E-Way: Development of Android Application for Aggregation of E-Rickshaws in Amethi District in India

Sonam Dwivedi[1] Shachee Mishra[2] Riya Singh[3]
[1,2,3]Department of Computer Science & Engineering
[1,2,3]Rajarshi Rananjay Sinh Institute of Management & Technology, Amethi, UP, India

Abstract— E-Way (Development of Android Application for Aggregation of E-Rickshaw in Amethi District in India) This paper gives out the methodology of aggregating and collating the resources of all type of Rickshaws used by the general population in rural areas. A model has been evolved for Amethi District of Uttar Pradesh, India in order to benefit the rural persons. An Android Application based implementation has been developed which is very user friendly and can be used with bare minimum training by even illiterate persons. Facilities included in App are daily booking, fare charge application on approved routes, customer data loss of signed up person.

Key words: Android, GPS, Google Map

I. INTRODUCTION

Electric rickshaws (E-Way) have been becoming more popular in some cities since 2008 as an alternative to auto rickshaws and pulled rickshaw because of their low fuel cost, and less human effort compared to pulled rickshaws. They are being widely accepted as an alternative to Petrol/Diesel/CNG auto rickshaws. They are 3 wheels pulled by an electric motor ranging from 650-1400 Watts. They are mostly manufactured in China, only a few other countries people, who suffer most from a lack of transport facility, if introduced in a systematic manner according to experts. E- Rickshaw Policy with powers developed on Municipal manufacture these vehicles. Battery-run rickshaws could be a low-emitter complementary transport for the low-income Corporation to regulate E-Rickshaw. Cost of regulation to be based on type of vehicle-from E-Rickshaw to Luxury Sedans .Integration of E-Rickshaw into the transport system-Develop it as feeder system. Urban planning to include design of urban streets for IPT system-separate line for E-Rickshaw. Better technology and innovative models to be encouraged. In this project we track the location using GPS and Map. The registered Vehicles are allotted to any driver which is also registered.

The Vehicles are not allotted permanently for one Driver. Driver may be very according to the availability of E-Rickshaw for every day. The user login and fill the registration form which is required and book the Taxi.

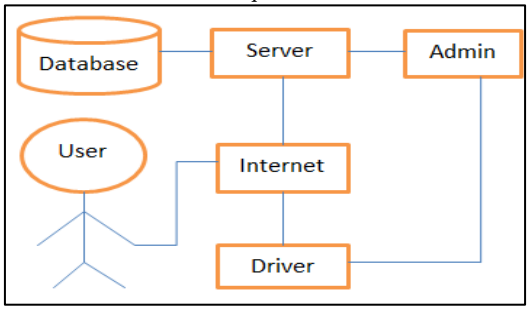

Fig. 1: Location Based Vehicle Tracking System

E-Way is based on development of a user-friendly Android-based application called E-Rickshaw booking App. Vehicle Tracking Solutions, a leading provider of GPS fleet management services, has introduced a free downloadable "app" for the Android phone that interacts with the fleet supervisor's Vehicle Tracking Solutions account. Called Silent Passenger, this GPS tracking Android app offers flexibility and mobility to fleet and operations management enabling them to modify settings, get reports, or monitor vehicle status, all from their smart phone. E-Way provides rickshaw booking services to customers, most cab booking portals are plain vanilla website with price listings. Our strategy is to focus on the backend interface with rickshaw operated because that would ensure a certain level of quality and predictability with respect to the consumer experience. The mobility component of Area Based Development and Pan City under Smart City Proposal includes various features such as:

- Development of Non-Motorized Transport Infrastructure.
- Improving the road connectivity within and outside the city.
- Improving the on-street and off-street parking in the major locations by developing Multilevel rickshaw Parking.
- Improving the last mile connectivity in the city by introducing e-Rickshaw as the new green mode of transport.

S.No	Description	Specification	Reference Standards/Test Standard
1.	Type of E-Rickshaw(Electric Rickshaw)	Passengers	Two or Four- Seater
2.	Maximum Speed	25 kmph	As per motor vehicles Amendment Act 2015
3.	Curb Weight (weight of Electric Rickshaw including Battery)	375 kg	Tentative
4.	Laden Weight (curb weight + weight of four passengers, the driver and luggage of 250kg 40 kg)	755 kg	For a tentative curb weight of 250 kg
5.	Speed Range	25 kmph	For a full charge of battery, to be tested with full load at, maximum AIS- 040
6.	Motor Output Power	850 Watt	At full load (48V, 850Watt or above but not more than 2000W)
7.	Motor Controller	48 V	PCB based Controller
8.	Battery Voltage	12V	
9.	Battery Capacity	105 Ah	
10.	Battery Charger	48 V 15 Ah	SMPS Charger

