. EXISTING SYSTEM

In general way, every bus is controlled by a conductor. The conductor will collect money from each passenger and issue ticket. Initially, printed papers or tokens are used as tickets. Nowadays, handheld machines are used to print tickets. This system has many disadvantages. The passenger have to carry the ticket till the reaching their stopping, the conductor should ensure that everyone has got the ticket, the time taken for ticketing is comparatively more and more amount of paper is needed to print the Ticket. For example, if a passenger wish to travel in bus. He has to carry money with them. Then conductor will collect the money and he will give ticket. This has to repeat for all passengers. This will take more time and waste of human resource as well as energy. The data relate to an AFC system integrated with an automatic vehicle location system that records a transaction for each passenger boarding a bus, containing attributes regarding the route, the vehicle, and the travel card used, along with the time and the location where the journey began. Some of these are recorded for the purpose of allowing on board ticket inspection but additionally

enable innovative spatial validation features introduced by the methodology.

IV. PROPOSED METHODOLOGY

A. The Internet Of Things in Automatic Fare Collection

An Automatic Fare Collection System (AFC) is one of basic station equipment that consists of automatic gate machine, a ticket vending machine and the ticket checking machine. In this application, a stable and integrated platforms are necessarily to keep passenger flow run smoothly at an a peak hours; at the same time, all data will be gathered and transmitted into server.

B. RFID Based Automatic Bus Ticketing

In Recent advancements in various technologies have made remarkable developments in various fields for public welfare and public transport is one such area. In near a future public transport bus system with advanced technologies like Radio Frequency Identification Device (RFID), and RF modules will gain spotlight due to their advantage of higher convenience and greater life standards as compared to the conventional bus systems. The study brings out improved Solution in terms of cost, convenience, user satisfaction and future implementation.

C. Related Theory

Automatic bus fare collection will be working based on following components. As an electrical device, the computer needs power in order for its components to operate properly. The device is responsible for supplying power to the computer . In short, we could say that the main function of the power supply is to convert alternating voltage (AC), which is supplied by the electrical power system into continuous voltage (DC). In other words, the power supply converts the conventional 220V alternating voltage into a continuous voltage used by the PC electronic components. we will use “220 V” voltages will converted into +5V. The power supply is also present in the PC cooling process. A Micro-controller is a IC chip that executes programs for controlling other devices or machines. If your microwave oven has an LCD screen and a keypad, it contains a micro -controller. All modern automobiles contain at least one micro-controller. We use devices made up of Liquid Crystal Displays (LCD) like computers and digital watches. CRT draws more power than LCD and are also bigger and heavier. All of us have seen an LCD, but no one knows the exact working of it. A Radio frequency identification (RFID) uses electromagnetic fields that automatically identify and track tags attached to objects. The tags contain electronically stored information. Passive tags collect energy from a nearby RFID reader's interrogating radio waves. A wireless Wi-Fi adapter connects a computer without wireless hardware to a wireless network by transmitting a Wi-Fi The adapter receives signals from a wireless router or other wireless devices and it translates the signal, so the computer user can access the Internet at any time they are in range of a Wi-Fi hot-spot or wireless network. A PHP means Hypertext Preprocessor (PHP) is a programming language that allows web developers to create a dynamic content that interacts with databases. PHP provides mysql connect function to open a database connection .The passenger and bus details have to be maintained by mysql database.

V.DESIGN METHODOLOGY

This implementation is aimed at a real time usage of Automatic Fare Collection system and does not compromise on the security. It guarantees us that the proposed project is simple, efficient and cost effective.

A. Problem Definition

There are a number of reasons why wi-fi might be the real pick.

1. Wi-fi technology is economical.
2. Users compatibleness is considered and given more preference

B. Methodology

RFID has been an emerging technology in recent years. RFID consists of two components,RFID Tag and RFID Reader. RFID Tag contains information such as name, address and mobile number. RFID reader reads the above informations from the RFID Tag. IR sensor is used to count the number of persons entering into the bus. Internet of Things define the concept of network devices to sense and collect data from the world around us, and then share that data across the Internet where it can be processed and utilized for various interesting purposes.

C. The Internet Of Things(IOT)

In IOT is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. An Internet of Things allows objects a sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and the computer-based systems resulting in improved efficiency, accuracy and economic benefit. Each thing is uniquely identifiable by its embedded computing system but is able to inter-operate within the existing Internet infrastructure.

D. Implementation

This chapter discusses the implementation of each module in this project.
The proposed project consists of these modules.

