Vehicle Automation Management in Urban Area

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Abstract— The aim of this paper is to help the Auto-Rickshaw drivers and the passenger to interact with each other and also to server each other in an efficient way. This application will be used by customer to get the Auto-Rickshaw by one click on android phones, to find nearest to his cellular zone with the help of GPS tracking system and by clicking on customer can call them. Driver side application provides location tracking system to start location tracking and to stop tracking location is done socket listener services. The socket listener will keep on updating the information of Auto-Rickshaw driver in the database also it will continuously put the location based information of the Auto-Rickshaw driver in the database. To find nearest Auto-Rickshaw driver, we are using Haversine Formula that provides us distance in KM. this application will be useful for the Auto-Rickshaw Drivers to get the customer , to save the unnecessary wastage of fuel and also to increase their daily profit margin.
Key words: GPS, Google Maps 2.0, Haversine Formula, Android

I. INTRODUCTION

We are very thankful to launch this paper "AutoPlease". Now a days as every small to larger activity is preferred to be done on a mobile phones. So we gave a thought to make an application for Auto-Rickshaw seeker which will help him/her to get Auto-Rickshaw on single touch on android phone.

The purpose of this paper is to introduce the android application to the customers who are seeking for Auto-Rickshaw so that within one touch on their mobile phones they can get a detailed map view along with the contact number of Auto-Rickshaw driver who are nearby their respective places. We will be also including driver side small application which will be installed on the phones of Auto-Rickshaw driver which will keep tracing the exact location of the Auto-Rickshaw driver. Tracking of location is using socket listener services [7].

The objective of this paper is to help the Auto-Rickshaw drivers and the customer to interact with each other and also to serve each other in an efficient way, this application will be useful for Auto-Rickshaw driver to get passengers, to save the unnecessary wastage of fuel and also to increase their daily profit margin. Also this application will be used by passengers to get Auto-Rickshaw nearest to his cellular zone with the help of a single touch and a single phone call. This system mainly will be beneficial to Auto-Rickshaw driver and passenger both to have their own efficient way interaction and communication. Auto-Rickshaws mainly run short urban and sub-urban routes, some with fare meters and other without them [4].Every Auto-Rickshaw needs to brought under surveillance and tracking system [4].

Although Auto-Rickshaws provide a convenient travelling solution to the commuters, various issues are faced, such as [3]:

- Passengers often have to walk long distances to get Auto-Rickshaws as they aren't readily available at their doorstep [3].
- Denial of Auto-Rickshaw drivers to ferry the passengers to a particular location.[3]
- Denial for a metered ride or duped by a unnecessary longer routes.[3]
- Security issues arise when travelling at night or for women passengers.[3]

A. Significance of this Application:

- Quick availability of Auto-Rickshaw.
- Will be extremely helpful in case of emergencies.
- Will help Auto-Rickshaw drivers to get passengers easily, which are nearby their location.
- Will help in increasing the profit margin of Auto-Rickshaw drivers.
- Application will provide easy one touch access to passenger as well as Auto-Rickshaw drivers.

B. End User Application Features:

- User can check Auto-Rickshaw drivers on the map view as well which will be provided android application of the user and also call them manually.
- User can also take look of list view with respect to distance of the Auto-Rickshaw drivers.
- Focusing on Women's safety security tab is provided which will send message to the 3 relevant numbers which are set by users on single button click.

C. Driver Application Features:

- The driver application has two buttons namely start and end duty, as soon as he press the button to start duty location tracing gets started and as soon as he presses the end duty button to his location tracing stops.

D. Web Application Features:

- The web application will be for administrator which will useful for adding and deleting new or existing Auto-Rickshaw drivers.
- Web application gives privilege to administrator for managing Auto-Rickshaw driver's accounts.

On startup customer side application it automatically search his current location, it means customers doesn't need to search his current location. We also provided map view and list view to see nearest Auto-Rickshaw drivers.

Driver side application Auto-Rickshaw driver should click green button to on location tracking, red button is stop location tracking when he log off from his duty. This application uses dynamic Google map 2.0 versions.