Table 1: Technical specification of E-Way

Smart Tracking System is an Android based application for the travelers to obtain the geo-location and tag it with multimedia features. This application allows users to create, store and view their Vehicles, Vehicle related information and all the memories that bring with it. Vehicle Tracker Combines places visited, notes taken and the images

captured, and display all this information on a map at the exact location where it all took place. This application is developed to provide the users a rich user experience by having all the information in one place, easy to-access and interactive. With the help of Google Maps, each Vehicle can be drawn out on the map with all the locations visited and the route taken. The user will also be able to view the description, the location address and the image captured any. Vehicle Tracker, developed in Android, provides extensive flexibility, supports many features and can be among the best travel friendly app. We are going to use GPS for locating the position of vehicle. We will also find the speed of the vehicle in real time. We can track vehicles through android application using GPS to find out here a bus is using a web application which requires login of administrator for Vehicle Details and User. We use the Vehicle details From Vehicle Registration Form i.e. (Vehicle Name, Vehicle No. Driver Name, Driver Mobile Numbers).This is the Administrative Activity. From that detail we can track the location of Vehicle, only registered vehicles location can track. It's providing the better control on rickshaw availability and service quality while keeping costs low.

II. EXISTING POPULAR PROTOCOL

There are number of protocols using client-server structure and some others peer-to-peer architecture to exchange data between network components as following.

A. Hypertext Transfer Protocol Secure(HTTPS):

HTTPS is an extension of the Hypertext Transfer Protocol(HTTP)for secure communication over a computer Network. In HTTPS, the communication protocols encrypted by Transport Layer Security (TLS), or formerly its predecessor, Secure Sockets Layer(SSL).The principal motivation for HTTPS is authentication of the accessed website and protection of the privacy and integrity of the exchanged data while in transit. It protects against man-in-the-middle attacks.

B. Transmission Control Protocol (TCP)/Internet Protocol (IP):

The Defense Advanced Research Projects Agency (DARPA), the research branch of the U.S. Department of Defense, created the TCP/IP model in the 1970s for use in ARPANET, a wide area network that preceded the internet. TCP/IP uses the client/server model of communication in which a user or machine (a client)is provided a service(like sending a webpages)by another computer(a server)in the network.

C. TLS:

TLS is a successor to Secure Sockets Layer protocol. TLS provides secure communications on the Internet for such things as e-mail, Internet faxing, and other data transfers. There are slight differences between SSL 3.0 and TLS 1.0, but the protocol remains substantially the same. It is good idea to keep in mind that TLS resides on the Application Layer of the OSI model. This will save you a lot of frustrations while debugging and troubleshooting encryption problems related to TLS.

D. SMTP:

Simple Mail Transfer Protocol (SMTP) is an Internet standard for electronic mail (email) transmission. First defined by RFC 821 in 1982, it was last updated in 2008 with Extended SMTP additions by RFC 5321, which is the protocol in widespread use today.

Although electronic mail servers and other mail transfer agents use SMTP to send and receive mail messages, user-level client mail applications typically use SMTP only for sending messages to a mail server for relaying. For retrieving messages, client applications usually use either IMAP.

SMTP communication between mail servers uses TCP port 25. Mail clients on the other hand, often submit the outgoing emails to a mail server on port 587. Despite being deprecated, mail providers sometimes still permit the use of nonstandard port 465 for this purpose.

SMTP connections secured by TLS, known as SMTPS, can be made using STARTTLS.

III. BACKGROUND

Android is a free, open source mobile operating system (OS) based on the Linux kernel and currently developed by Google. Android platform has four main layers, on top of world Linux kernel, there are libraries and APIs written in C, application framework and application layer.

A. Android Operating System

Android is a mobile operating system[5.] developed by Google, based on a modified version of the Linux kernel and other open source software and designed primarily for touchscreen mobile devices such as smartphones and tablets. In addition, Google has further developed Android TV for televisions, Android Auto for cars, and Wear OS for wrist watches, each with a specialized user interface. Variants of Android are also used on game consoles, digital cameras, PCs and other electronics

B. GPS

GPS [3.] or Global Positioning Systems is a term that most commonly conjures up images of vehicle navigation systems, space-age satellite technology, and interactive maps for outdoors-types and sportsmen.

But the reality is, Global Positioning Systems is now beyond GPS vehicle tracking or map navigation. We are going to use GPS for locating the position of vehicle. We will also find the speed of the vehicle in real time. We can track vehicles through android application using GPS to find out here a bus is using a web application which requires login of administrator for Vehicle Details and User. We use the Vehicle details From Vehicle Registration Form i.e. (Vehicle Name, Vehicle No. Driver name, Driver mobile no.). This is the Administrative Activity. From that detail we can track the location of Vehicle, only registered vehicles location can tracks.

