AUTOMATED TICKETING AND BUS TRACKING SYSTEM USING RFID

Abstract- **The present ticketing system in public transport is tedious and has many drawbacks , such as malfunction, malicious arguments among public ,corruption and also many people travel without paying .All these lead to unnecessary wastage of time and resources .Hence considering these drawbacks, in this paper a much more efficient and user friendly ,automated ticketing system along with bus tracking system by using RFID is proposed .The system is designed to be cost effective deployable on short term but open for easy extension.**

INTRODUCTION

Radio-frequency indentification (RFID) is the use of a wireless non contact system that uses radio frequency electromagnetic fields to transfer data from a tag attached to an object, for the purpose of automatic indentification and tracking .

The present paper based ticketing system has its cons and also no prior notification of arrival and departure of transports are available creating a lot of confusion among passengers. The tracking and ticketing system using RFID can be merged to solve the prevailing problems .RFID based tickets is proposed as it is low cost ,easy operation ,portability, durability, reliability and very user friendly.

Public carrying RFID based electronic tickets will have access to any bus service of the city only on scanning his card on the scanner attached to the bus .Also the display screens at every bus stop will notify the passengers , the departure and arrival time of the buses in the route .This automated system will save time , have a higher authoritative inspection and reduce chaos and confusion on the road.

SYSTEM DESCRIPTION

The proposed system has two functions automated ticketing along with bus tracking system. Firstly let us consider automated ticketing. Each passenger will be given a RFID tag unique to their indentity.

In the particular card personal details like name, address ,phone number will be stored and also along with this a account information is stored in the card .The card is rechargeable from certain electronic booths placed at certain locations of the city .Each bus will have RFID scanners attached at the entrance and exit doors the passengers are supposed to scan their RFID cards while boarding and while exiting from the bus .As soon as the passenger scans his card while boarding his unique id number is stored and location is noted in the database ,say the passenger travels and now his destination has come now the passenger has to scan his card to exit from the bus. Based on the

number of zones travelled by the passenger the fare is automatically deducted from his account and new balance is stored in his card. The sample information stored in the database about the route distance and fare system is shown in Table-1. At the initial boarding of the passenger when he scans for the first time the amount in his account is checked in order for the passenger to travel in a given route he should posses a fixed minimum amount below which he would not be eligible to travel.

