IOT Based Dual Purpose Web Application for Smart Public Transportation

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ABSTRACT: This paper proposes dual purpose Web Application that enables the user to track the bus details and its location. It also provides a portal for online toll payment. The user has to firstly register with the web application and can easily login from there after. The dashboard in the web app provides a portal for both location tracking of the public transport and also for the online toll payment. The location of the vehicle is pin pointed on the Google maps. The location is tracked depending upon the GPS installed in the public transport. The online toll payment for the respective tolls can be made by using the toll payment portal, the required amount will be deducted from the users account. Technologies like IOT and components like RFID and raspberry PI shall be the base of the app rendering the users capable of proceeding with online toll payment just before reaching the toll.

KEYWORDS: IOT, Raspberry Pi, GPS Tracker, RFID Reader, RFID tag and Web Application

I.INTRODUCTION

People use different modes of transportation to travel from one place to another. It may be city buses, passenger trains, metro trains, auto rickshaw, cans and so on. But the most widely used one is the public transportation.

Taking public transportation into consideration there are different drawbacks to the service offered. The public transportation is more time consuming and the time table scheduled are rarely followed. There is always a disappointment regarding the arrival of a bus. This causes a problem to the passengers who travel daily by bus and also to those who are new to travel in that route.

With regard to the major time problem associated with the bus, a simple knowledge about the bus information can solve the discrepancies related to public transportation. For example it can be the arrival time of the bus, its location, the number of subsequent bus stops etc can be beneficial to the passengers. Hence a smart public transportation system is necessary to solve such issues. This paper proposes a smart public transportation where all relevant information of the bus is gathered and given to the passenger.

Thus in this paper we propose a web application for tracking the location of the bus. The web applications acts as a dual porpose app which also provides a portal for online toll payment.

Many of the toll gates even today are manually operated with a person providing a receipt for the travel journey at the toll gates. This creates a huge traffic at the toll gate. Even during emergency this is a great burden to the travellers to wait in long queue at the toll gate. There may be several number of toll gates on the way and the payment for each toll becomes difficult for the travellers.

Thus in this paper we propose a system which would help the travellers in making the online payment of the toll before they enter the toll gate.

Thus the web app acts as a dual purpose app for the online payment and also for tracking the location of the public transport. This helps in nullifying the long waiting time for the travellers.

II. RELATED WORK

In [1] Süleyman Eken and Ahmet Sayar proposes smart bus tracking system based on location- aware services and QR codes. Here in [2] Shiv H Sutar, RohanKoul, Rajani Suryavanshi presented a paper on Integration of Smart Phone and IOT for development of Smart Public Transportation System which provides notification in the form of sms to the

user.In [3] Ajay Shingare, AnkitaPendole and Prof. SamadhanSonavane   proposes a paper on GPS Supported City Bus Tracking & Smart Ticketing System. Authors in [4] Manali, Najme Zehra Naqvi proposed a system for Smart Public Transport System Using Mobile phone based sensing based on technologies like GPS, GSM, participatory sensing, cellular based tracking. In [5] passenger-assisted sharing of bus location to provide an estimation of bus arrival time was proposed by Winwin Loon Haw Lim, Joe Tuck Wai Lum, Ian Jer Wei Yeo, Sye Loong Keoh. Authors in [6] Muhammad Nur Zaki Juhari and Hasmah Mansor published a paper on IIUM Bus On Campus Monitoring System.In [7] Surya K Narayanan, Thushara C, Sandhya C, Saranya N, Sreepriya P V proposed a system for automatic toll gate system using RFID & GSM technologyin this the amount is collected from the user's account from a tag in the vehicle using RFID technology and the transaction details will be send to the user's mobile through GSM technology. In [8] Pranoti Salunke, Poonam Malle, Kirti Datir, Jayshree Dukale proposed a paper on Automated Toll Collection System Using RFID in this Whenever the vehicle passes the toll naka, the tax amount will be deducted from his prepaid balance and new balance will be updated. Authors in [9] Drazen Pasali, Zlatko Bundalo, Branimir Cviji, Dusanka Bundalo and Radovan Stojanovi proposed a paper on Vehicle Toll Payment System Based On Internet of things concept.