C. Google Maps API

Google Maps provides developers set of Google Maps API[4.] functions that can be used to operate components or applications. By interpreting Google Maps APIs, we can develop rich-feature applications with street view mode,

driving directions and advanced geo-coding. In our research, we mainly focus on geo-coding, location and interact with the longitude, latitude data in embedded map. With the help of Google Maps, each Vehicle can be drawn out on the map with all the locations visited and the route taken.

D. Application Server (Apache PHP Firebase Database)

Apache PHP web server is developed and maintained by an open community of developers, and it plays an important role in the initial growth of World Wide Web. Apache supports a variety of features, modules and common language inter-faces such as Perl, Python, PHP [2.]. PHP [2.] is a lightweight and powerful server-side scripting language for web development. PHP is now the most-used web programming language, e.g. Facebook, Word press etc. Besides, Firebase [1.] is a feature rich, open-source database that powers a lot of application. Firebase is a real time database. In this study, Firebase database is used to store all User, Driver and GPS locations data.

IV. SYSTEM ARCHITECTURE & DESIGN

In this section, we are introduce the architecture, which our work is based on and then present the design of system that paper is to address.

A. Entity Relationship Diagram (E-R Diagram)

The E-R diagram [6.] was first Process to be introduced. It is also referred to as a linear-sequential life cycle model. In this model each phase must be completed fully before the next phase can begin. It is basically used for the E-Way which is small and there are not uncertain requirement. At the end of each phase, a review takes place to determine if the project is on the right path and whether or not to continue or discard the E-Way. Booking are mainly done via telephone calls and cash was the dominant model. Booking will have done via telephone calls as well as through their app. While cash was still dominant payment from, credit/debit cards started being used as well in this model.

1) Users

Customer can book rickshaw through this app. Among other initiatives, the firm released an SOS(Save our souls) button for customers, which, when activated, sends out all rides details in real time including GPS coordinates to pre-set friends and family members of the user via SMS and e-mail.

2) Vehicles

These vehicles shall be operated only by those university employees and students specifically authorized to do so by Director, or Chair or designee. It is the responsibility of the department Director or Chair to inform and enforce proper use and ensure that only duly licensed, registered and trained drivers operate University vehicles. For insurance purposes, qualified drivers must be registered with TRE AND DES Transportation and Traffic Management (TTM) prior to use of a state vehicle using the Drivers Registration Form.

3) Drivers

Only persons possessing a valid and appropriate driver's license, meeting the standards outlined in the Vehicle Acquisition, Use policy and who have department authorization by the department may operate a university owned or leased vehicle. It shall be the responsibility of the department to ensure that drivers meet the required qualifications outlined below.18 years of age or older.

Driver must be employee of the city or working in an official capacity for the department.

4) Payment

Booking are done via telephone as well as mobile app and the payment via cash and wallets.