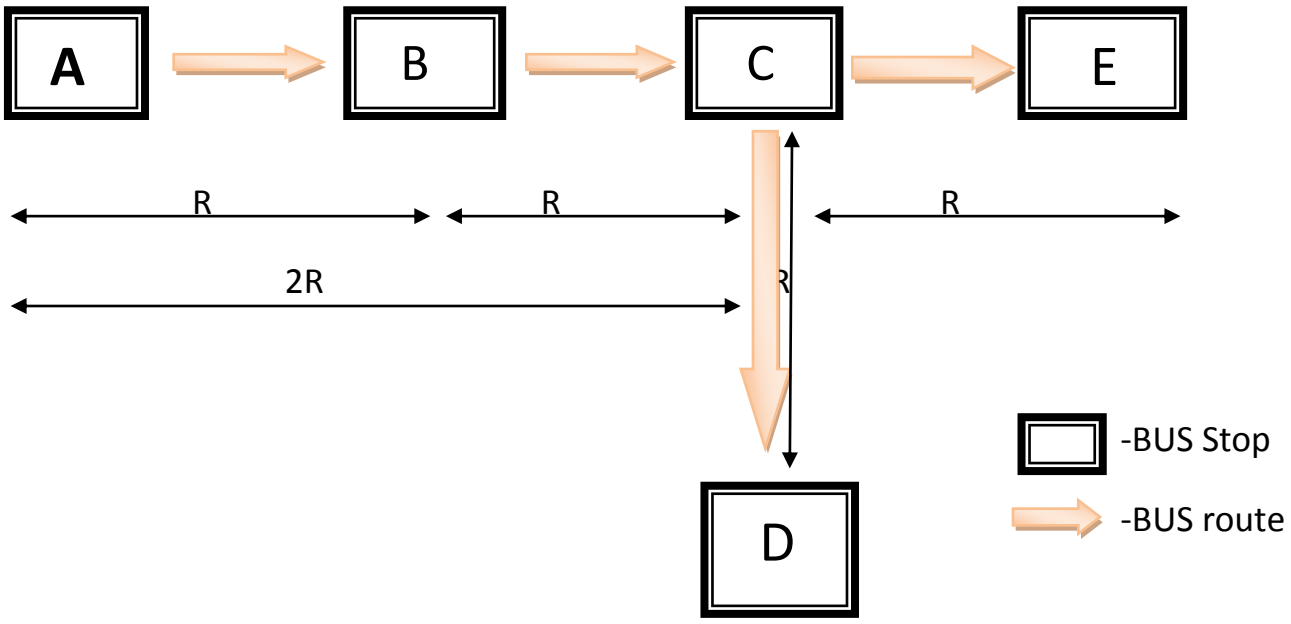


Figure-1 **Distances between different bus stops in a bus route.**

Start location	End location	Distance	Ticket fare(credit)
A	B	R	2x
A	C	2R	4x
A	D	3R	6x
A	E	3R	6x
B	C	R	2x
C	E	R	2x

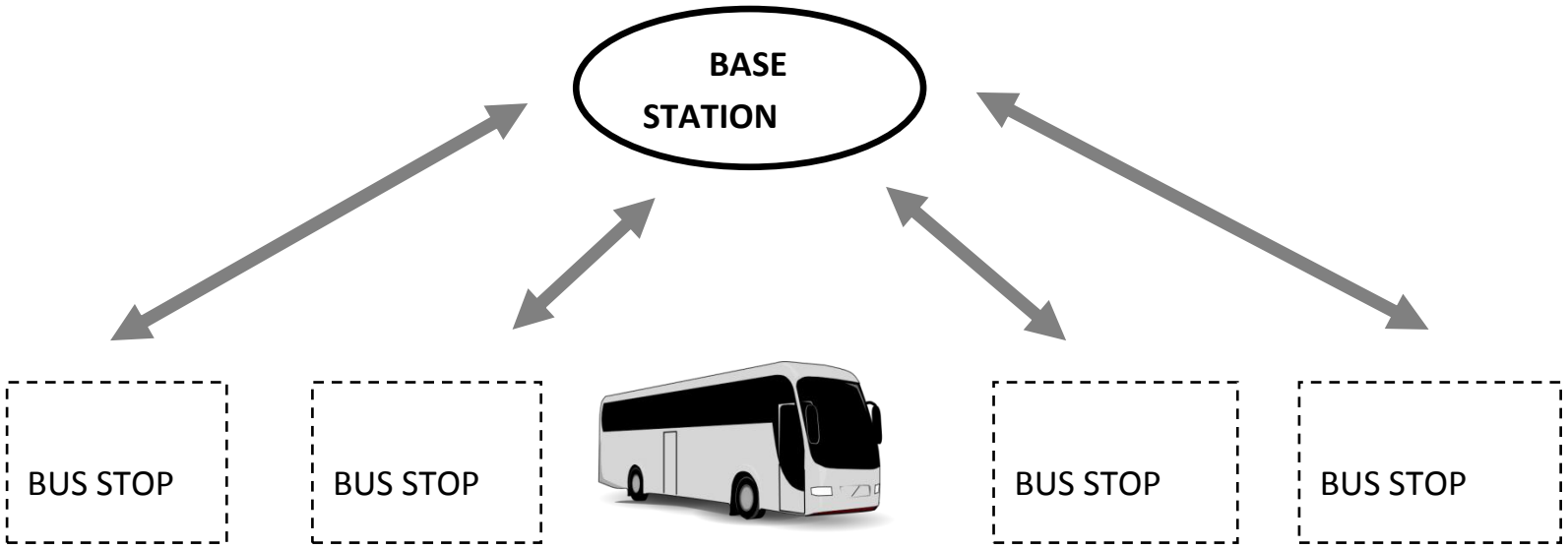
Table-1 **Sample data to calculate bus fare for a particular route.**

Bus tracking system – All the buses will have a RFID tag fitted on the outer side at the front end and at the rear end of the bus there will be a RFID scanner. The RFID tag at the front is fixed so that it

is scanned by the RFID scanners placed at each bus stop.All the details of the bus and its route details will be stored in the card .The RFID scanner at the rear end on the bus is fixed to scan the RFID tag which will be placed at each bus stop containing details of the location and zone of the stop and other route details .Hence this tag is detected when the bus departs from a particular bus stop. This helps the bus system know its location in its route. Based on the location information acquired from each bus stop the automated fare system is governed.

