Research Paper

Ticket Generating and Bus Crowd Controlling Smart Bus Stop System Using Internet of Things

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Abstract: In urban areas, bus transports are the maximum popularly used and fee efficient. In this, every people may additionally get angry and loss their patient while ready and touring on the overall bus crowd and also the process of ticket amassing it could cause tension to the conductor and the passenger. For this issue, we came up with an innovative concept of a Smart Bus Stop. Which they can easily take tickets by themselves with the use of the RFID (Radio Frequency Identification) technology generates the tickets by using passengers very own. Right here, this is placed inside the bus stop as opposed to bus for time decreasing. And it's going to display the arrival of the bus and the precise count of the passengers on the LCD (Liquid Crystal display) panel. It calculates with the help of IR (Infrared) sensors and all of the information may be sent to the created internet site using IoT (internet of things). It facilitates them to pick out their experience with comfort.
Keywords: RFID, Bus Ticket, IR Sensor, Passengers count, LCD, IOT, Bus Stop.

I. INTRODUCTION

In urban areas, bus transports are the maximum popularly used and cost efficient. Each people may additionally get indignant and loss of their affected person while waiting and journeying on the overall bus crowd and additionally the system of ticket gathering it may purpose anxiety to the conductor and the passenger. For this problem, we came up with an modern idea of a smart bus stop. This system makes its easier than that current gadget. Inside the bus stop cage, LCD (Liquid Crystal display) display is made to display the precise area of the bus with the exact be counted of the passengers. Whilst the bus arrived to smart bus stop each enter and go out gate may be opened the use of RFID generation which is having a connection among the bus and the smart bus stop. The people are allowed to enter the bus handiest in the event that they entered the bus stop cage with a proper RFID card. After the travel receives over with their respective destination point, the passengers ticket fare has been debited from their RFID account after made a RFID experiment whilst get exit from the smart bus stop. The RFID (Radio Frequency Identification) technology generates the tickets by using passengers very own. Right here, this is placed inside the bus stop as opposed to bus for time decreasing. The IR (Infrared) sensors allows to calculate the precise count of the passengers. The GPS used for music the area of the bus and ship all the records to the cloud through Wi-Fi module.

II. LITERATURE SURVEY

The paper [1] proposes a RFID based automatic bus fare collection system using electronic Ticket, it is described that a system that employs RFID based location information to provide navigational guidance based on his position. That a system that uses the RFID based location information give the navigation indications depending on his current location; given that the user has previously indicated the destinations he wishes to visit. Collected data can be used to predict bus moment timing in order to provide better service. 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

electromagnetic waves. Collected data can be used to predict bus moment timing in order to provide better service. The money can be taken out of the smart card. Passengers typically throw away used paper-made tickets after they have completed their journey, polluting the environment. Again, a big number of trees are being cut down because the existing system relies on paper- based ticketing, and used tickets are just thrown away.

However, in our suggested approach, the RFID tagged card carried by the passengers handles everything automatically,reducing the complexity previously indicated.

The paper [2] proposes the urban transport administrations are generally sent in urban communities around the globe and it gives financially savvy and monetary open transportation. The main benefits of using public transportation are the reduction of air pollution, traffic congestion, and increased fuel efficiency. Considering the existing system at 2016 the navigation routes were developed. The passenger can view all the route details and navigation of buses using the mobile app. Even the timing of bus arrival can be viewed using mobile. In 2018, different parameters such as temperature, fuel level, speed, alcohol were also monitored. Later the crowd density was considered and this density can be viewed by every passenger along with the traffic information about the arriving buses using IoT technology. The information about the accident along with the above said parameters were also monitored. In 2018 QR technology was the main thing used in the urban bus system for various purposes. QR code scanned by every passenger and the number of tickets will be entered by the passenger and the respective amount from the user bank account will be deducted. The method using RFID technology has been developed and it is implemented in school buses to ensure the safety of the children. It helps the user to check the status of security appliances using IoT. It also checks drunk and drive, speed control, accident along with a missing child and inappropriate drop information using RFID. RFID technology has been used in the urban bus system at the entry and exit point of the bus, which allows the passenger to buy tickets using provided RFID tag before entry. It is an efficient method nowadays. And these parameters can be monitored using IoT using cloud server. This helps in the maintenance of a complete data of the bus transportation system. However, it has many deprivations towards the comfort-ability of the passengers. Due to the overload of passengers in the bus it creates an unsafe place as well as it can also lead to many accidents. And even it happens to overcharge in transport tickets on the bus fares through manual methods. In the existing urban transport system, it gives all the required data, for example, bus routes and bus location and furthermore the crowd density, yet none of the framework fulfills the fundamental need of the traveler, for example, suggesting the quantity of accessible seats and to give an answer for conquering the additional bus fare charges. The current system helps in an overall satisfaction of the riders and not the individual needs and the comfort. Nowadays, urban buses play a vital role in providing an economical transportation system for many passengers. The embedded system plays a major role in the development of the existing system and helps in overcoming the deprivation of the passenger comfort.

