

TAP2PAY¹K.RAJU, ²B.BALA KRISHNA, ³MD.ASMA, ⁴V.RITHIKA REDDY, ⁵S.PRIYANKA¹Assistant Professor, Dept. of ECE, CMR COLLEGE OF ENGINEERING & TECHNOLOGY²Assistant Professor, Dept. of EEE, CMR COLLEGE OF ENGINEERING & TECHNOLOGY³Assistant Professor, Dept. of CSE, CMR COLLEGE OF ENGINEERING & TECHNOLOGY⁴⁻⁵B-TECH, Dept. of AIML, CMR COLLEGE OF ENGINEERING & TECHNOLOGY**Abstract**

Nowadays the public transportation system like the metro are well advanced. Passenger safety, convenience and the need to improve the performance of existing public transportation is driving demand for intelligent transportation system in the market. The paper-based ticket system for collecting the bus fare has been found to be a source of major financial loss in India. It is difficult to assure the purchase of ticket by each and every passenger. A paper ticket becomes useless to the passengers when the destination is reached. Hence, we propose an automated card driven system using RFID for bus journeys in India. Hence people do not have to carry the money and they don't have the problem in giving the right change to conductor. 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 be updated automatically in the server continuously. When more people are travelling than it's also easy to give the ticket. This project reduces the time for issuing tickets, eliminates the use of paper tickets and exchange of cash.

1. INTRODUCTION

Transportation plays a key role in the most of the people routine's life. Modes of Transport can be individual and group. Railways, Roadways and Airways are the most common forms of group transportation. Since roadways reach each nook and corner of most of the places, road transport preferred by most of the commuters. Bus Transport provides last mile connectivity in group transportation

and takes the public to the nearest location of their final destination. Passenger Buses play a key role in the life of a common man and is the lifeline of transportation of every state government. The Government of Telangana has subsequently established Telangana State Road Transport Corporation (TSRTC), on 27.04.2016, under the Road Transport Corporation Act, 1950. The Corporation is operating 10,460 buses from 97 Depots. There are 364 bus

stations in the State. The Corporation's buses cover 35.29 lakhs KMs. and carry 100.03 lakhs people to their destinations every day. They connect 9377/844 villages/Hamlets to all major towns and cities in Telangana State which constitutes 92% of Road Transport. TSRTC operates to City and Mofussil areas. The Corporation's buses also ply to important towns and cities in the neighbouring States of Andhra Pradesh, Karnataka, Maharashtra, Goa, Odisha, Chhattisgarh and Tamil Nadu. For conventional paper-based ticket and online electronic ticketing machine, there are problems like use of papers, proper tender exchange, giving ticket to each and every passenger at the peak hours and there is a chance of passenger going ticketless. During peak hours these problems might result in verbal fight between passenger and ticket collector. This project travel card using RFID will eliminate the above-mentioned problems for both bus passes and daily travel through conventional tickets. The passenger can collect the travel card from the transport corporation as a one-time procedure and he/she can choose the amount to be added. Once the passenger travels with the travel card, there is no need for money exchange, showing proof of authentication. Amount will be deducted from the travel card based on the

source and destination. Hence it reduces the problems raised in conventional method.

2. RELATED WORK

This literature studies the various technologies that are used worldwide in the automatic fare collection systems (AFC). The research papers which are published on the similar topic use the similar technology which is the RFID based system. The RFID based system are based on the smart cards. The papers also suggested the usage of the GPS technology which would calculate the distance and the fares can be calculated according to the distance travelled. In our project, our setup includes the usage of RFID Technology. The Radio-frequency identification (RFID) is a wireless technology that uses low frequency radio signals ranging from 3 kHz to 300 GHz in order to transfer small bits of data between RFID devices. An RFID device consists of two fundamental components: tags and readers. The communication between the reader and the tag is achieved via the transmission of electromagnetic waves. A reader is used to magnetize the tag and decode the information from the tag. Tags store and process information stored in it. A reader emits radio frequency signal which interacts with the tag. This energizes the pin or bar code producing its own magnetic field with a unique interference

pattern which corresponds to a unique number which is read by the tag. RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and enter those data directly into computer systems with little or no human intervention. RFID tags contain an integrated circuit and an antenna, which are used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time.

3. IMPLEMENTATION

An RFID based fare collection system which has a wide range of application to improve the current existing fare collection systems in our country. The problem posed thus is used to implement a system that is capable of transferring trip details to the database stored in the servers and also deduct the fare according to the predefined destination codes. A microcontroller is used to implement the control circuit which in turn logs the trip details into the database very efficiently. The key objective of our project

is to design an RFID based fare collecting system, which is user-friendly in a cost effective way. We aim for our system to be capable of performing cashless transactions of bus fares which would reduce the ticketing frauds and verbal fights between the passenger and the conductor.