II. LITERATURE SURVEY

In last few years usage of android phones in society has been increased. Previously mobile phone id's and cell towers were used to find location of android phones. Now a day's concept of mobile id's is replaced by GPS (Global Positioning System) [6]. GPS calculates the latitude and longitude to extract the exact location of android phones.GPS receives are now rooted into android mobile phones [1].
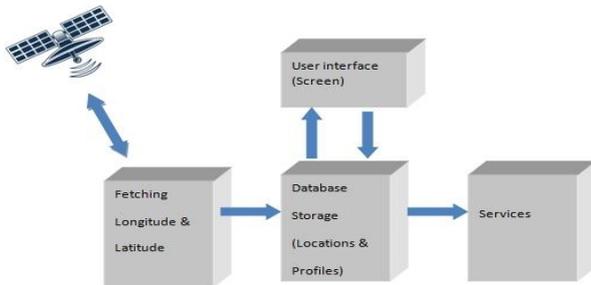

Fig. 1: System Architecture [1]

System mainly consists of following [1]:

1) Database: It stores information about location where different services are to be performed as shown in fig. 1.
2) Service handler: It handles various services like profile change, reminders and meeting request.
3) User interface: It allows user to select particular location and also allows adding contact numbers for meeting request.
4) GPS system: It continuously fetches the location co-ordinates and compares it with database and if any match found it calls the service handler.

Emergence hospital locator is an android application that helps the users to locate the hospital in urgent condition [2]. The GPS shows the top five nearest hospital present in the current city and also the route to those hospitals [2].The location and details of nearest hospital including the address and phone number can be notified through text message in mobile phone [2]. There is button which is clicked to make a call to the nearest hospital. On receiving the call the hospital sends the ambulance to their requester's location.

III. PROPOSED SYSTEM

"AutoPlease" helps the Auto-Rickshaw drivers and the passengers to interact with each other and also to serves each other in an efficient way. This will be useful for Auto-Rickshaw drivers to get passengers, to save unnecessary wastage of fuel and also to increase their daily profit margin. This application will be used by passengers to get Auto-Rickshaw nearest to his cellular zone with help of single touch and a single phone call.

The main aim of this application is to provide passengers an easy way to use application that helps them to find the nearest Auto-Rickshaw that can be located using GPS [6]. The GPS shows the top 5 nearest Auto-Rickshaw Drivers present in the current location if there nearby location any Auto-Rickshaw driver is registered. Including the phone number of Auto-Rickshaw driver with map view and list view on user side application. There is button which is clicked to make a call to nearest Auto-Rickshaw driver.
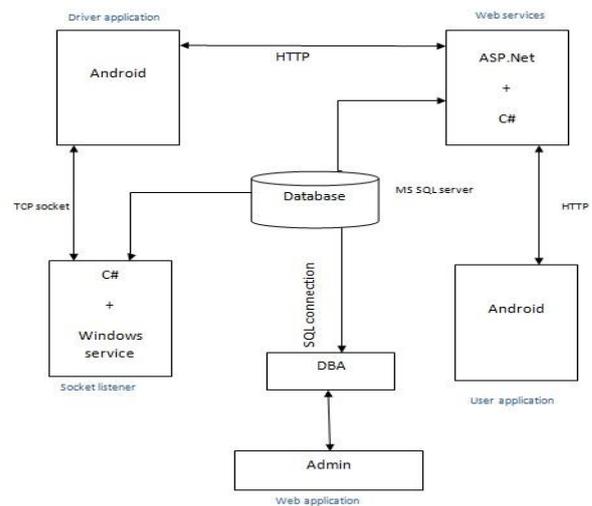

Fig. 2: Block diagram of proposed system.

Above proposed system consist of following components:

1) Socket listener services:

The socket listener will keep on updating the information of the Auto-Rickshaw drivers in the database. It will continuously put the location based information [5] of Auto-Rickshaw driver in the database. So that it can be further used to help passengers in getting the information of Auto-Rickshaw drivers.

2) Web API:

In fig. 2, web API will be use for user side android application which will be used by passengers to get the list and contact details of the Auto-Rickshaw drivers. So that he / she can contact them and get Auto-Rickshaw in the location where the passengers want.

3) Driver tracking application:

Driver tracking application will be installed on the android mobile phones of the Auto-Rickshaw drivers which will help in tracing the location of the Auto-Rickshaw drivers [5]. It will keep on sending the data to the socket listener services so that it can put into database [5].