The paper [3] proposes an IoT makes it possible to connect number of devices with each other and these devices are now linked to the internet. The data from both the sensors are analyzed and programmed in such a way that the passengers waiting for the bus on the bus stop are able to get an idea about the crowd in the bus on the display available on the bus stop and will take the decision about whether to board or not to board the bus. IoT and Big data. The advancement in Information Technology provides a new infrastructure through IoT which includes software and hardware applications as well as an OS; organizations must handle the influx of data that begins flowing in and examine it in real time as it evolvesby the minute.

The paper [4] proposes 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, labour costs associated with it. By taking into consideration the above parameters, a smart ticketing system using a combination of RFID technology, GPS, Arduino micro-controller, Node MCU. 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 serves the main purpose of detecting the RFID cards carried by the passengers to buy tickets in bus. The Arduino micro-controller used in this system is responsible for communicating with the RFID reader. Every RFID card is encoded with a unique identification number. 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.

The paper [5] proposes a Buses are mainly used for the public transport system. In major cities like Tamil Nadu, Mumbai, and Delhi, etc., 10-15 million people travel through public transport daily. Today, In the year of Digital India and Cashless Economy, public transport needs to adapt to the technology advancement. The major problems experienced by the passengers are no refund of the balance, extra number of passengers, etc. A system that uses the same RFID card and RFID reader through GSM. we can find the location information give the navigation indications depending on his current location. we provided that the user has indicated before and the places he intends to visit. Collected data can be used to predict bus moment timing to provide better service.

By using a smartcard instead of RFID we can pay the amount easily and using GSM we can get the ticket through SMS.

The paper [6] proposes a now days the public transport system needs to be smart. However, public transport buses in India have always been an area where such new advances have turned their faces out. Passengers convenience needs to improves the performance of existing public transport is driving, demand for intelligent system in market. Also there are no methods to authenticate a passenger travelling in the bus. Automatic fare collection system is currently being used in many urban cities around the world. In addition, this system integrates ticketing system inside the public transport only. This project is implemented fully on IoT. Today in world of IoT we are going to decrease use of paper and will use smart technology for bus fare system. This project shows the beauty of IoT. It defines how IoT can be used effectively to generate the ticket automatically. It eases the pressure on passenger of buying a ticket in rush to travel in local buses. only be allowed to travel in a bus. The project is implemented using RFID card and Arduino and servomotors. The system uses Arduino micro-controller, as it is very much advance so certain applications such as automatic opening and closing of doors on basis of RFID cards can be easily implemented. This paper shows how RFID cards can be used to generate bus ticket. Also with the help of this RFID cards a passenger can be authenticated will be scanned. Respective bus and asked for destination. Passenger will choose their destination and automatically respected amount will be deducted from their respective account and their ticket will be generated. As, the ticket will be generated doors of the bus will be opened for 30 seconds for passenger to enter in bus.

The paper [7] proposes as the population in urban areas keep on growing there dependably exists a vulnerability as for time of arrival of bus at the bus stop and bus networks boggling and navigate. Additionally, infrequently transports are crossed out because of their other reasons the" bus Tracking system" that is proposed intends to give a powerful and effective framework to enable facilities to track buses, know evaluated time of entry of and to ticketing transaction by means of a flexible application on the android platform. Real routes positioning system bus routes on the map with their geographic and nongeographic qualities. GPS and Google maps are utilized for showing current areas of buses on the maps together with the related course data. The RFID tags are utilized to recognize individuals and other datalike payment, validity etc. Bidirectional sensor on the door is utilized to take the people count tally in the bus. Arduino UNO is a microcontroller to program with real time clock (RTC). A real time clock is a computer clock that monitors the present time. In light of IoT the travelers can data of android application. This proposed framework additionally has a web application for concede in the head office, clients can enlist any grievances, any crisis issues can be alarmed adaptability which is an essential piece of this task. Subsequently the android application is created as a User Interface. The principle reason for this of the system and to make full utilization of its functionality. A large portion of the facilities provided by this framework will wipe out the issues looked because of vulnerability of arrival of buses. the people count tally in the bus. Arduino UNO is a microcontroller to program with real time clock (RTC). A real time clock is a computer clock that monitors the present time. In light of IoT the travelers can data of android application.