III. PROPOSED WORK

Since this paper proposes dual purpose web app we describe this in two different modules. The following are the two modules:

Module 1-

The block diagram figure 1 mainly contains Raspberry Pi, GPS module, Power supply, LCD display, Web Application and Google Maps. The Raspberry Pi configured with GPS tracker, LCD display and power supply is installed in the bus. The LCD display is used to display the bus number. The GPS installed helps to update the location of the public transport to the server. All the necessary information is stored on to server with the IOT technology. The passenger waiting at the bus stop can log on to the web application and track the location in his route by entering the specified bus number. The web app pin points the location on the google maps. The whole system makes use of python for coding the Raspberry Pi ,GPS, LCD display and power supply that is installed in the bus. The web application is developed using google API's, javaScript and PHP.
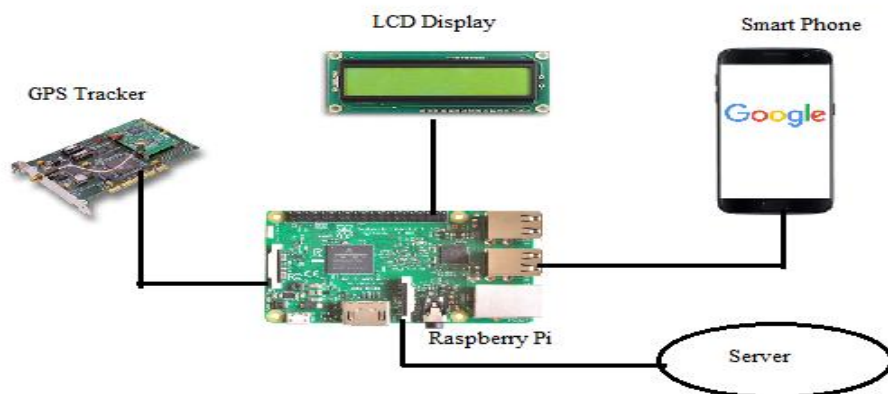

Figure 1: Architecture for public transport tracking

Module 2:

In this module we describe the online toll payment. The block diagram Figure 2 mainly consist of Raspberry Pi, RFID Tag and Reader, LCD Display, stepper motor and Power supply. The toll gate is configured with the Raspberry PI installed with the RFID reader, LCD Display and power supply in order to read the data of the car that enters the toll

International Journal of Innovative Research in Computer and Communication Engineering

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Vol. 5, Issue 5, May 2017

gate. The travellers car is installed with the RFID tag that is to be scanned at the toll gate. The traveller can make the online payment of the toll in advance before he reaches the toll gate. The system makes use of a web application that provides the portal for making the online toll payment. The amount is deducted from the users account. When the user scans the RFID Tag at the toll gate the system checks for the valid card and also for the payment. If all the required details are verified, the vehicle number is displayed on the LCD Display and stepper motor rotates to open the gate.. The system makes use of python for coding the Raspberry Pi, RFID tag, RFID reader and GPS. The web application is something similar to the gmailaccount, the user has to first register with all the necessary details. In case of toll payment the owner of the vehicle has to provide all the necessary details such as vehicle number, account details, vehicle owner etc. Once the user is registered they can easily log in. Thus the single web application provides an interface for two different application.
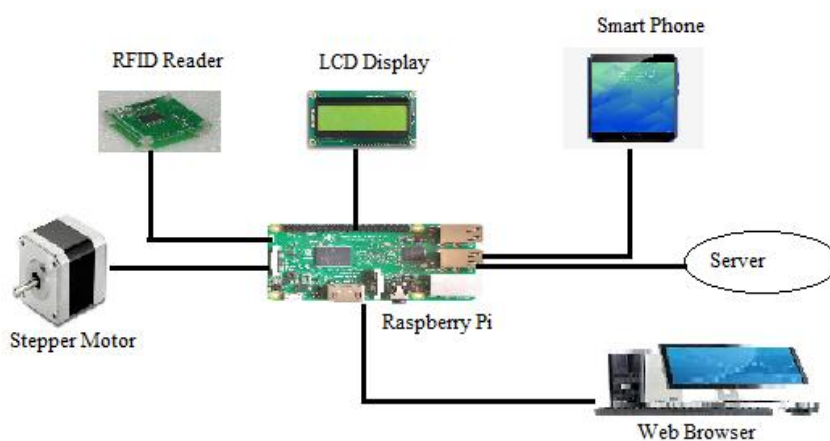

Figure 2: Architecture for Toll Gate System

IV. PSEUDO CODE

Step 1: Initialize the system.
Step 2: User login's to the login page using the web application.
Step 3: If the user is registered, then the user will enter the username and password in the login page and click on the login button.
else
    The user should click on the register button to get registered.
Step 4: After registration, the user can log in for other options in the dashboard.
Step 5:By clicking on the toll payment option on the dashboard the user can make the necessary online toll payment, the required amount will be deducted from the users account. The necessary information is updated on to the server.
Step 6: The RFID Reader configured with Raspberry Pi scans the RFID Tag installed in the car and checks for the payment.
Step 7: If the payment is made the stepper rotates and the gate opens.
    Else
        The user should manually make the payment.
Step 8: In case of unregistered card it shows invalid member.
Step 9: By clicking on track location, the user has to enter the bus number so the user can track the location of the bus.
Step 10: The GPS tracker configured with Raspberry Pi updates the location of the bus to the server.

