Estimation of Fare Collection and Count Determination in Public Transportation

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Abstract—Transport is a very important part of India's economy. Conveyance remains the primary mode of transport for many of the population, and India's conveyance systems are among the foremost heavily utilized in the planet. This method focuses on enhancing the usability and productivity of existing bus facility in Indian cities. During this sector, by means of victimization RFID technology within the public transportation systems towards the chase of passengers once they board and exit buses. The higher than system planned has been valid victimisation RFID that performs automatic fare assortment and passenger's count. this can be associate degree user friendly system, which can mechanically determine the traveler and deduct the passenger's fare in keeping with the amount of stations cosmopolitan. The cards being reusable, ar rather more convenient compared to paper primarily based ticketing system. RFID cards ar distributed among the general public. The distinctive ID within the RFID cards ar hold on within the information in conjunction with their personal information and creates account for every person. By accessing this information, it's therefore potential to spot the individual, check his/her account and deduct the fare from their account, additionally to the higher than options, this method may also notice traveler overload associate degree provides an estimate for count of passengers within the bus which can overcome the matter of ticketless coiffure passers. Footboard accidents are prevented because the doors ar mechanically closed as shortly because the bus starts from the station.

Keywords—RFID, LCD, Automatic fare calculation, Embedded C, Safety.

I. INTRODUCTION
PTS remains the foremost supply of financial gain in most of the developing countries like Asian country. however PTS currently faces severe malfunction and numerous security issues.
First, there's lots of confusion between the passengers concerning fares that cause quarrels and corruption. additionally to the current, these days there's a severe security crisis in PTS thanks to anti social components. The user friendly automatic ticketing system urged during this paper won't solely mechanically discover the passengers fare per the stations lined however conjointly discover the passengers identification. this can be doable by use of RFID cards and automatic fare calculation, and may be wont to build the dealing and travel terribly precise [5]. This paper essentially deals with the identification and ticketing of the passengers travel by the bus. the thought of exploitation RFID in PTS was antecedently advance by totally different personalities. however the system projected here stays nearer to a future ticketing system than the rest. RFID has been AN rising technology in recent years. RFID technology will be effectively used in variety of applications thanks to its preference for efficiency[2]. As for its application, its been a good unfold tool for each following the transit transports. A elementary system of RFID consists of 2 primary components: The reader circuit and also the tag. There area unit 3 forms of tag one.Active RFID two.Semi Passive RFID three.Passive RFID. Active RFID is taken into account to be most costly than the opposite sorts.

The remainder of the paper contains the subsequent sections: Sections two contains a number of the connected works that area unit referred; Section three discusses the projected work; Section four presents the results achieved at the side of discussions; Section five provides the conclusion at the side of the restrictions, followed by the longer term work that would be additional to the tactic.

II. RELATED WORKS
There has been a varied works exploitation RFID in several fields. There are a unit multiple ways being expressed otherwise. principally supported the technology used.
RFID (radio frequency identification)is a technology that includes the utilization of magnetic force or static coupling within the radio frequency(RF) portion of the spectrum to unambiguously establish Associate in Nursing object, animal, or person. RFID is coming back into increasing use in business as an alternate to the code. The advantage of RFID is that it doesn't need direct
contact or line-of-sight scanning. RFID is usually known as dedicated short vary communication (DSRC).

A. property URBANIZATION—THE ROLE OF ICT IN town DEVELOPMENT
This is the urban century—for more folks worldwide reside in urban areas than rural for the primary time in recorded history. The urbanization trend picked up pace within the twentieth century and has accelerated since. Whereas in 1950 solely concerning thirty p.c of the world’s population lived in cities, these days the figure is over fifty p.c. By 2030, the UN expects over sixty p.c of the world’s population to measure in cities. With the urban populations of Asia and continent set to double between 2000 and 2030, going forward, this trend is anticipated to be dominated by developing economies.

