



## RFID AND OTP BASED SMART TICKETING CARD FOR PUBLIC TRANSPORTATION, TOLL, PARKING

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**Abstract**— In this paper, Buses, trains, metros, and private automobiles are among the many modes of transportation available in today's cities. Each mode of transportation now has its own way of collecting fares, making it a time-consuming procedure for consumers to keep track of fares for each mode of transportation. As a result, we suggest a smart master card system that connects all of these systems and enables for a single master card and centralized system for all modes of transportation. We employ three RFID scanners to showcase this notion as bus, train, and metro train smart card scanners, respectively. We now utilize a single smart card that is compatible with all of the platforms. We now provide a fourth card, the master smart card, which can be used on all three scanners, allowing the user to utilize any mode of transportation they want with the same card. This is comparable to an ATM card. If customers indicate that they want to take a specific bus, they can acquire tickets using RFID technology by flashing the ticket in front of the bus, which opens automatically and closes after a specified amount of time. 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 person 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.

**Keywords:** RFID, Transportation, Smart Card.

### I. INTRODUCTION

A Smart Ticketing system has its benefits while many people may argue that a switch to paperless will be more expensive, in terms of software and hardware requirements than the traditional paper-based system. Going paperless not only has a huge

impact on the environment but also saves costs of ink, paper, labor costs associated with it. By taking into consideration the above parameters, a smart ticketing system using a combination of RFID technology, GSM microcontroller. RFID has proven to be one of the most promising technologies in recent years and can be effectively employed in various applications since it is economical and widely used tool for tracking and locating purposes. A reader will be attached to both ends of the bus. This Reader System is a combination of RFID Reader which serve the main purpose of detecting the RFID cards carried by the passengers, Microcontrollers and GSM technology.

The microcontrollers used in this system is ATmega328P which is responsible for communicating with the RFID reader. Every RFID card is encoded with a unique identification number. The RFID cards used in this system are passive RFID tags which unlike active tags that require an internal power supply. These tags have a read range up to 10m. The frequency of the RFID Reader MFRC 522 is 13.56 MHz and its read range is between 10 cm – 1 m. These cards are detected by the reader with the help of electromagnetic fields created between them. While the cards are detected by the reader a micro controller is responsible for fetching the details from the reader system about the balance and bus stations.

### II. RELATED WORK

Nandini M S, Manisha, Pooja D, Poonam Sharma, Ramya M [1] in this paper highlights that the Radio Frequency Identification (RFID) card is used to make the identification of passenger and transaction very precise. RFID cards are distributed among the public. The personal details of the passengers will be collected through which account

will be created and RFID cards with Unique identification number will be issued to each user or passenger. Through this database, identification of traveler, verification of traveler and deduction of fare is achieved from their respective accounts. The user will swipe the card only once when he/she get into the bus.

**Vitthal Waghmare, Rushikesh Santre, Piyush Gupta, Rudull Redijj** [2] focuses in this paper RFID as associate economical methodology, by not giving the price tag within the style of paper instead collecting the fare from it in line with their distance travelled and it additionally reduces the consumption of papers that are used for printing the tickets because the traveller is often carrying the RFID. The RFID contains the data of the passenger and additionally the fare is debited from it. The passengers carrying the RFID are suggested to swipe it within the RFID reader, so the fare is collected from it, but the minimum amount is not fixed. And Bluetooth technology is also available.

**Prafulla P S, Hema K J, Kalavathi S N, Sharath S, Manikanta G** [3] shows in this paper that RFID reader is used to identify the passenger, and uses the database to monitor balance, fare etc. GPS is used to find source place and destination place to calculate the fare and internet access is provided to update the database but doesn't focuses on GSM. [7], [8].