4) Web application:

Web application will be useful for administrator to add or delete new Auto-Rickshaw drivers. It also provides privilege to administrator to customize Auto-Rickshaw drivers as shown in fig. 2.

A. Mathematical Model:

In this application, to find nearest Auto-Rickshaw driver it is very mandatory to calculate shortest distance between Auto-Rickshaw drivers and passenger's current location by taking consideration of latitude and longitude.

It calculated by Haversine formula [1]:

$$\Delta\lambda = longitude2 - longitude1$$
$$\Delta\varphi = latitude2 - latitude1$$
$$a = \sin{}^2(\Delta\varphi/2) + \cos(\varphi2) \times \cos(\varphi2) \times \sin{}^2(\Delta\lambda/2)$$
$$(1)$$
$$c = 2.atan2(\sqrt{a}, \sqrt{((1-a))}) \qquad (2)$$
$$d = R \times c \qquad (3)$$

Where R is radius of earth (6371 KM)

$\Delta\lambda$ is distance between two longitude points.

$\Delta\varphi$ is distance between two latitude points.

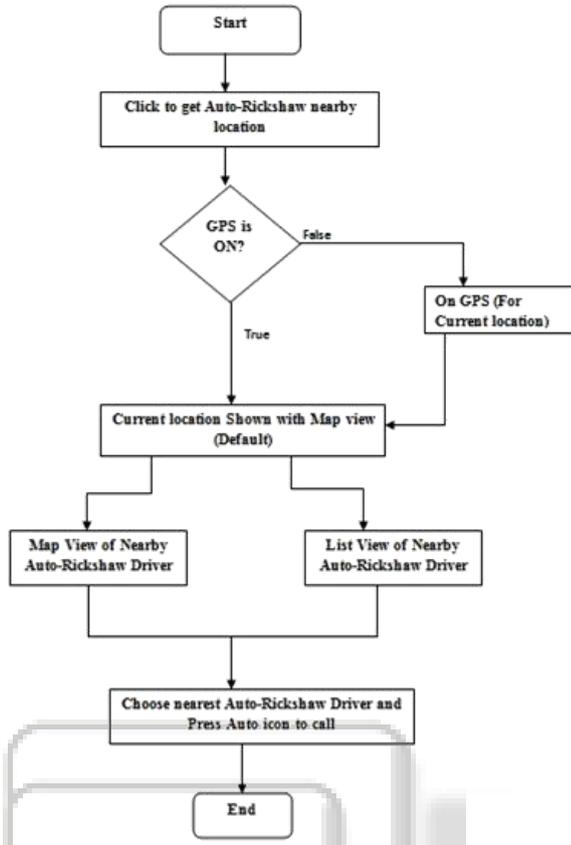## B. Flowchart:

1) User Side Flowchart:

Fig. 3: User side flowchart

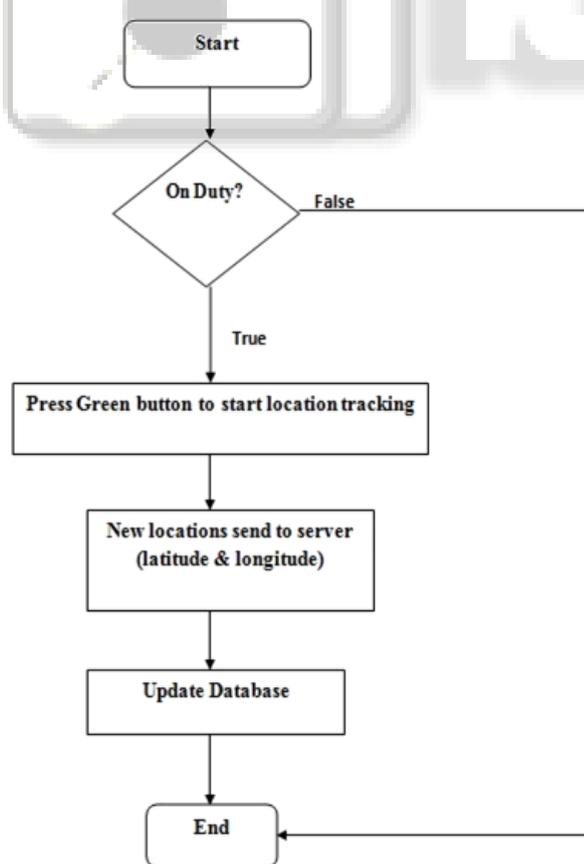### 2) Driver Side Flowchart:

