

# Recommendation System for Efficient Taxi Business

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**Abstract:** Despite of wide use of Taxi in the main cities for travelling purpose the taxi drivers does not decide in which route they will get more passengers and passengers also does not know when actually the taxi will come to pick up. Because of this problem taxi drivers have to travel from one place to other without any passengers and this is just not wasting time of taxi drivers but they even consume lots of fuel. The taxi drivers do this work to earn money but due to this problem they do not earn that much money at the end of day. So here is a new application for efficient taxi business. Though this is basically design for taxi drivers to improve their revenue but this will also help passengers in some manner.

**Keywords:** Global Positioning System (GPS); Taxicab; Recommendation System; Cab.

## I. INTRODUCTION

A taxi or a cab, is a type of vehicle for hire with a driver, used by a single passenger or small group of passengers, often for a non-shared ride. A taxicab conveys passengers between locations of their choice. This differs from other modes of public transport where the pick-up and drop-off locations are determined by the service provider, not by the passenger, although demand responsive transport and share taxis provide a hybrid bus/taxi mode[1]. A taxi is important transportation type in cities because its not like other public transportation systems. Passenger decides where to go by which rout. But sometimes taxi system also creates some issues like if a passenger is waiting for taxi since long time and one more passenger gets taxi immediately just because they walked few meters. Or sometimes what happen you are trying to catch taxi from your place and while walking towards road from your place you see some vacant taxies are going, you are very near still you can not catch those taxies and after that you have to wait for long time for next taxi. This is very much irritating for passengers. These are some situations where passengers are suffering but in some ways even taxi drivers have same kind of issues. Imagine two taxies are coming from two different lane and one passenger is waiting for taxi, here only one who will come earlier to passenger will get next trip and other one have to wait for next passenger. These are some issues with traditional taxi system.

With time, everything is changing, and likewise transportation system is also changed with time. Now a days we do not have to wait for too long to catch up taxi. A new system of booking taxies for trips is available now. In this latest system we just need to book a taxi from starting location to end point using some applications. Examples of this system are: OLA, MERU, TAXIFORSURE and many more[2].

There are many options for taxi business but each of them has their own problems. And the solution to these

problems is efficient taxi recommendation system. With the help of this application taxi drivers can decide which trip they are suppose to accept among all the requests available in system at current time and passenger can book taxi from their location. And in this way taxi drivers will get more business and hence increase in their revenue. This is main objective of this application.

## II. RELATED WORK

In this area some work had done by many researchers. Few of them are studied here to understand how exactly those system work. The very first one is, Luis Moreira-Matias et al. [3] proposed an online taxi stand option for taxi drivers in their research. According to that theory if taxi drivers know where they want to stand to get more passenger then waiting time will get reduce by some amount. In that approach only waiting time is reduced by some amount but that not ensures increase in revenue. Here in our case we are suggesting them information related to current trip and upcoming trip too. Another work done in this area by Nicholas Jing Yuan et al. [4]. They proposed a system which helps taxi driver to find passenger and passenger to find place where they can probably get taxi for trip. This system helps passenger to get taxi but not from the location they want. Passenger will get recommendation about location where they can get taxi. In our system we are trying to overcome this issue because it may not be possible for passengers to travel till some other spot to get taxi.

Jing Yuan et al. [5] presented a direction system for drivers to help them to reach particular place as soon as possible. For this they used GPS system to get information about source location of trip and destination of same trip. In our system, we are also using GPS system to track taxi driver and passengers, this will help in fast service. Y. Yue, Y. Zhuang et al. [6] focused on clustering techniques for identifying locations where taxi is in demand, so that

no. of trips get increase resulting in more income. Similar work is done by Junghoon Lee et al. [7] to find out nearest place where vacant taxi drivers can get passenger depending on some previous data. All the above mention system have their own drawbacks such as some systems are design to help only taxi drivers and on other side some systems are able to help only passengers. But here in our system we are trying to help taxi drivers to increase their revenue.

At the same time we are providing some facilities to passengers such as passengers will get notifications about confirmation from taxi driver and waiting time for trip. Though this system is mainly design for increasing profit of taxi driver we are trying to attract passenger towards system by providing facilities. And this will help in increasing passengers for our taxi drivers.

