Smart Bus Transportation with Cloud Security

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***Abstract*- The primary goal of our undertaking is to give easy to use and a savvy path for picking transport administration utilizing the cloud. The framework contain application both for user and bus operators. Everyone can utilize the web application and can skip the queue. The target of an administrator is to check the subtleties of the travellers and their equalization in the account. By utilizing on the web technique, the travellers can lessen the paper use and time utilization and make the procedure speed up. passengers can refill their record and they can broaden the pass on the off chance that it is necessary. The information of the travellers will be ensured by utilizing cloud security. By utilizing this, the travellers can get a notice about their buses. It will likewise assist the administration with providing a seamless service. We use distributed computing appropriation framework (DCAF). By using the application, the users can track the government bus position using GPS and we can also get the information about the occupancy of the bus.**

***Index terms*- GPS Tracking, GSM, RFID, Notification, Pass Generation, Payment Gateway, Offline Tracking, Voice announcement, Passenger Information System**

INTRODUCTION

Cloud computing is the on-demand availability of laptop gadget assets, mainly records storage and computing energy, without direct active control through the consumer. The term is usually used to explain facts centres available to many customers over the Internet. Large clouds, most important these days, regularly have functions distributed over more than one location from vital servers.

Wireless conversation may be defined as switch of data between or extra points without the use of wires or cables. There is exclusive wireless technology together with RFID (Radio Frequency Identification), GPS, Bluetooth, and WI-FI, and so on. In olden days' vicinity announcement become executed with the assist of speakers, but now it is developed with the aid of the use of IVRS (Interactive Voice Response) in railways stations. Nowadays bus area may be located with the help of Geo Positioning satellites. This bus area statement device is very beneficial for folks who are blind, illiterates and new to towns. This device can be carried out in extraordinary regions like shipping companies, public trains, personal travels, authorities travel corporations, carrier businesses, and so forth. With the use of locating the object and knowing its location helped for better shipping control. These technologies may be carried out to other vehicle structures, mainly state/central government vehicles, which are not able to keep up time because of obstacles like signals and more use of vehicle in road and many others. This inappropriate timing of the bus makes state/central government Transport Corporation unattractive for travellers. A Real-time Passenger Information System makes use of a ramification of technology to know the locations of state/central government vehicles and helps them to get the exact timing of vehicles.

GPS Tracking:

It is monitoring unit that helps us in getting the exact location of the vehicle it is done by using a transferring signal. The already reviewed location facts can either be saved in the system or transmitted to an Internet-related tool using different kinds of signals. This allows the users who are travelling in that direction using this monitoring program. Now-a-days every mobile has the location tracking system.

This tracking system essentially consists of GPS modules that gets the signal and display/estimate the coordinates. Data pushers uses different signals available to transfer the information through message etc., Satellite-based monitoring devices will work everywhere on the globe using satellite era consisting of Global Star. This satellite monitoring system doesn't need any mobile paired to it. The trackers are classified into three forms, though maximum geared up phones can work in any of those modes based on the mobile packages hooked up:

Fig (1): GPS Tracker

Data Loggers:

loggers loads/enter the position of the vehicle at every instance in its inner memory. loggers have both memory slot and a USB port. Few of them act as a USB flash force, it will permit loading of the tune log records for similarly laptop evaluation.

Fig (2): Data Loggers

Data pushers:

A statistics pusher is not an unusual kind of monitoring unit, which is used for asset monitoring, non-public monitoring and automobile monitoring systems.

Also referred to as a "GPS beacon", this device sends information at a given interval of time, it can also use to send information like velocity or altitude to a determined server. Navigation tool and a mobile has its own importance in the field. during particular durations, the phone sends a textual content message, which contains the information from the GPS receiver. Now-a-days the advancement in mobile has helped in such a way that the phone itself can be used as a pusher (or logger) tool.

Fig (3): Data Pushers

Data Pullers:

Pullers are also referred as "GPS transponders". The main difference between a pusher and a puller is, in the pusher the device position is send in a regular period of time using a push generation but in a puller the information is send regularly based on its requirement. The main example of puller is a computer with an Internet connection.

Fig (4): Data Pullers

GSM:

The ETSI abbreviated as European Telecommunication Standards Institute has developed this technology firstly in a mobile with second generation (i.e., 2G) networking It is firstly used in Finland in December 1991.By the half of 2010 it is accepted as international cellular communications which had reached over 90% market proportion, and operating in over 193 nations and territories.