Fig. 4: Driver side flowchart

IV. IMPLEMENTATION

The whole functionality of this application is discovering the exact location of the passenger when he starts with the application. We use GPS [6] and Google map to find the passengers precise location. Using the extracted location information, application will look for any services registered. Also application will track whether Auto-Rickshaw driver is nearby who are having driver side application of "AutoPlease". In this application, location shown by GPS [6] is going to be optimized so that user will know the precise position. If any Auto-Rickshaw driver will not able to pick call from passenger then passenger will try for next Auto-Rickshaw driver.

1) Example: Calculate distance between two points by using Haversine formula

Suppose we consider two points,

− First point is 18.53008N, 73.853013E
− Second point is 18.500337N, 73.853152E

Therefore,

Latitude1=18.53008   Longitude1=73.853013
Latitude2=18.500337   Longitude2=73.853152
Covert latitude and longitude from deg2rad [3]
(i.e. degree to radians)
We calculate difference,

$$\Delta\varphi = -0.0005178566423592375$$
$$\Delta\lambda = 0.0000024226007485739193$$

Now calculate,

$a=(\sin(0.0005178566423592375/2)^2)+\cos(0.3234096500208894) \times (\cos(0.32289179337853013) \times (\sin(0.0000024226007485739193/2))^2$ (1)

a= 6.7045197e-8

$c= 2 \times \text{atan2 (sqrt } (6.7045197e\text{-}8),(1\text{-}6.7045197e\text{-}8))$
$=2 \times \text{atan2}(0.00025893087,0.99999996647)$ (2)
$= 0.00051786174$

$d= R \times 0.00051786174$ (3)
$= 6371 \times 0.00051786174$

d=3.29929714554 KM

Thus we calculate distance between two points is 3.2992 KM.

Source	Destination	Distance
18.500433N, 73.853218E	18.522067N, 73.848631E	2.455km
18.478361 N, 73.824314E	18.366240N, 73.756207E	15.27 km
18.462362N, 73.836081E	18.462978N, 73.816780E	2.03 km

Table 1: Result

V. FUTURE SCOPE

We will add feature like traffic condition alert and also can add features like pre-booking through web site and android application. GPS correctness can be enhanced in future.

VI. CONCLUSION

The proposed system provides time consuming as well as decreases fuel wastage of Auto-Rickshaw drivers, and easy way to hire a Auto-Rickshaw by android application. Help in increasing profit margin of Auto-Rickshaw drivers. It also help Auto-Rickshaw driver to get passenger easily. Application will provides easy way to access to passengers

as well as Auto-Rickshaw. Very effective for handicap person to get Auto-Rickshaw at doorstep

REFERENCES

[1] Vedang moholkar, prathamesh hule, mandar khule,sumit sourabh "Automated location based services" Volume 4,Issue 2,February 2014

[2] Sathiyabama M," Android Mobile Widget for Proximity Hospital Locator"Volume 2,Issue 9,Nov-Dec 2013,pp(23-24)

[3] Sanchay Vaidya, Sourabh Gupta, Gouresh Singhal," GPS Devices to Increase Efficiency of Indian Auto-Rickshaw Segment" International Journal of Social, Education, Economics and Management Engineering Vol:8 No:3, 2014

[4] Parag Chatterjee, Dr. Asoke Nath2," Information Technology in public transports of India – A ubiquitous approach", International Journal of Advance Research in Computer Science and Management Studies, Volume 2, Issue 10, October 2014

[5] Sameer Darekar, Atul Chikane, Rutujit Diwate, Amol Deshmukh, Prof. Archana Shinde" Tracking System using GPS and GSM: Practical Approach", International Journal of Scientific & Engineering Research Volume 3, Issue 5, May-2012

[6] GPS tracking system http://www.eetimes.com/document.asp?doc_id=1278363

[7] http://www.articlesalley.com/article.detail.php/133304/104/GPS/Communications/11/How_GPS_Tracking_Can_Be_Used