### III.PROBLEM STATEMENT

To increase revenue, it is very important to find out how exactly we should work i.e. strategic planning is important part of every profitable business. Taxi driving is also one kind of business. In this case drivers must think about right location for getting passengers. If they know where exactly they should go to get next passenger then their waiting time will get reduce. Once waiting time is reduce by some amount it may be possible for them to take more trips than previously. And ending day with more profit in hand. As well as when taxi drivers are roaming around the city to find passenger of their choice and convenience, they waste fuel and increase pollution. This extra fuel consumption decrease their day to day income by some amount. Keeping this thoughts in mind we are planning to create something that can help taxi driver to increase revenue.

### IV.SYSTEM ARCHITECTURE AND APPLICATION DETAILS

The system architecture for mentioned recommendation system is as shown below:

From this architecture it is clear that there will be three users of the mentioned system i.e. admin, taxi driver and passenger.

Taxi driver and passenger have to go through registration phase to use system in future. In registration phase, information related to users is asked and saved in database of system for future use. After successful completion of registration phase, user can use system at any time just by login.

Whenever any passenger wants to book a cab for ride, one form containing details of starting location and destination as well as time for trip have to be filled by passenger. Then this request will appear on driver's phone with the other requests previously sent by some passengers if any. Now it is dependent on drivers which requests they want to accept.

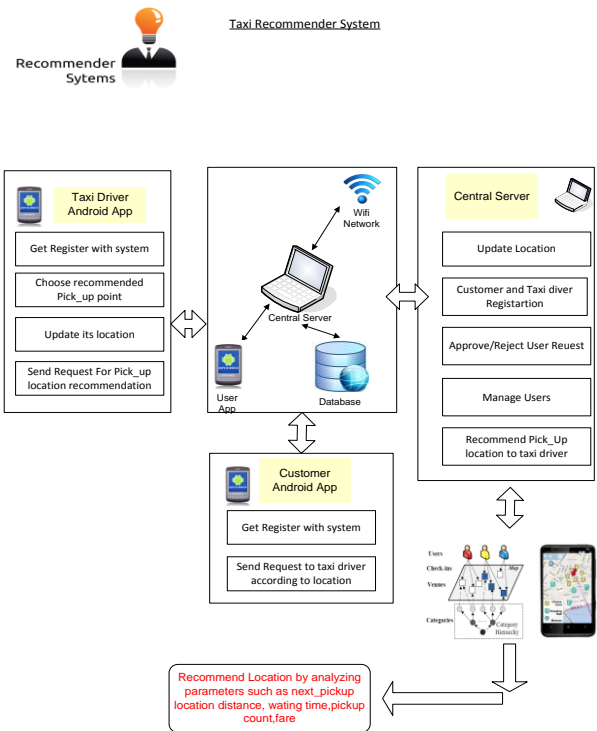


Fig.1 System Architecture

The list with all request from system is displayed on screen and on the top of this list recommended trip is highlighted so driver can understand that this is more profitable request among all in list. To calculate this, system checked previous data, current trip km and fare as well as from destination will driver get request depending on historic data. After all calculation the best trip is recommended.

### V. RESULTS

Here are some screen shots of how exactly system is working.

First step is registration phase of users which is compulsory to use system in future.