The second-generation (i.e., 2G) is an improvement to its first generation (i.e., 1G) mobile network. The second-generation mobile networking is basically a two-way mobile network or it is said to be as full

duplex and it is a virtual device and it is circuit-switched network which helped the second generation of mobile network to be a complete duplex. By using this circuit-switched network it increased the speed of response time, this is done initially by using circuit-switched delivery, and then it has been updated by using packet information delivery, and it also increased or improved Data Rates for GSM Evolution (EDGE). Basically, the success of the second-generation of mobile networking has made others to think in a different and improved way which gave a path to the third-generation of mobile networking (i.e., 3G) and also the advancement of mobile networking world-wide paved a way to the future of networking (i.e., 4G) and the next generation of networking is fifth-generation (i.e., 5G) which will be rolled soon in India and world-wide. All of it become possible only with the success of second-generation of mobile networking.

Fig (5): GSM

RFID:

Radio-frequency identity (RFID) makes use of frequency to instantly receive and locate tags which has been stick or attached to items. It also stores the information about the item which has been assigned to it at the time of attaching it to the particular item. The tags has been classified into two types namely passive and active as its name indicate the passive type of tags is dependent on others or we can say that it rely on adjacent tag reader but it is different in the case of active it doesn't depend on others it is independent it has its own power source with additional of battery. Many of us have a doubt about the tags and a bar code the main difference between the two of them is a barcode should be in the sight of reader but the case is different in tags, it can also be in sight of the reader or it can also be inserted inside the item.

The application of tags is limitless. For example, a tag connected in a vehicle during the time of manufacturing can be used to check or supervise its development thru the meeting line; The tags can also be used in medicine industries, the medicines are tagged and by using the tag we can check the where about of the medicine we can check whether the medicine is in transit or it is delivered; and we can also attach the tag with the collars of the pet which helps us in identification of the pets in a crowded place or it also helps in knowing the location of our pets when it is lost.

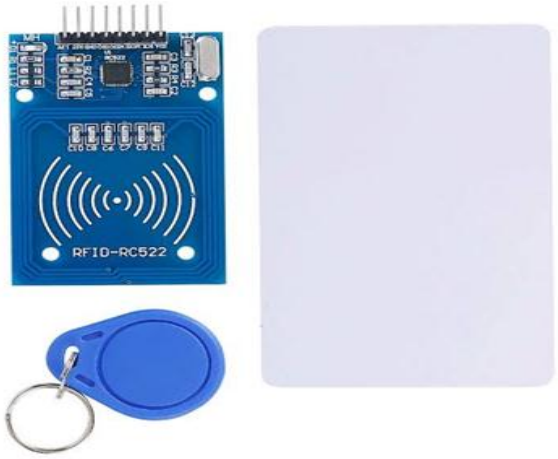

Fig (6): RFID Tag

IVRS:

IVR abbreviated as Interactive voice response. The automated voice which we all hear in railway station, airport etc., is made possible by using this voice response application. At the beginning we need to feed the values into the system and then the interaction is made possible. In communications sector, this system is used in two ways the users can use this by the form of input message we enter or by the form of recorded voice both the message and audio input is accepted by this system and then the output is sent thru IVR communicate. As explained above the machine can reply to us in the form of pre-recorded audio and system generated audio this both outputs are used to help the customers in the time of need and it helps us in knowing the direction and proceed to our destination. As this technology is smarter than dialler structure that we use traditionally this can help us in dealing with large amount of

crowd and gatherings and it also used for addressing the large audience.

The application of this system is seen in many places like banking sector in which the challan numbers is being called by this system, It is used in food sector in calling out the order number of the customers, It is also used in tourist guide buses in which the automated voice is been used as the guides in explaining about the importance of a place, It is also used in telling the weather telecast. This structure is used as an attendant. This is used in different communication sector. The main motive of this structure is to take the input from the users, process the input which has been received from the users, and give the output as an end result, in the form of an automated voice. VRU abbreviated as voice reaction unit also has the same usage as IVR.