B. INTELLIGENT AGENT primarily based RFID SYSTEM FOR ON-DEMAND BUS programming AND TICKETING
The public facility wants some amendment for satisfying the travelling wants of the final public. These systems area unit operated by state run authorities or by personal parties. The commuters face challenges as so much as accessing the general public transportation facility as required [6], this can be principally attributed to the static programming of bus visits, inside some pattern, notwithstanding fluctuations in commuters demand. this can be quite common in several countries and Jamaica isn’t exception during this respect. There has been quite a quantity of analysis work disbursed in exploitation frequency Identification (RFID) technology publically facility towards pursuit of passengers whereas they board and exit the bus. analysis has additionally been disbursed on pursuit passengers possessing RFID enabled revolving credit and store in central locations for future viewing if want be, that a privacy concern is admittedly. additionally analysis has been disbursed in exploitation RFID technology towards pursuit of buses by deploying RFID sensors at traffic stop lights, intersections, etc., for change bus point that user will read in his cellular phone [3]. additionally analysis is being conducted in exploitation mobile agents with RFID technology towards traveller demand and carrying capability [4]. it's so clear from literature accessible on the topic that there has been no work rumored thus far in dynamic programming of buses supported traveller demand by suggests that of RFID usage. thus our planned analysis work would get on dynamic programming of buses from the purpose of read of traveller pursuit pattern, which might be noted and enclosed in coming up with and programming by suggests that of intelligent agents.

C. TRANSIT revolving credit data processing FOR traveller ORIGIN data EXTRACTION
The machine-driven fare assortment (AFC) system, additionally referred to as the transit revolving credit (SC) system, has gained a lot of and a lot of quality among transit agencies worldwide. Compared with the traditional manual fare assortment system, Associate in Nursing AFC system has its inherent blessings in low labor value and high potency for fare assortment and dealings knowledge repository [10]. though it's potential to gather extremely valuable knowledge from transit SC transactions, substantial efforts and methodologies area unit required for extracting such knowledge as a result of most AFC systems don't seem to be at the start designed for knowledge assortment. this can be true particularly for the Peiping AFC system, wherever a passenger’s boarding stop (origin) on a flat-rate bus isn't recorded on the arrival scan. To extract passengers’ origin knowledge from recorded SC dealings data, a Markoff process primarily based Bayesian call tree algorithmic program is developed during this study. exploitation the time unchangeableness property of the Markoff process, the algorithmic program is any optimized and simplified to possess a linear procedure quality. This algorithmic program is verified with transit vehicles equipped with world positioning system (GPS) knowledge loggers. Our verification results incontestable that the planned algorithmic program is effective in extracting transit passengers’ origin data from SC transactions with a comparatively high accuracy [1]. Such transit origin knowledge area unit extremely valuable for transit system coming up with and route improvement.

D. PERFORMANCE analysis OF radio frequency RFID TECHNOLOGIES FOR REAL TIME traveller RECOGNITION IN IPTS
machine-driven traveller pursuit publically transportation systems is wont to estimate the short demand and, thereby, to optimize the fleet schedule in real time. It may also be wont to verify the origin—destination matrix and to take care of statistics of every passenger’s transportation habits over time, so facultative enhancements in long coming up with [7]. However, ubiquitously pursuit passengers throughout a network needs the flexibility to acknowledge them at single locations within the network. during this paper, we tend to study the deserves of realizing this task by suggests that of radio-frequency identification (RFID) technologies. Forty volunteers carried RFID tags of the norm EPC Gen2 in their rucksack, folder, pouch, and hand during a mockup of a bus door
equipped with four reading antennas. Setups with one and 2 rows of persons walking through the portal were evaluated [8]. The RFID tags were embedded in covered synthentic cards. solitary ticket tag entrenched by means of one EPC Gen2 tag and dual-tag cards that additionally contained a standard Mifare tag were used. Recognition statistics of passengers for all the mixtures of 1, two, three, and 4 antennas area unit bestowed. the popularity percentages area unit in the main influenced by the antenna position and graph and by the line-of-sight conditions between the tag and also the antennas.

E. PAID automobile PARKING
The RFID primarily based system may also be wont to management the entry and exit of cars into parking system, exploitation the RFID tag. The tag is used as a credit automobile|mastercard} wherever the parking quantity is subtracted and consequently the car gets entry to the management unit consequently deducts the quantity} from the cardboard and shows the parking lot number on the display

F. MOBILE ENABLED BUS pursuit AND TICKETING SYSTEM
It has been found that quite a quantity of analysis work has been disbursed, during this sector, by the approach of exploitation RFID technology within the public facility towards the pursuit of passengers after they board and exit buses. additionally analysis has additionally been disbursed in exploitation GPS towards the pursuit of buses along side RFID technology at traffic lights, bus impede, meeting point etc and present predictable influx times on alphanumeric display screen at bus stops along side their current positions.