There will be a base station where all the database is monitored .There will be constant data exchange between various bus stops to the base station and vice versa. Let us consider an example of a bus travelling in a particular route when the bus departs from its 1st stop RFID scanner at the bus stop scans the tag gets the information about the bus .Now based on the departure time of the bus , the status of this bus is updated in all other bus stops falling in this route and also is updated to the base station using wireless communication. At each bus stop there will be display boards displaying information about buses arriving or travelling in the route along with their time .All the details of the bus arriving and departing in various stops along with their time is updated to the base station for better monitoring of the system and can also be used to schedule buses accordingly.

And also using the information collecting in the base station an SMS service can also be governed from which passengers can get to know the status of the bus in which they want to travel in.



<u>Figure-2</u> Schematic representation of data transfer in the system.

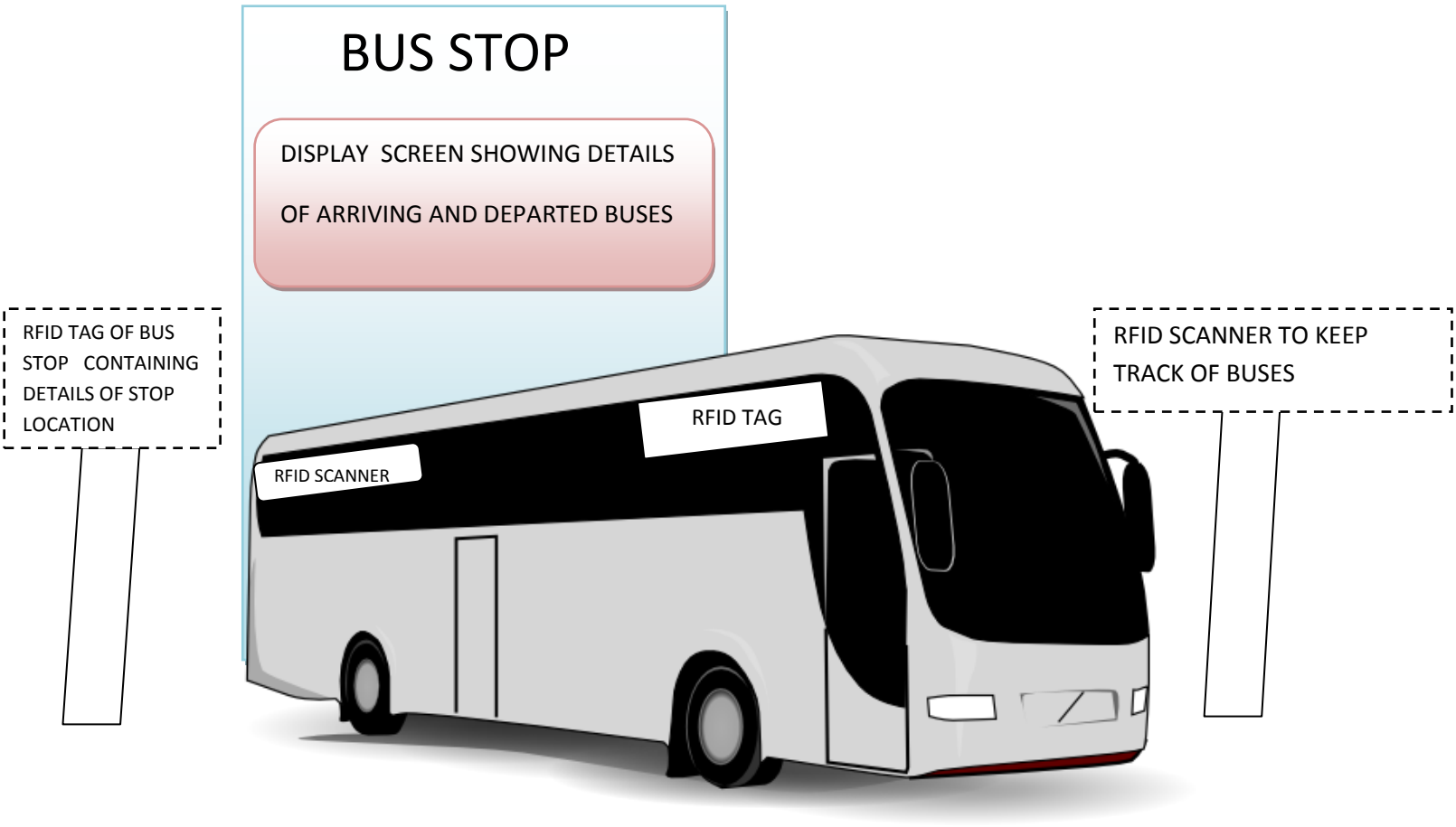


Figure-2 Diagram representing the setup of bus stop .

