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RFID Based Smart Master Card

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Abstract: *The report presents a system which is automated for ticketing and based on passenger identification. This is a user-friendly system, which automatically identifies the user's fare according to the path travelled. Radio Frequency Technology has been proven the best for many industrial Applications. RFID technology refers to where the data is digitally encoded in a tag and it is read by the reader through the radio waves. RFID tag contains electronic information stored in it. The unique ID in the RFID cards are stored in a database with the help of the internet along with personal data and creates accounts for every person. By accessing the account, it is possible to identify the user, check his/her account and deduct the fare from his/her account. In this project, an effort is taken to develop the existing smart card system by adding few new features to the ticketing system. In this study with the smart card system for ticketing of bus, train and metro we have used an android application which is connected to the system for tracking the location of the user after the transaction and the transaction message is sent to the user and its guardian as a backup data.*

Keywords: Smart Cards, RFID, Bus Ticketing, Train Ticketing, Metro Ticketing, Universal Pass, Public Transport

I. INTRODUCTION

The transport system remains the major source of income in most of the developing countries like India. But now faces malfunction and security problems. Controlling the traffic is one of the important and the major issues. There is a lot of confusion between the passengers regarding fares which lead to quarrels and corruption at that moment.

The ticketing system suggested in this prototype model will not only automatically deduct the passenger's fare according to the path covered but also detect the passenger's identification. It is seen when RFID cards can be used to make the transaction and travelling very precise. This project basically deals with the identification and ticketing of the passengers travelling by the bus, metro and train. RFID has been an evolving technology in recent years. RFID technology can be effectively seen in a number of applications. The system of RFID consists of two components: the reader and tag. RFID has a great advantage as it is considered to be an integral part of Internet of Things (IoT).

For enhancing the system, we use 3D printing technology which prevents rusting and it is easily accessible. The whole system acts to bring out the consistency in the transport system and that will conclude in uniform access of the system of passengers in daily journey through an automated server being updated every time the passengers travel.

The main hindrance of using public transport in our daily life is uncertainty of waiting at the stops or in long queues, there are also ticketing problems and malfunctions which causes chaos at the stops and stations. So our developed smart master card would solve our problems and reduce the time that we spend at stations in long queues.

In the existing system the transportation has less transparency and less security which do not meet the passenger needs. It ensures that every passenger should have a printed ticket throughout the journey. This will take more time and waste human resources as well as energy. Even handheld ticketing machines are comparatively slow and need a trained person to operate it.

The main motive behind usage of RFID Card technology is reusability which is more efficient than the traditional paper-based ticketing system. It will not only eliminate the human efforts required for fetching, but it will also contribute to the seamless travel experience.

This project provides the concept of e-currency and it reduces the human effort. To implement this smart card, RFID technology is used to detect the smart mastercard and the distance travelled by the passenger and keep a check source and destination of the user. In our daily life, we travel by public transport and we face problems like long queues for tickets and

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chaos at the stations. So this smart master card would solve our problems and reduce the time that we spend at stations in long queues. Also, we look forward to reducing the frauds by our proposed system which ensures maximum safety and security. The system which gives fare calculation and transaction providing-tickets via messaging stating the status of transaction via messages to the user and guardian on the registered mobile number. The Card reading system in our system will be 3d printed using PLA material, as it is the most evolving technology in future.

II. Circuit Diagram

A circuit is actually any loop through which matter is carried. For an electronic circuit, the matter carried is the charge by electronics and the source of these electrons is the positive terminal of the voltage source .When this charge flows from the positive terminal, throughout the loop and reaches the negative terminal, the circuit is said to be completed. However this circuit consists of a number of components which affects the flow of charge in many ways. Some may provide hindrance to the flow of charge, some simple store or dissipate charge. Some require external source of energy, some supply energy.

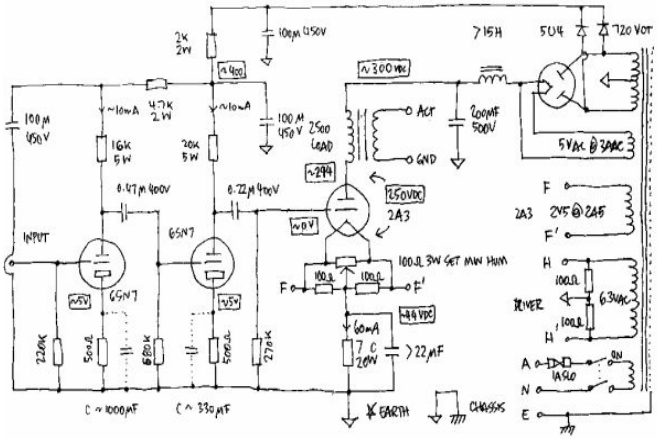

Figure 1: Circuit design

III. Hardware & Requirement

LCD, RFID CARD READER, RFID CARD, Resistors, Capacitors, Push Button, Crystal Oscillator, Cables & Connectors, Diodes, PCB, LEDs, Transformer / Adapter.