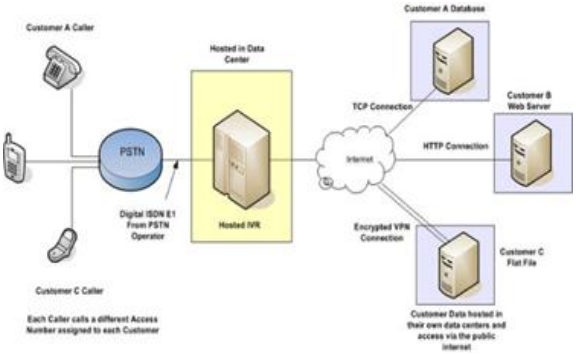

Fig (7): IVRS

Existing System:

In the Existing system the essential modules are Passengers, Admin and Driver In the existing system the main concept is registering the bus pass in online format, In the online format the customers need not to stand in a long queue and waste their time. In the existing system the paper usage is null, In the case of offline bus pass service the customers need to fill the paper form and by this the paper usage is high, so to reduce the usage of papers we can opt to online service. To use this application the passengers, need to get registered. The first thing the passengers see when they open the application is a registration page, The page consist of two selection column, If you are an existing customer customers you can login into the system just by giving the credentials needed by the system, But If you are new to the application you need to get register just by clicking the register now column, After clicking it you are redirected to a new page in which you need to enter the required credential and you should also attach a document containing your identification card. After giving all the required information and submitting the required document you are allocated with a login ID which you can use for entering into the page. In this System the information which is given by the users is verified by the admin, after the verification process if the information given by you is genuine then you are allocated with the login ID and if the information is wrong the form will be cancelled. After you are registered you can utilize the service given by the operators. In the Existing System only the authenticated/registered consumer is having access to. It does not permit users who are not registered. As the registration format for this application is online the payment method is also done by online transaction. In some cases, due to some trouble if the transaction is cancelled and the amount is debited the cash will be credited to your account. The renewal process of the bus pass in the existing system is also done in online format. In the existing system we have a renewal option in the online application. For renewal you need to enter the required credential. After giving the required credential and completing the payment process your pass is renewed. In the existing system we are having notification method, by which the information about the bus pass is send to customers. The renewal of bus pass is also notified to the customer. In the existing system the customers are notified through the registered mail id or Mobile number which they give while filling the form for registration for bus pass. In the existing system if the customer didn't renewal the bus pass service within the given period of time the bus pass which is allocated to the customers is cancelled.

Proposed System:

The main concept of the project is to create economic, secure, user friendly, system using cloud Computing and cloud security. In the proposed system the data which is given by the customer while registering for their bus pass is kept safe and secure by using the cloud security concept. Transportation plays a major role in the life of humans, There are many ways of transportation like own vehicle, cars etc., But the commonly used mode of transportation by every humans is government buses, The statistical information shows that more than half of the population in the country uses government bus

service for their daily use like children's going to the school, employee going to their respective jobs, and other travelers going to their respective destination. The passengers face many problems while travelling in bus some of them are due to some unwanted conditions like traffic many buses can't arrive in given time and due to over crowd in the bus the passengers waiting in the next stop can board the bus. so, to reduce their problem we can introduce GPS system in state government buses, by this the passengers can get the exact position of the bus. Passengers also can know about the occupancy of the bus and if the bus is crowded before arriving at their stop they can opt to some other plan or travel in other bus route. By using GSM, the passengers can use the application in their respective smart phone by using the mobile network. By using the IVR response communicator the passengers who are new to a city can know the bus stop and can get to their destination without others help, This IVR system also helps the peoples who are blind, by this system the recorded audio helps the blind people to get to their destination. Sometimes due to lack of network or data connection issue passengers can't able to track the buses so in that case the passengers can opt to offline tracking system using cell tower by using this the passengers can also track the buses. Improving data connectivity. In the near future the tags will be used for entering into buses, while entering into the bus the sensors which is pre-installed in the bus will scan the tag which you possess in your pocket or your wallet and while leaving the bus the tag is again scanned automatically and the amount will be deducted. The tag will contain your information and this is also used to pay for your bus travel. And with the combination of all the technologies the bus pass service is also included in the proposed system and the same login page is also used in the application. We can also pay for the pass using online transaction. The proposed system is the combination of the already existing online bus pass service with a few improved versions of technologies and few developments in services. In the proposed system we also have a Queries section in which you can describe your experience and it will be helpful for others. And if suppose you need to file any suggestion or any complain about your journey you can also do it in the Queries column.