- Hardware collection and assembly
- Experimentation and result

✓The module 1 involves the collection of hardware needed for the completion of this phase.
✓It also includes mounting of ultrasonic sensors to the PCB.
✓The module 2 incorporates the coding needed for the distance measurement.
✓The module 3 is the phase where the sensor input is taken into account for calculating the distance of the obstacle.

E. Hardware Collection and Assembly

1.Power Supply

Almost all basic household electronic circuits need an unregulated AC to be converted to constant DC, in order to operate the electronic device. All devices will have a certain power supply limit and the electronic circuits inside these devices must be able to supply a constant DC voltage within this limit. That is, all the active and passive electronic devices will have a certain DC operating point (Q-point or Quiescent point), and this point must be achieved by the source of DC power. The best method used is in the form of an unregulated power supply –a combination of a transformer, rectifier and a filter.

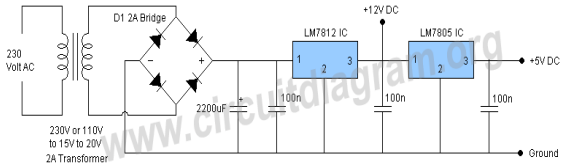


Fig 5.1:Power Supply

2.Micro Controller

Micro-controller is heart of the system. It has number of features and its controlled over all process we can write code and load the controller for control real time application processes.

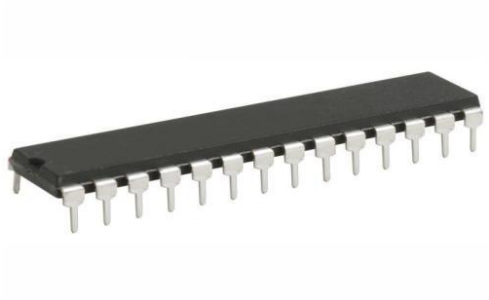


Fig 5.2:Micro Controller

A timer module used to allow the micro-controller to perform tasks for certain time periods. A serial i/o port to allow data to flow between the controller and other devices such as a PIC or another micro-controller. An ADC used to allow the micro-controller to accept analogue input data for processing.

3.Liquid Crystal Display

LCD, or Liquid Crystal Display, is the fundamental display technology used by monitors, televisions, tablets and smart-phones. They are thinner and lighter and draw much less power than cathode ray tubes (CRTs).LCD (liquid crystal display) technology is used for displays in notebook and other smaller computers.

Fig 5.3:Liquid Crystal Display

Like light-emitting diode (LED) and gas-plasma technologies, LCD display the information to be to much thinner than cathode raytube(CRT) technology. LCD consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it.

4.The Concept of Smart Card

Hardware component and software that are used to implement the RFID. The hardware includes reader, tags, printer and host computer. While software part is the application that used to run the RFID system, which probably is middleware. RFID reader consists of an antenna, transceiver and decoder, which sends periodic signals to inquire about any tag in vicinity.

Fig 5.4:Smart Card

On receiving any signal from a tag it passes on that information to the data processor. These tags can be either active or passive. While the active tags have on-chip power, passive tags use the power induced by the magnetic field of the RFID reader. Thus passive tags are cheaper but with lower range (<10mts) and more sensitive to regulatory and environmental constraints, as compared to active tags. The RFID device serves the same purpose as a bar code that provide a unique identifier for the object, but it was a scanning technology rather than using radio signal.

5.RFID Reader

A radio frequency identification reader (RFID reader) is a device used to gathering the information from the RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items.

Fig 5.5:RFID Reader

VI.EXPERIMENTATION AND RESULT

A. SETTING UP HARDWARE

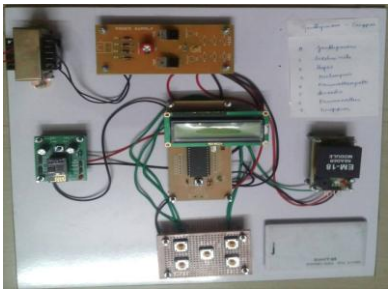
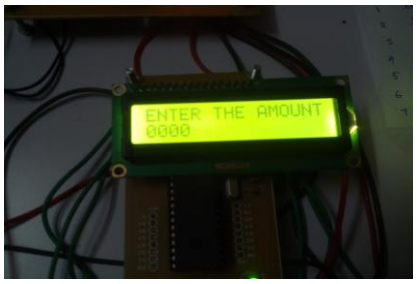