G. sensible pursuit SYSTEM for college BUSES
This analysis tested the relevance of frequency identification(RFID) technology in pursuit and observation kids throughout their trip to and from college on college buses. the kid safety system developed during this analysis utilised the passive RFID pursuit technology attributable to its economical pursuit capabilities, low value and simple maintenance. To explore the technical feasibleness of the planned system , a group of tests were performed within the science lab and with the general public.

III. PROPOSED SYSTEM
In the planned system we have a tendency to square measure attending to implement automatic fare assortment model for conveyance victimisation RFID. mechanically bus stops are intimated to the traveler depends upon the RF signal. we will simply calculate the whole range of passengers within the bus by the utilization of IR combine. It conjointly notifies the passengers in voice (show card) for debiting quantity based mostly upon their move distance well ahead in moment. IR intelligence constituent reckoning the admission and way out and cherished accommodate handiness in LCD.

Salient options
• Easy to make sure 100 percent ticketing
• Reduce man power
• Easy to access

IV BLOCK DIAGRAM
The figure one.1 shows that the passengers enter the bus by victimisation their RFID cards. The RFID reader acknowledges the distinctive ID of the traveler and displays the data on the LCD. The count is calculated with the assistance of entry and exit sens
tors. The proximity sensing element is employed for dominant the gap and shutting of doors. The RF receiver within the bus receives the signal emitted from the transmitter within the stop. The voice module intimates following station info.

BUS STOP STATION
The RF transmitter in every station encodes the data and transmit it to the receiver with the assistance of relay drive.

The planned system has many modules. The elaborate clarification of the system are often obtained from the modules namely:
- Microcontroller(AT89S52)
- RFID Reader and UART
- Entry and Exit sensors
RF transmitter and receiver
show and Voice
Relay Circuit

A. Microcontroller(AT89S52)
The AT89S52 could be a low-power, superior CMOS 8-bit microcontroller with 8K bytes of in-system programmable non-volatile storage. The machine is industrial unit prepared persecution Atmel’s far above the ground thickness non volatilisable memory technology and is compatible with the manufacturing customary 80C51 training position and brooch away.

B. RFID Reader and UART
Radio-frequency identification (RFID) is that the wireless non-contact use of radio-frequency magnetic force fields to transfer information, for the needs of mechanically distinguishing and trailing tags hooked up to things [9]. Some tags need no battery and square measure steam-powered and skim at short ranges via magnetic fields (electromagnetic induction). Others employ a vicinity authority provide and produce broadcasting effect (electromagnetic radiation at radio frequencies). The tag contains electronically hold on info which can be scan from up to many meters away, not like a code, the tag doesn’t got to be inside line of sight of the reader and should be embedded within the caterpillar-tracked object. RFID offers benefits over manual systems or use of bar codes. The tag are often scan if passed close to a reader, although it's lined by the article or not visible.

C. Entry and exit sensors
This sensors are often used for many indoor applications wherever no vital close lightweight is gift; it’s an equivalent principle altogether Infra-Red proximity sensors. The essential plan is to send below red lightweight through IR-LEDs, that is then mirrored by any object before of the sensing element. Then it picks-up the mirrored IR lightweight. For detection the mirrored IR lightweight, we have a tendency to square measure attending to use a awfully original technique: we have a tendency to square measure attending to use another IR-LED, to discover the IR lightweight that was emitted from another junction rectifier of the precise same kind.
D. RF transmitter and receiver
RF module includes of associate degree RF Transmitter associate degree an RF Receiver. The transmitter/receiver (Tx/Rx) combine operates at a frequency of 434 megacycle per second. associate degree RF transmitter receives serial information and transmits it wirelessly through RF through its antenna connected. The transmission happens at the speed of 1Kbps - 10Kbps. The transmitted information is received by associate degree RF recipient outfitted at an comparable rate of recurrence as that of the transmitter. The RF module is commonly used together with a combine of encoder/decoder. The encoder is employed for coding parallel information for transmission feed whereas treatment is translate by a decoder. HT12E-HT12D, HT640-HT648, etc. square measure some remarkably used encoder/decoder combine ICs.