IV. Study Area

Radio Frequency Identification (RFID) is a generic term for technologies that use radio waves to automatically identify and track product, animal, or person by means of using RFID tags that are applied or incorporated on them. An RFID system consists of For the purpose of Bus Identification, the tags are embedded into the bus. Each bus will have two tags: one is at front and other is at rear. The front tag will inform the reader about its arrival to the bus stop whereas the rear one informs its departure. Each bus will also have a reader that is connected to the main server for charging of ticket fare from the passengers through a keypad attached with the reader on which the passengers give the information of their departure & destination locations. The reader sends the electromagnetic waves to the tag. The tags draw the power from this wave and return back the bus information, which are stored in its memory to reader. The readers again demodulate this wave and convert it as a digital data. For the purpose of Ticketing, the operational feature of the cards is almost the same but here the tags are attached to special cards carried by the passengers and the reader collects the detail from them. By using RFID technology in ticketing system, allowing passengers to "tag on" and "tag off" and be charged automatically, according to how many zones they have travelled. a tag, basically a microchip with an antenna and an interrogator or reader with an antenna. Most RFID tags contain at least two parts. One is an integrated circuit for storing and processing information, modulating and demodulating a radio-frequency (RF) signal, and other specialized functions. The second is an antenna for receiving and transmitting the signal. The reader It sends out electromagnetic waves. The tag antenna is tuned to receive these waves. A passive RFID tag draws power from field created by the reader and uses it to power the microchip's circuits.

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The chip then modulates the waves that the tag sends back to the reader and the reader converts the new waves into digital data.

V. Operational Principle of Proposed System

Considering from the arrival of a bus at the bus stoppage, the reader will read the RFID tag attached to the front side of the bus that is denoted as the front tag. Thus the reader will have the idea of the bus and also the route of the bus along with the arrival time. Also the reader being connected to the main server, the data will automatically transfer to the server database. The screen in the bus stop will notify waiting passengers about the arrived bus and its route. All the passengers will carry a prepaid system RFID based card that will have a unique ID number. The card is rechargeable from certain electronic booths placed at certain locations of the city. The RFID based ticket will contain some a group of data. The passenger trying to get on board will have to place the RFID ticket in front of the reader attached to every bus. The reader will detect the tag and require certain information from the passenger. According to the route distance between departure & destination as well as considering bus type, it will calculate the ticket fare and deduct the credit from the RFID tag based ticket electronically. The sample information stored in the database about the route distance & credit unit.The complete detection algorithm is described in detailed in the later part. After all the passengers getting on board, the bus will leave the stoppage and the reader will detect the rear tag attached to the bus. The reader will send the information to the server and also to the screen showing the departure time of the bus. If a agency has a bus service that the buses come after each 20 minutes, from the screen above the waiting passenger will surely know when the last bus departed and after how long the next bus is coming. After the whole day, the individual bus reader will know how much credit has been transferred to the corresponding account and also the information can be found in the main database. Cross checking of all those information will allow better monitoring.

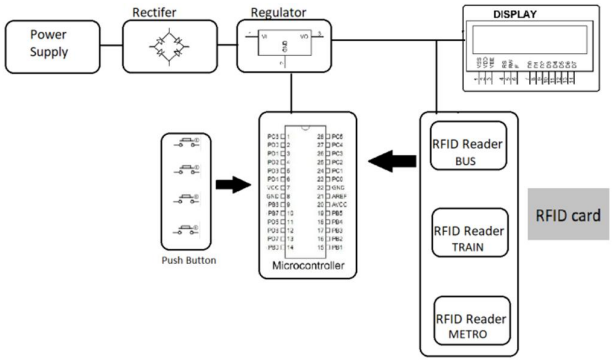

Figure 2: Proposed System

VI. Conclusion

The system is expected to be fully automated, reliable, transparent and convenient. The cards being reusable, they are much more convenient compared to the paper-based ticketing system. The card also can be used to be a universal travel pass card that will allow any transportation on any route. Any unwanted events can be avoided as all the people carrying RFID tickets are monitored every time they travel. In future we can use the similar card by modifying at shopping mart, toll, parking, etc.

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