Fig 6.1:Setting up hardware

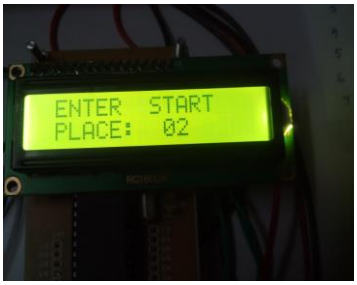
The hardware sample use different wiring. Micro-controller contains full implementation of a standard microprocessor.Light emitting diode used for displaying information about the ticket processing A wireless Wi-Fi adapter connects a computer without

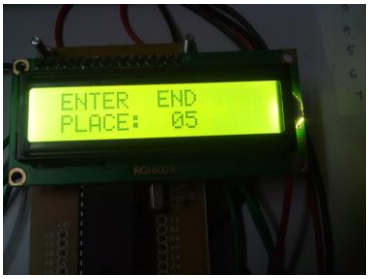
wireless hardware to a wireless network by transmitting a Wi-Fi The adapter receives signals from a wireless router or other wireless devices. There are three module has been implemented in this hardware sample.

First module is designed for recharing amount in Rfid.We can enter how much amount we want by paying the money.



Second module designed for entering the traveling details. we want to enter the starting and destination place based on that the travelling distance will be calculated and amount will be extracted from the smart card.





Third module for checking the available balance in our RFID.

B. .SETTING UP SOFTWARE

A PHP means Hypertext Preprocessor (PHP) is a programming language that allows web developers to create a dynamic web page .login from which requires admin name and password.In this project we are using Adobe dreamweaver software for generating the website. Adobe dreamweaver is a proprietary web development tool and it is a part of cloud. Adobe dream weaver is the all-in-one visual development tool for creating,publishing and managing the websites.

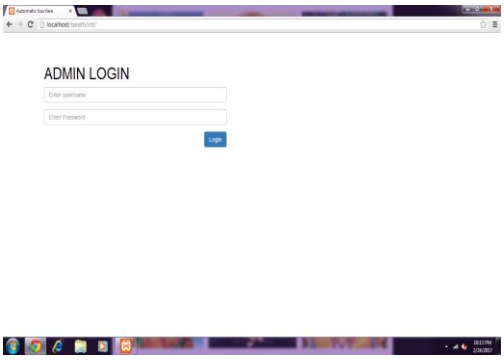


Fig 6.2:Login

The php code has two module one is view buses and another one is logout. when we will click view buses it will show all bus images .logout option is used to exit from the admin web-page**.**Each bus have separate hardware sample for automatic bus ticketing. Wi-Fi The adapter receives signals from a wireless router or other wireless devices and it translates the signal, so the computer user can access the Internet at any time they are in range of a Wi-Fi hot-spot or wireless network. PHP provides mysql connect function to open a database connection .The passenger and bus details have to be maintained by mysql database

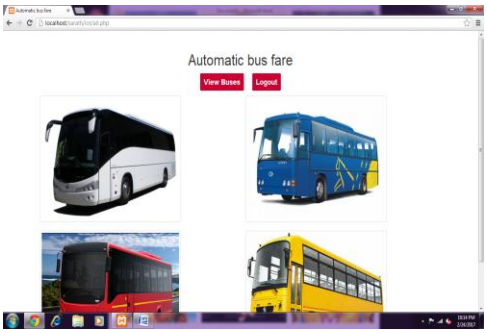


Fig 6.3:View buses

All the details will be updated automaticaly by using network Passenger details has the details of passenger id,name,starting place and destination place and how much amount required for travelling and details of balancing amount.

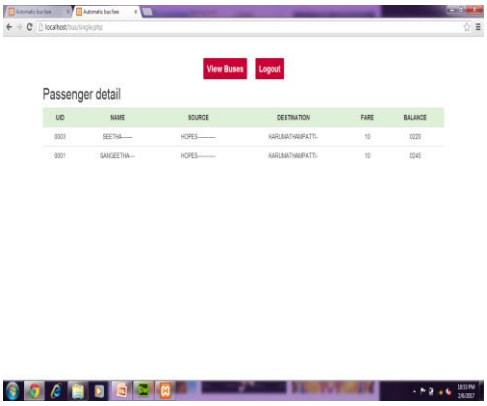


Fig 6.4:Passenger details

Passenger details has the details of passenger id,name,starting place and destination place and how much amount required for travelling and details of balancing amount.

VII.CONCLUSION

The fare collection problem has been eliminated Moreover, the project phase is completed successfully by using smart card .This project is made with pre-planning, that it provides flexibility in operation. This innovation has made more desirable and economical. This project **"AUTOMATIC BUS FARE COLLECTION SYSTEM USING RFID "**" is designed with the hope that it is very much economical and helpful for passengers and as well as conductors during Journey

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