E. Display and Voice
16×2 LCD module could be a quite common kind of LCD module that's utilized in 8051 based mostly embedded comes. It consists of sixteen rows and a couple of columns of 5×7 or 5×8 LCD dot matrices.16×2 LCD module contains a set of predetermined command directions. every command can create the module to try and do a specific task. The APR9600 experimental board is associate degree assembled PCB board consisting of associate degree APR9600 IC, associate degree electret mike, support elements and necessary switches to permit consumer to travel around all task of the APR9600 chip. The oscillation electrical device is chosen in order that the whole recording amount is sixty seconds with a rate of four.2 kHz.

F. Relay Circuit
A relay is associate degree electric switch that uses associate degree magnet to maneuver the switch from the off to on position rather than someone moving the switch. It takes a comparatively bit of power to show on a relay however the relay will management one thing that attracts way more power. Ex: A relay is employed to manage the air conditioning in your home. The AC unit most likely runs off of 220VAC at around 30A. that is 6600 Watts! The coil that controls the relay might solely would like a couple of watts to drag the contacts along.

G. Software Analysis
The main purpose of victimisation the microcontroller in our project is as a result of superior CMOS 8-bit microcontroller with 8K bytes of in-system programmable non-volatile storage. By combining a bendable morsel CPU by means of a scheme programmable blaze on a monolithic chip, the Atmel AT89S52 could be a powerful microcontroller with the aim of extremely stretchy and expenditure competent resolution to several embedded management applications. The programs of the microcontroller are written in Embedded C language and were compiled victimisation KEIL, a compiler worn for microcontroller brainwashing. The communication between laptop {and the|and therefore the|and con}jointly the} microcontroller was established grievous bodily harm 232 commonplace and people programs were also exhausted C language.

V. RESULTS AND DISCUSSION
The system is absolutely machine-driven, reliable, clear and convenient. this will even be employed in vehicle on highways, their toll payment and in bus ticketing with little modifications. The cards being reusable, they're way more convenient compared to the paper based mostly ticketing system. The planned system focuses on the usage of RFID technology wherever the users have their own distinctive ID’s. Recently, vendors have introduced thirteen.56 MHz systems that provide longer scan vary. The advantage of RFID is it's convenient (an worker will interruption a badge to unlock a door, instead of yearning for a key or swiping a mag tape card) and since there's no contact between the cardboard and reader, there's less wear and tear, and so less maintenance. For security of the user’s ID the AES formula has been enforced. this can create the user’s ID safer and safeguard from hackers and attackers.
The figure1.6 demonstrates that the traveler at the start enters into the bus by exploitation RFID cards and therefore their knowledge are going to be displayed and the door gets opened.

![Figure1.7 Bus Reached KK Nagar](image)

The figure1.7 shows that the bus has reached the destination and therefore the door is closed.

![Figure1.8 Amount Has Been Deducted After Showing Card And The Passenger Exits The Bus](image)

Figure1.8 quantity Has Been subtracted when Showing Card and therefore the traveler Exits The Bus

The figure1.8 shows that the traveler exits the bus by showing his RFID card and therefore the quantity has been subtracted and displayed in LCD.

Classification of tags:

Active:
- Contain electric battery
- Longer vary doable (10-15 feet or more)
- Exclusive and Semi-passive:
- Contain a dormant battery
- Intermediate vary
- Mid-range value (over $1)

Passive:
- Draw energy from Associate in Nursing magnetism field

V. FUTURE ASPECTS

The major advantage of this method when put next to antecedently prompt RFID based mostly ticketing system is that this stays nearer to future ticketing system. RFID system and information used here are often helpful in IoT formation as a object and human data assortment is that the biggest challenge in IoT. thus Implementation of such a system are often thought-about as primary step towards absolutely operational IoT. conjointly Raspberry Pi provides an enormous area for future enhancements. The program are often slightly changed to get safe travel of any transit like railways, college buses etc...More powerful algorithms will offer real time location data in web, guaranteeing in time keeping of services.

VI. CONCLUSION

This paper has given a totally machine-driven, reliable, clear, and convenient system for ticketing in PTS. RFID cards being reusable ar way more convenient compared to the paper based mostly ticketing system. during this system there's no would like of conductors for supply the tickets as a result of the fare calculation is machine-driven supported the space cosmopolitan by the traveler. The system conjointly provides Associate in Nursing estimate for variety of passengers within the bus which can solve the matter of ticketless braid passers. Footboard catastrophe are prohibited for the reason that the entrance are automatically closed as presently because the bus starts from the station.

VI. REFERENCES