The paper [8] proposes the population explosion around the world over the past century has seen a tremendous increase in the demand for public transport services. This demand is rarely adequately met since the public transport services countrylike India and China have failed to catch up to the growing rates in population. In addition to this, newer technologies have scarcely been implemented to manage crowds in public transport. Beijing and Singapore have seen cases where individuals are crushed to death due to overcrowding in the subway systems. This begs the need to implement technological solutions to ease the problem and perhaps save lives. The concept of IoT first emerged when Kevin Ashton originally used the term IoT in 1999 under the context of supply chain management and it later evolved to include applications like healthcare, utilities, and bio-sensing. Today with the development of RFID, IPv6 and cloud computing, IoT is becoming ubiquitous. Urban IoT applications for smarter and more efficient cities focus on smart homes, public transport, street lighting systems and energy systems. In the domain of public transportation, IoT has been explored only to cover the following aspects i. Navigation and Route Planning ii. Real-time Tracking iii. Accident Prevention and Safety

iv. Information Alerts Keeping in mind the increase in crowding seen in public transport and the lack of IoT based solutions for this problem, this paper presents an IoT crowd management system. It uses an individual sensor per seat to display the seat occupancy over a mobile application. The seat occupancy status being displayed in real time would allow passengers to know beforehand the crowding situation in an arriving bus/train. This would inform them to look for an alternate route or mode of transport in advance to reach their destination on time. The accuracy of the system also allows for passengers to form evenly distributed queues to better distribute the crowd across multiple train coaches. This system also offers the added benefit of data analytics. Large amounts of data regarding seat occupancy can be gathered by the transportation corporations to study and analyse travel patterns to better organize, distribute and plan public transport routes. This would avoid having empty buses/trains during off peak hours and overcrowded buses/trains during peak hours. This system
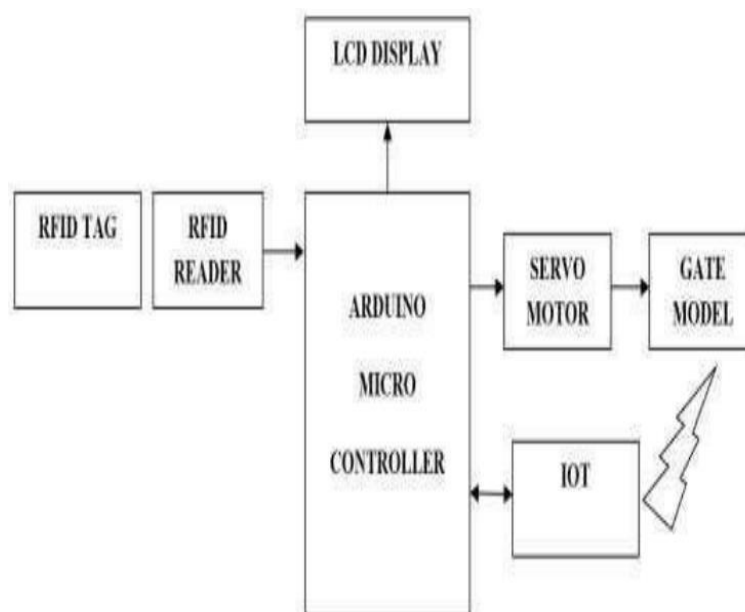
is only applicable to transport systems where pre-booking of seats is not done for example metro trains, local buses and general compartments of nonlocal railway trains.

The paper [9] proposes our College many students and staffs are not aware of exact timing and location of the college bus. So, we have planned to implement a smart bus tracking system for easy transport facility using IoT. The location of the bus is tracked using GPS and sends the collected data to a remotely located server using GSM module. Using application, students or staffs can locate the bus at any time when they need The collected data is retrieved and processed by the server using an application that we installed College bus transport system having many buses and that provides students and staffs for convenient travel from the long distances. But some students/staffs are not aware of timing and directions of the buses. In this case we have planned to do a project for easy transport system. In our project we develop an application on smart phones to monitor a location and timing of the college bus using IoT. It works using GPS and GSM technology designed to continuously monitor a moving bus for doing so a micro- controller is interfaced serially to a GSM Modem and GPS receiver used to send the position (Latitude and Longitude) of the buses from are mote place. IoT places the major role that provides the all details of the buses through the application on the smart phones to the students/staffs for easy transport system.