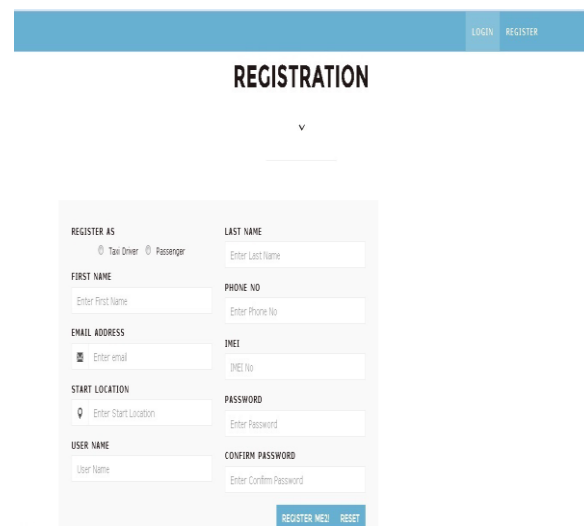


Fig.2 Login Screen

The login screen for every user is as follows

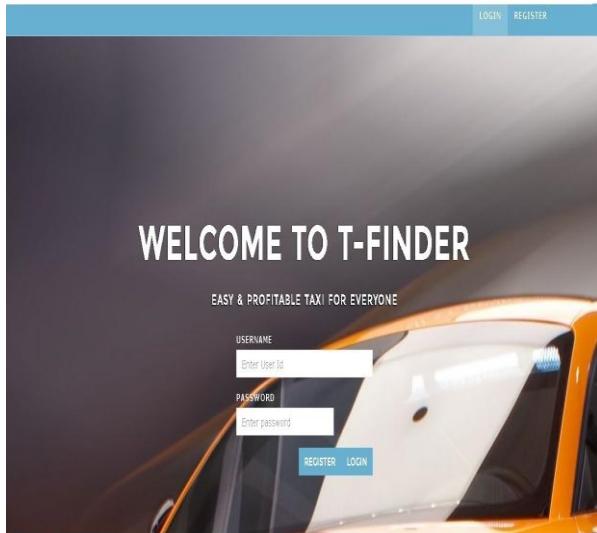


Fig.3 Home Screen

For requesting a taxi from any location passenger have to fill this form. The form is having few fields such as start location, destination and time when passenger wants to start trip.

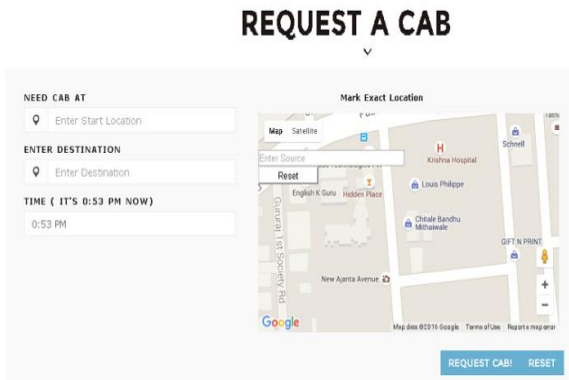


Fig. 4 Taxi Request Form

The list of all requests in system is shown to driver in tabular form.

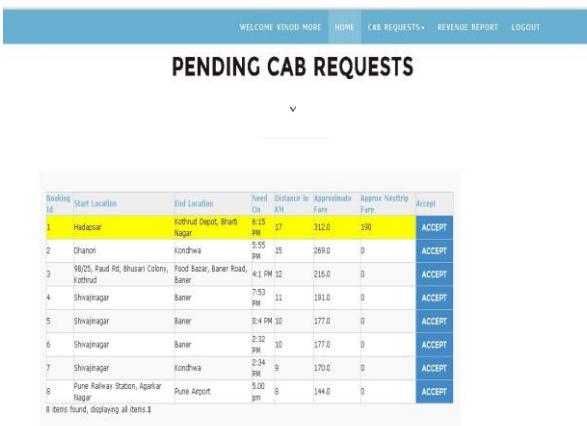


Fig. 5 List Of Pending Request



Fig. 6 Revenue Report

This revenue report is useful for driver to understand how much money they earned till time



Fig.7 Graph Representation

This is graphical representation of the revenue table to easily understand revenue report by everyone.

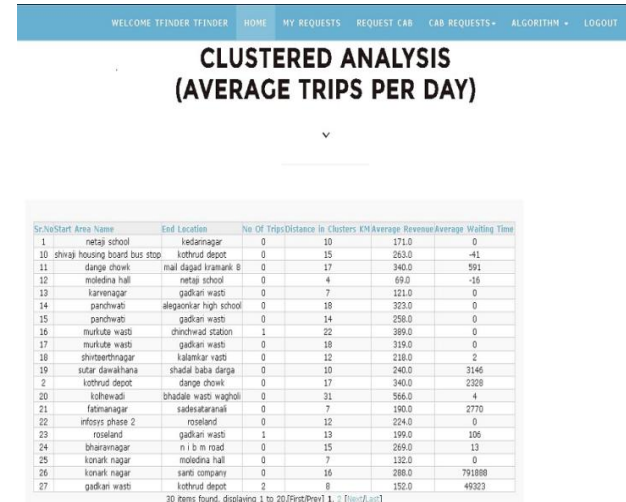


Fig. 8 Avg Trips Per Day

This table shows number of trips per day showing average waiting time for trips in particular place.



Fig. 9 Cluster Analysis

This figure shows the clusters which are having high profit, medium profit and low profit.

### VI. CONCLUSION

In this paper a system is explained to increase profit of taxi driver by providing them some recommendations about which trip is giving more profit to them. From above result it is clear that revenue of driver is increased by some amount. Because waiting time is reduce and extra fuel consumption is also less due to elimination of unnecessarily roaming on roads. As well as system is giving facility for passenger to book cab whenever they want from any place.

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