Hardware Requirements:

- NODEMCU – ESP8266
- 16 X 2 LCD Display
- I2C Module
- MFRC522 RFID Reader
- 4 X 4 Matrix Keypad
- PCF8574 I/O Expander
- Jumper Wires
- Piezo Buzzer

Software Requirements:

- Arduino IDE
- HTML5
- BOOTSTARP
- PHP
- PHPMYADMIN
- MySQL

An RFID based fare collection system is a system where the transactions of bus fares are through Radio frequency Identification cards. The fare is deducted as balance from the RFID cards. The primary benefit of using RFID is because the RFID technology is robust. It can work at extreme temperatures and harsh environment. This system works at a

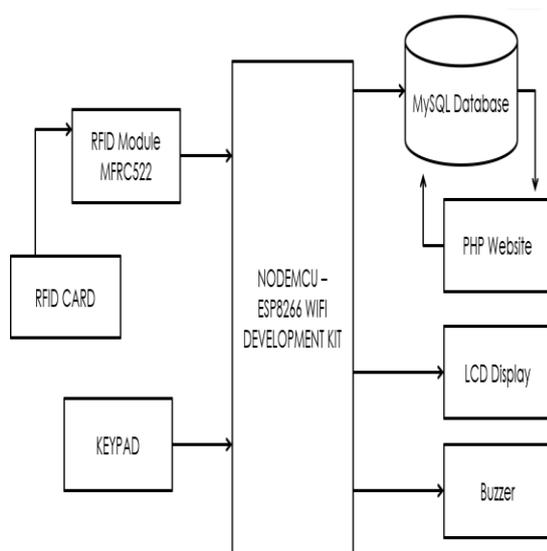
remarkably high speed, even in adverse conditions that makes it suitable for rough usages. The tags are available in different shapes, sizes, types, and materials. The information on the read-only tag cannot be altered or duplicated. Read-write tags can be used repeatedly. The RFID tags always read without any error. Direct physical contact between the tags and the reader is not required for the system to work. Radio frequency (RF) technology is used for communication using RFID. Multiple tags can be read at the same time. The tags can be read in a bulk of 10 to 100 tags at a time. Reading is automatic and involves no labor.

4. EXPERIMENTAL RESULTS

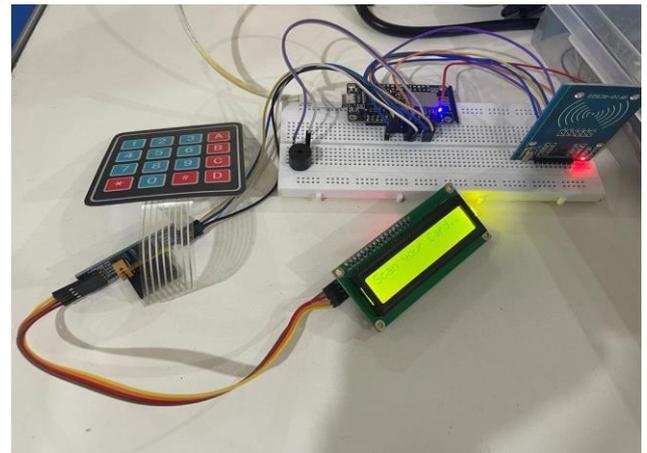
This “TAP2PAY” an RFID based fare collecting system uses the Nodemcu – Esp8266 wifi development kit board, 16 X 2 LCD Display, Keypad, Piezo Buzzer, RFID Reader Module(MFRC522), RFID card. In this project Nodemcu board was selected since it is cheaper than Arduino Uno boards and also have many additional features than ArduinoUn boards. The Nodemcu development kit has wifi connection capabilities and can run at low input voltages which is power efficient. In the Setup, the keypad, RFID reader Module and LCD Display is connected to the Nodemcu Board. When the RFID card is scanned to the RFID reader, it stores the

unique card Id in the microcontroller. That unique Id is compared with the database in the server. The destination code has to be entered with Keypad and meanwhile the balance in the card is checked in the database server. If there is sufficient balance then it displays the confirmation display and available balance on the lcd display and delivers a beep sound using buzzer. Hence through this setup we can achieve faster and simple transaction of fares in the public transportation systems. In this, for the above-mentioned problem statement we are making a RFID based fare collection system which is called as “TAP2PAY”. In this project RFID reader is used to read the information stored in the RFID card like the unique ID’s of the card. The project employs a keypad and LCD Display. The keypad is used to enter the destination code and the LCD display is used to display the desired prompted messages like available balance, status of the transaction etc. All the Devices like Buzzer, LCD and Keypad are connected to the Nodemcu WIFI development kit through GPIO pins. The RFID Reader Module communicates with Microcontroller through SPI Protocol. The Nodemcu is to be connected to the wifi to post the data to the database server and display it on the dedicated website. In this project, MFRC522 module for reading

the RFID cards which will return a unique ID. These Unique IDs are added to the user database and certain amount of balance is stored respective to the card information. When the card is scanned it compares the unique IDs in the Database and the balance is fetched. The conductor enter the destination code with the keypad on the machine. If there is sufficient balance then the ticket will confirmed and fare will be deducted and is logged to the database which can be viewed through a dedicated website. All the user messages are displayed using the 16 X 2 Lcd display in the machine. On Successful scans and ticket confirmation the user is alerted by buzzer. Through this way we can get cashless transaction for fares at public transportation systems.



Schematic Diagram



Prototype

5. CONCLUSION

In this project, we have focused on two things – RFID based bus ticketing. 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. The manual fare collection system has many issues which are overcome by our proposed system. “TITLE” is an innovative idea which reduces man power. It is believed that by implementation of these system problems such as underutilization of buses fleet will be reduced. So both passenger and bus station administrators will benefit from the 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 smart Embedded System can be implemented in the transport system, which will perform the fare collection automatically. This project "TITLE " 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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