The paper [10] proposes due to high-speed, highly maneuvering, and weak targets as well as strong clutter and jamming, it is known that the environment of modern radar becomes increasingly challenging. To deal with the challenges, focus before-detection (FBD) has been introduced in the first article of this two-article series. As some of the typical FBD methods, Radon-Fourier transform (RFT) and generalized RFT (GRFT) originally proposed in have briefly introduced in for coherent integration of a long time on target (TOT) to focus the energy of a target in parameter space with arbitrary parametric motion. That is, the motion is modelled with a finite number of translational and rotational motion parameters, such as velocity, acceleration, and also jerk. BAs a result, by combining accurate environment sensing from echoes and effective resource management for optimization, the proposed FBD-based methods can effectively improve target detection and parameter estimation without changing system parameters in a complicated environment.

III. PROPOSED METHODOLOGY

This is the system ticket generating and crowd controlling smart bus stop by using internet of things that claim the more benefits. The sensor for collect the data of precise count of the passengers of the bus and the GPS module track the location of the bus. The data are updated into the created website by the Wi-Fi module, then they are display in LCD panel which placed in the smart bus stop. Passengers know the status of the bus and they decide their journey with comfort. The RFID technology enhance the bus transportation. It allows the passengers to generate the bus tickets by their own. Here it placed in the smart bus stop instead of entrance of the bus. So, the passengers should not wait in the queue for ticketing and reduce the chance to miss their bus. It is not delaying the bus. By this system reduce the crowd in the bus and passengers can easily generate their tickets. It reduces the time span and make comfort journey of the people who travelledin the bus in urban areas.
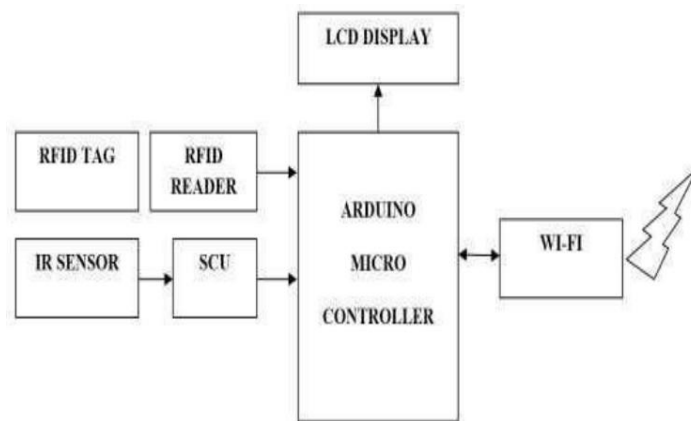
Figure 1. Block Diagram of Methodology

This proposed system for smart bus information system using IoT technology. This bus side RFID reader used in bus location identify in help of bus stop RFID tag laminated. Then and IR sensor used seat availability in the arriving buses. The send to bus information details IOT Server or android App then displayed for bus stop displayed in notification. The bus stop side Then bus stop side used person RFID base gate open and close controlling system in help of servo motor. This system enables the commuters to know the exact location of the bus, and occupancy level in the bus.

IV. RELATED WORKS

We have designed and implemented low cost Bus tracking system which helps the commuters to know the exact location of the bus and expected time of arrival at a particular bus stop along with the seat occupancy level on the smart phone. This reduces the waiting time, overcrowding at the bus stops and solves many problems like thefts and accidents etc.

V. RESULT AND CONCLUSION

This is the system ticket generating and crowd controlling smart bus stop by using internet of things that claim the more benefits. The sensor for collect the data of precise count of the passengers of the bus and the GPS module track the location of the bus. The data are updated into the created website by the Wi-Fi module, then they are display in LCD panel which placed in the smart bus stop. Passengers know the status of the bus and they decide their journey with comfort. The RFID technology enhance the bus transportation. It allows the passengers to generate the bus tickets by their own. Here it placed in the smart bus stop instead of entrance of the bus. So, the passengers should not wait in the queue for ticketing and reduce the chance to miss their bus. It is not delaying the bus. By this system reduce the crowd in the bus and passengers can easily generate their tickets. It reduces the time span and make comfort journey of the people who travelledin the bus in urban areas.

Figure 2. Result and Conclusion

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