Implementation:

MODULES USED IN PROPOSED SMART BUS TRANSPORTATION SYSTEM:

Modules help us in understanding about the each and every detail which helps to create the successful project. There may be many modules in the system which helps us in maintaining the perfect usage of the system but there is certain important module which is explained below.

Admin Module:

- Admins will play a major role in gathering the information about the passengers and verifying the information given by the users and giving them permission for using the application.
- Admin will check the data given by passengers and cross verify the information and if the information is genuine then he will provide the passengers with a login ID.
- Admin also has the authority to check the details of the vehicle (i.e., Bus) and the details of the drivers.
- Admin can also assign the employee with their respective bus route.

Passenger Module:

- The Passengers are the final user of the system and they play the major role in the system because they use the service provided by the operators.
- The passenger can track the bus location and they can know about the exact position of the bus and also they can check the occupancy of the seat.
- Passengers can also make an enquiry about the bus and can also write about their problems faced by them during their travel.
- Passengers can also make payment for their bus passes at any point of time and can also cancel their pass by checking the terms and condition.
- They also get information about the validity of their passes and the last date for renewal of their passes.

Driver/Employee Module:

- Drivers play a mediator role in between the admin and the passengers.

- The admin can't be able to talk to the passengers directly but in the case of drivers they can directly communicate with the passengers in person without any interface.
- Drivers comes under the category of employees and there are many employees who comes under this module like Managers, Accountant, Conductors etc.,
- Managers will overlook and manages the work and check whether every employee does their work properly they are the mediator between other employees and the admin.
- Accountant will manage the account related works. They keep a track on the total amount collected and payment related works.
- Drivers play a major role in this system they are the barriers or the bridge between the customers and the administration.

Bus Details Module:

- This module is controlled by the admin; he is responsible for inserting the information about the bus into the system.
- The information of the bus will include the details about the bus registration number, route of the bus, Seating capacity of the bus, Estimated arrival of the bus etc.,

Seats Occupancy Module:

- This module may come under the bus details module.
- If the bus reaches its maximum occupancy the driver will inform about it in his system and this information is received to the admin and the information is send to the passengers who have viewed the details of the particular bus.
- By using this module user can check whether the bus is full or not and can plan their journey accordingly.
- The notification about occupancy will be send to the passengers who wait for the bus in the next stop.

Payment Module:

- As this method is majorly based on online application, the payment is also done by online transaction.
- While making transaction for the bus pass if you face any error in transaction and money is debited the debited amount will be credited to your bank account within given period of time.
- This payment portal is overviewed by the admin and if you face any problem you can inform about the problem you are facing in Query section.
- As many of them will worry about the online transaction this payment module will be designed by using safety measure.

Cancel Module:

- This module comes under bus pass option, if the customers need to cancel the bus pass issued by the operators they can cancel the pass any time but there will be certain terms and condition for this cancellation.
- After the cancellation of the bus pass the remaining amount in the pass will be credited to their respective bank account but it follows certain terms and condition.

Enquiry Module:

- Passenger can get the information about the particular bus and check the route of the bus in this Enquiry column.
- Passengers can also write about the problems faced by them during the travel and the problem is viewed by the admin and action will be taken according to the problem.
- Passenger also has an option to talk to the customer representative and can file their complaint.
- Passengers can check the details about bus estimated timing, seat availability and other query.

Notification Module:

- This module is fully automatic method. This module is controlled by the admin.
- Passenger will get a notification about the bus seat occupancy before the bus arrive at their stop.
- Passengers will be notified about the bus arrival time within particular range of kilometer.
- The expiry date of bus pass will also be notified in the form of notification and in the form of mail to registered mail id and to their registered

mobile number before a particular period of time.

The use case for the important module:
Admin module:

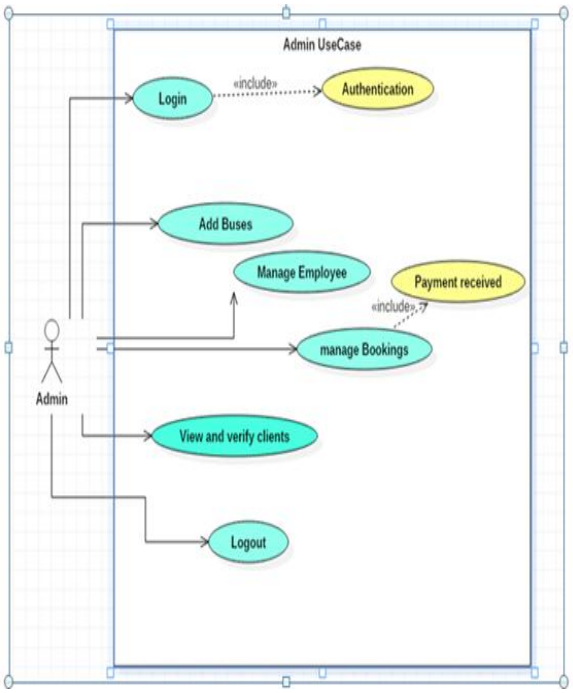

Fig (8): Diagram for admin module.