### III. EXISTING SYSTEM

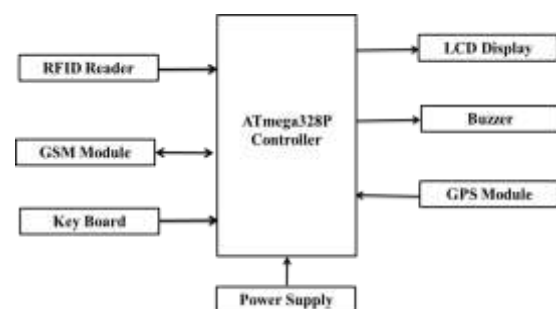
In the existing system Survey Every bus will have a conductors, he will be collecting the money from the passenger and then issues the printed tickets. This requires the passenger to carry the money and more amount of paper is used to print the tickets. The fluctuations of the ticket fare are a major problem. This system overcomes these problems. It regulates standard fare collection in all buses.

In the existing method has less transparency and security, which does not suit the expectations of passengers. It guarantees that every passenger has a printed ticket for the duration of the voyage. This will take more time and squander human and energy resources. Even portable ticketing machines are sluggish and require a qualified operator to use. The primary impediment to taking public

transportation in our everyday lives is the unpredictability of waiting at stops or in lengthy lines; there are also ticketing issues and faults that generate commotion at stops and stations. So our designed smart master card would address our difficulties and save the time we spend waiting in huge lines at stations.

### IV. PROPOSED SYSTEM

The proposed system the primary reason for using RFID Card technology is reusability, which is far more efficient than the old paper-based ticketing system. It will not only reduce the need for human retrieval, but it will also contribute to a seamless travel experience. This initiative introduces the notion of e-currency and lowers human work. RFID technology is utilized to identify the smart master card and the distance travelled by the passenger, as well as to maintain track of the user's source and destination. In our everyday lives, we use public transportation, toll, parking, Shopping malls and encounter issues such as long ticket lines and commotion at train stations. So this smart master card will solve our difficulties and save us time waiting in huge lines at stations. In addition, we hope that our suggested approach, which assures maximum safety and security, will help to decrease fraud. The system that calculates fares and provides tickets via messaging, informing the user and guardian of the transaction's status via messages sent to the registered cell phone number.



**Figure:** Proposed Block diagram

As depicted in the figure above, the ATmega328P microcontroller forms the central part of the architecture which interacts with the RFID Reader, GSM modem and LCD. The RFID card or tags

which are issued to the passengers interacts with the RFID readers by tapping on the RFID Reader. The following are the functionalities provided by the components of the architecture.

- RFID Reader reads the RFID cards or tags which is issued to the passengers and calculates the fare according to number of stations travelled by the passenger.
- RFID tags are issued to the Passengers. These tags or cards are tapped on the Reader placed at the door while entering and getting down the bus. The RFID cards are also placed at bus stations.
- ATmega328P is used as both microcontroller and database which stores the information of passengers, bus, bus stations, bus fare and so on. It interacts with RFID reader, GSM modem and LCD in order to perform its function.
- And every transaction its generates the separate OTP.
- GSM modems are used for transmitting messages to the users regarding the balance in the RFID or Smart card & send the location every transaction.
- LCD is used as a display device or output device which displays the information regarding the user when the card is tapped.

Buzzer is used to notify the user and conductor when the user transaction in his card.

## V. RESULTS

In this paper microcontroller was used, to perform the various operations the several circuits are designed and interfaced to the microcontroller. The signal received from the GSM module is converted by using TTL logic circuit.



**Figure:** Hardware Kit

## CONCLUSION

The system should be totally automated, dependable, transparent, and user-friendly the card may also be used as a universal travel pass, allowing access to any mode of transportation on any route. Unwanted incidents may be prevented since everyone who travels with RFID tickets is tracked at all times. In the future, we will be able to use a similar card by altering it at shopping malls, toll booths, parking lots, and other locations. With few or no modifications, the entire system may be employed in highway vehicles, toll payment systems, and railway ticketing systems. The cards are far more handy than the paper-based ticketing



system since they are reusable. The card may also be used as a universal travel pass, allowing access to any mode of transportation on any route. Unwanted incidents may be prevented since everyone who travels with RFID tickets is tracked at all times. Also, the prospects for minimizing traffic bottlenecks and confusion in bus stops, which we frequently encounter in cities, are enormous.

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