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Vol. 5, Issue 5, May 2017

Step 11: The user can log out by clicking on log out option.

V. RESULTS

In the figure 3, we can see the overall system connection for the vehicle Toll payment. Here all the components are connected to gpio pins in Raspberry Pi board. Tx and Rx pins of Raspberry Pi are connected to Tx and Rx pins of RFID Reader. Stepper motor are present at the toll gate. LCD display is used to display welcome message and vehicle number. When the payment is made the tag is scanned at the toll gate and the stepper motor rotates to open the gate.
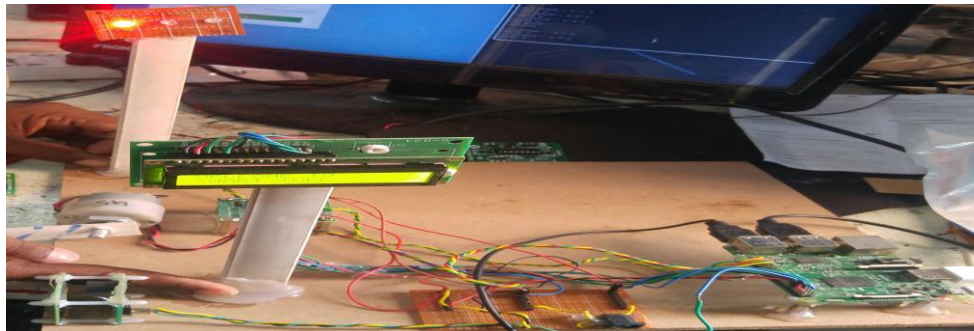

Figure 3 shows the connection of hardware components for toll gate system

In the figure 4, we can see the overall system connection for public transport tracking. Here all the components are connected to gpio pins in Raspberry Pi board. GPS tracker installed updates its location to the server.

Figure 4 Shows the connection of hardware components for public transport tracking

V. CONCLUSION AND FUTURE WORK

Thus the Development of Smart Public Transportation would become necessary for the passengers travelling in the Public transport and also for those users who have to make payment for each Toll Gate. This system provides a platform for both the application through one single Web Application. The passengers can easily track the location of the buses through Google maps that is interfaced with the Web Applications. The Web Application also provides a portal for the user for online Toll payment.

In future the Web Application can also be replaced with Android App. This can even be implemented with the Google Maps that shows the number of subsequent toll gates in its route, depending on this the payment can be made for the whole travel journey. The notifications can also sent to user mobile phone.

The system can be altered for even finding the number of seats available in the bus. The app can be developed for entering the source and destination for the passengers unaware of the bus number.

REFERENCES

1. SüleymanEken; AhmetSayar, "A smart bus tracking based on location-aware services and QRcodes", IEEE International Symposium on Innovations in Intelligent Systems and Applications (INISTA) Proceedings-2014.
2. Shiv. H. Sutar, RohanKoul, RajaniSuryavanshi , "Integration of Smart Phone and IOT for development of Smart Public Transportation System", International Conference on Internet of Things and Applications (IOTA), pp.73-78, 2016.
3. Ajay Shingare, AnkitaPendole, Prof. SamadhanSonavane, "GPS Supported City Bus Tracking & Smart Ticketing System", International Conference on Green Computing and Internet of Things (ICGCIoT), pp.94-98, 2015.
4. Manali, NajmeZehraNaqvi, "Smart Public Transport System Using Mobile phone based sensing", Annual IEEE India Conference (INDICON)-2015.
5. Winwin Loon Haw Lim, Joe Tuck WaiLum, Ian Jer Wei Yeo, SyeLoongKeoh, "A Crowd-Assisted Real-time Public Transport Information Service: No More Endless Wait", IEEE International Workshop on Pervasive Computing and Communication Workshops(PerCom Workshops)-2016.
6. Muhammad NurZakiJuhari and HasmahMansor , "IIUM Bus On Campus Monitoring System", International Conference on Computer and Communication Engineering (ICCCE), pp-138-143, 2016.
7. Surya.K.Narayanan, Thushara.C, Sandhya.C, Saranya.N, Sreepriya.P.V, "Automatic Toll Gate System Using Rfid&Gsm Technology", International Journal of Science, Engineering and Technology, Vol 3, Issue 5, pp.1273-1279, 2015
8. PranotiSalunke, PoonamMalle, KirtiDatir, JayshreeDukale, "Automated Toll Collection System Using RFID", IOSR Journal of Computer Engineering (IOSR-JCE)   , Vol 9, Issue 2, pp.66-69, 2013.
9. DrazenPasali, ZlatkoBundalo, BranimirCviji, DusankaBundalo and Radovan Stojanovi, "Vehicle Toll Payment System Based on Internet of things concept", 5th Mediterranean Conference on Embedded Computing (MECO), pp.485-486, 2016.

BIOGRAPHY

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