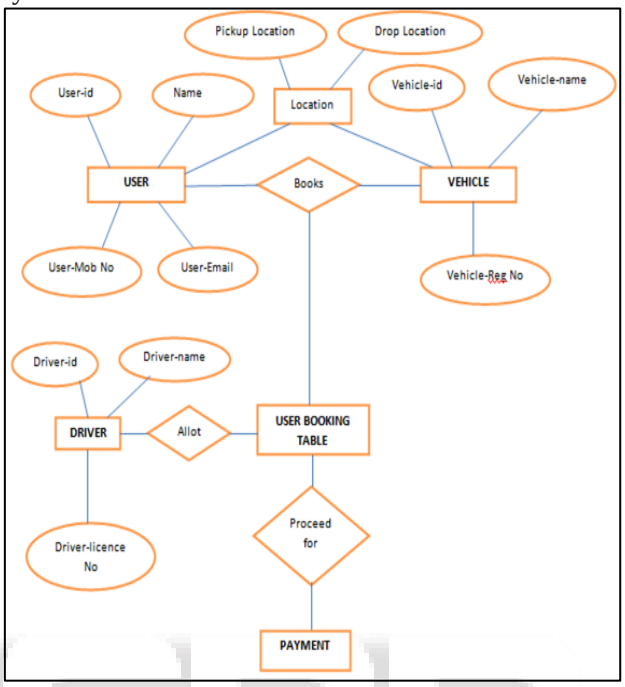

Fig. 2: E-R Model of E-Way

B. Use Case Diagram

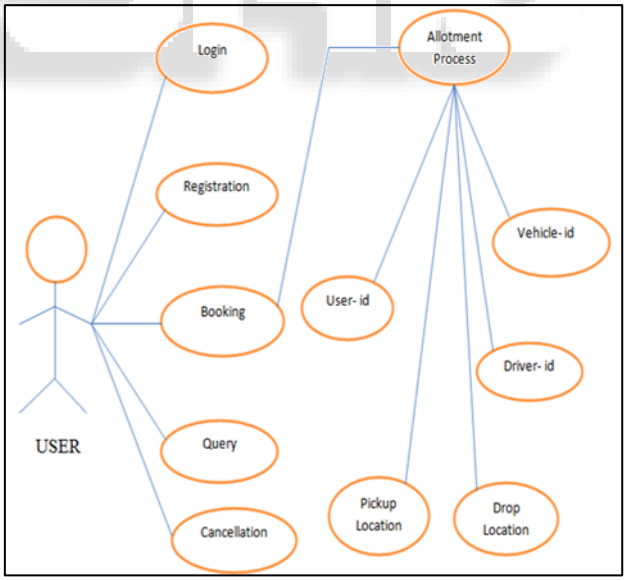

Fig. 3: Use Case Diagram of E-Way

A use case diagram is a graphic depiction of the interactions among the elements of a system. A use case is a methodology used in system analysis to identify, clarify, and organize system requirements. In this context, the term "system" refers to something being developed or operated. System objectives can include planning overall requirements, validating a hardware design, testing and debugging a software product under development, creating an online help reference, or performing a consumer-service-oriented task.

C. Data Flow Diagram

A Data Flow Diagram (DFD) is traditional visual representation of the information flows within a system. A neat and clear DFD can depict a good amount of the system requirements graphically. It can be manual, automated, or combination of both.

It shows how information enters and leaves the system, what changes the information and where information is stored. The purpose of a DFD is to show the scope and boundaries of a system as a whole. It may be used as a communications tool between a systems analyst and any person who plays a part in the system that acts as the starting point for redesigning a system.

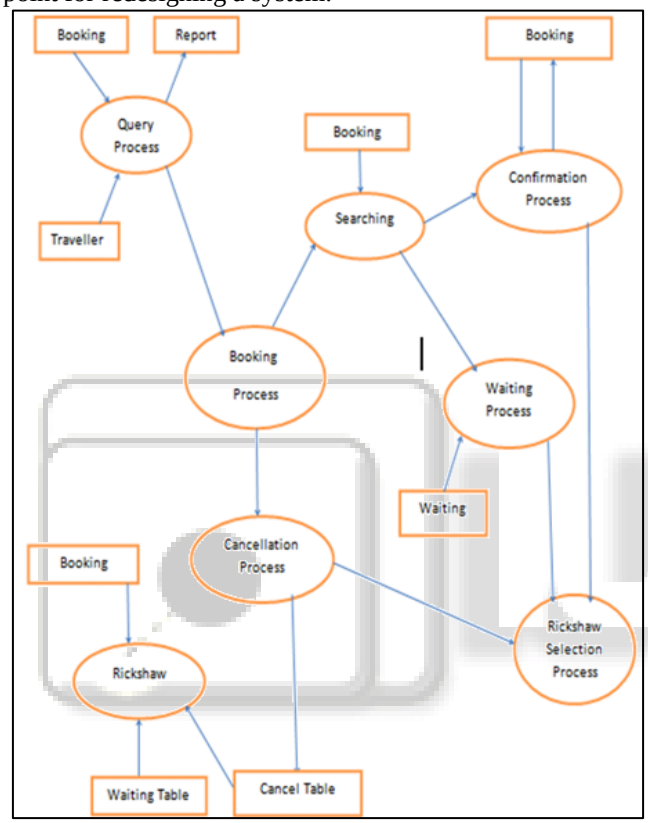

Fig. 4: Data Flow Diagram of E-Way

1) Query Process: If a user has any query related to travelling or booking then they can report in this process.
2) Booking Process: This module consists of all information related to booking.
3) Searching Process: A user can search the vehicle in this process and then proceed for confirmation.
4) Confirmation Process: In this Process if the E-Rickshaw is available according to the user request then a confirmation message is to be send to the user.
5) Waiting Process: If the requesting vehicle is not available then wait till it is free.
6) Rickshaw Selection Process: User can select the E-Rickshaw as per their requirement.
7) Cancellation Process: If a user wants to cancel their booking then they can cancel it.
8) Rickshaw: All the record of booking, Cancel Table and Waiting Table are stored in this module.

V. Conclusions

Android is one of the most popular mobile operating system today, it has been attracting more attention to developers and mobile industry. In this modern era of technological communication, it is increasingly easy for people to stay in contact at all times with the use of smart phones and other internet capable mobile devices. While business has traditionally been conducted during specified business hours and pre-planned locations, communication and scheduling software advances in recent years have made it easier to facilitate impromptu meeting or work schedule changes.

In this project we track the location using GPS and Map. The registered vehicles are allotted to any driver which is also registered the vehicle are not allotted for one driver. By providing the employability, we can also enhance social status of the people. Safety and security. This application is develop to provide the facilities of E-Rickshaw booking which is at nearest location of the users.

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