CONCLUSION-

The system is expected to be fully automated , reliable, transparent and convenient .The whole system can also be used in vehicles on highways, their toll payment and in also in railway systems with modifications accordingly. The card being reuseable , they are much more convenient compared to present paper based ticketing system. The card can also be used as a universal travel pass card.Also this system reduces traffic jam and chaos in the transport system .

COMPONENTS

Components that the project needs are as follows

1. Arduino Uno or MEGA

Arduino is a single-board microcontroller, intended to make the application of interactive objects or environments more accessible .The hardware consists of an open-source hardware board

designed around an 8-bit Atmel AVR microcontroller, or a 32-bit Atmel ARM. Pre-programmed into the on-board microcontroller chip is a boot loade that allows uploading programs into the microcontroller memory without needing a chip (device) programmer .Arduino is chosen for the following reasons and also simple and easy to interface with all kinds of sensors.

Figure-4 Picture of arduino uno.

2. RF SECTION

RF Transmitter Module – This will send data using RF communication which is received by the receiver

RF Receiver Module- This will receive the data which is transferred from the transmitter device. It also works similar to the transmitter module.

Encoder-The HT12E IC is a 4bit encoder which encodes the input data applied on it.

DECODER-The IC HT12D (18 pin) is a decoder that converts serial data into parallel which is received by the RF Receiver module.

3.RFID Scanner

The **NSK125 series** RFID Proximity OEM Reader Module has a built-in antenna in minimized form factor. It is designed to work on the industry standard carrier frequency of 125 kHz.

This LF reader module with an internal or an external antenna facilitates communication with Read-Only transponders—type UNIQUE or TK5530 via the air interface. The tag data is sent to the host systems via the wired communication interface with a protocol selected from the

module Both RS232 and Wiegend Protocal

The LF module is best suited for applications in Access Control, Time and Attendance, Asset Management, Handheld Readers, Immobilizers, and other RFID enabled applications.

Features

- Output- TTL or Wigand26
- Plug-and-Play, needs +5V to become a reader
- Buzzer indicates tag reading operation
- Compact size and cost-effective

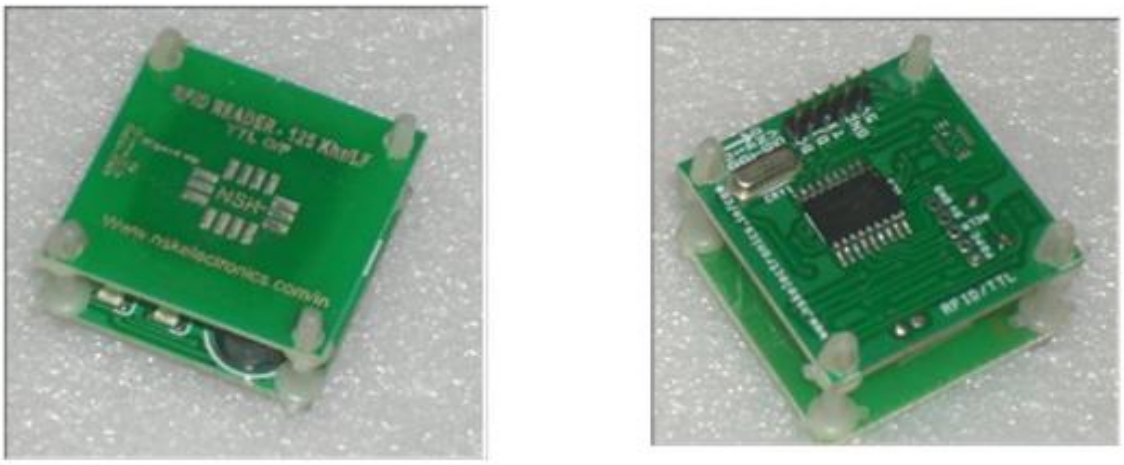


Figure-5 Picture of RFID scanner

4. RFID TAGS

Figure-5 Picture of RFID tags .

5.OTHER Components – Other components which may be required for the project accordingly .

References – Internet .

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