Passenger module:

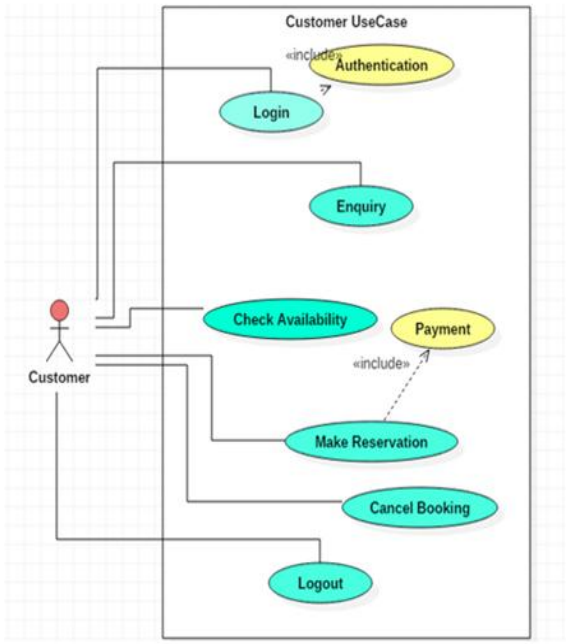

Fig (9): Diagram for Passenger module.

Employee/Driver module:

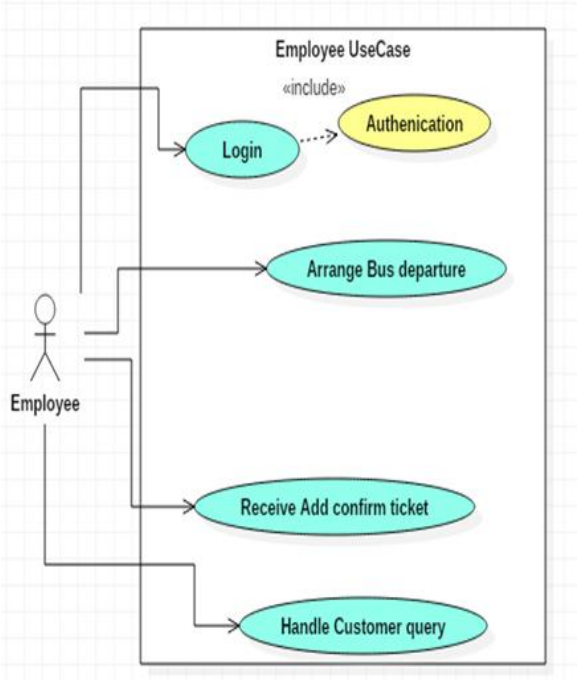

Fig (10): Diagram for Employee module

CONCLUSION

This paper focuses on smart bus management system using cloud computing concept. The main use of our project is to develop an effective system that ensures safe and secure, Ease of access of smart Bus Management System. This system provides each and every information about the bus. Every user or visitors can use this application and search about their bus. The user can register the bus pass on their own by using this system without wasting their time in standing in a queue and this system also helps in saving the papers. The user can also write about their experience and the problems faced by them during the travel. This comment will be useful to other users. And the complaint will be viewed by the admin and action will be taken. In this system Passengers will automatically receive information about the bus arrival and seat occupancy based on their searches. Passengers will also be notified about the expiry of their bus pass. In manual case where we need to stand in queue and apply for pass takes lot of time and sometimes there will be an error in entering of data. To solve this problem and to keep the details of the customer securely we can use this online system. It will be helpful to the user who are new to a city or a

place. By using this system, the people who are new to a place can get information about their bus without others help. In addition to this the tracking system helps the user to know the exact location and arrival of their bus. IVRS technique in the bus helps the new comers to know about the different bus stops and can also help them to depart the bus in their respective stop without any others help.

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