
ABSTRACT

We all are using different transportation facility to travel to particular location in our day today life. While traveling from one place to other, as time is changing ,the way we travel is also changing very fast. Like long years ago people used to walk from place to place as that time no vehicles were available. Then after invention of vehicles people started using bus, train, taxi, bike, plane for travelling. Though there are many options available for travelling in city, most popular is taxi or cab. After evolution in all areas now taxi system is also taking new look. In this paper we are trying to discuss all the systems which are available in current time for taxi transportation. And with these systems taxi drivers are earning more than by traditional System.

KEYWORD: RecommendationSystem,Taxicab,GPS.

INTRODUCTION

The traditional taxi system is all taxi drivers have to wait at one particular place which is called as taxi stand, for passengers. At taxi stand taxis are parked in one queue and service is on the basis of first come first serve only. These stands are basically located near a crowded place so that to get passenger easily [1]. But in this case taxi drivers have to wait till their turn come to take passenger. That means they have to waste more time if there is long queue and less passenger. In this case they did not earn that much money. To overcome this disadvantage taxi driver started finding passengers by roaming around the city. This is the middle era of taxi business. When they drop off any passenger at particular location, then they search nearby for next passengers by their own. No need to wait at taxi stand. The latest Version of taxi system is, with help of mobile applications taxi drivers can know about passengers. That is form that application they come to know about passenger requests for taxi or passenger might be waiting there for taxi. And this can be done by recommendation systems developed for taxi drivers and passengers. For these systems GPS is used to get location of taxi and passenger in real time [2] [3].

In this paper we are discussing different techniques available today for taxi drivers and passengers. Some System helps passenger to find nearest place where they can find vacant taxi for trip. In some application taxi drivers are getting information for passengers. While some applications are helpful for passenger and taxi drivers both. With the help of these systems taxi driver can earn more money and passenger can reach destination as early as possible.

RELATED RESEARCH WORK

Many researchers have done tremendous work in the field of data mining, information retrieval, recommendation systems. In mid 90s researchers concentrated on recommendation systems for users depending on some rating structure [4]. There are different approaches available for recommendation system models to work efficiently, these are Content-based filtering approach, Collaborative filtering approach, and Hybrid recommender systems approach [5]. One of the growing and complex areas for research in recommendation system is Mobile recommendation system. It is difficult area just because mobile data in this type of recommendation system is very complex [6]. Like recommendation systems, even for improvement in taxi business many researchers suggested so many options for taxi drivers and passengers. We will study those approaches so that we can easily understand what exactly is done in taxi recommendation systems for passenger and taxi drivers.

First of all, when taxi drivers start to search passenger for trip, they face some problem. Like where they will find passenger, how long trip will be, whether they know that place if they are new in city and etc. So the solution to this problem is that taxi driver must know a place where there is maximum probability of finding passengers easily. In [7] Jing Yuan et. al. suggested a solution to this problem by recommending place to passenger and taxi driver. According to this system, passenger gets notification based on the current location about where to stand, so they will get vacant taxi. The recommended place is in walking distance from passenger's current location. First the application checks whether passenger is nearer to any of parking places detected by system. If passenger is nearer to any of that place, application suggests that place otherwise nearer road segment where passenger finds vacant taxi. For taxi drivers, this application suggest best parking place and even route till that place, so driver can reach their as soon as possible. Detection of best parking place is done on the basis of probability to get passenger, short waiting time, and long distance trip to earn more money. To implement this system author introduced parking candidate detection algorithm. Similarly in paper [8], Han-wen Chang et. al. presented one system which suggests hotspots to taxi drivers based on historical data. When taxi drivers know that from which place more people hire taxi to travel, they can go to that place and get passenger instead of roaming on street for passengers. In this paper, authors used three algorithms for clustering road segments and city. Authors suggested hotspot to taxi drivers based on current time, current location of taxi driver and previous data about no. of trips from these locations. Basically this application is just to help taxi driver to decide where to go to find passenger from his current location. Another system in same area is presented in [9]. In this paper they presented a system which help taxi driver to decide best taxi stand. Instead of roaming on street for passenger, taxi drivers can go to nearest and good taxi stand to get passenger. Based on taxi drivers current location system analyze historic data and recommend a stand which is nearer so that waiting time will be minimized. But according to result from paper, sometime it is possible that taxi drivers have to drive vacant taxis till taxi stand. This system managed to reduce average waiting time of taxi drivers, according to their test result some of the taxi driver's average waiting time is decreased by 5%. These are some research papers which had their concentration on taxi drivers.

There are some researchers who had concentrated on both taxi driver as well as passengers too. Some papers suggest that showing efficient route to taxi driver may increase possibility of getting next passenger. Because they can reach destination earlier. We all know that none of the passenger will like to walk till some place to get taxi, if they will get at their own location. So in few research work scientists have concentration on passenger's convenience also. In paper [10], Nicholas Jing Yuan et. al. introduced a system for recommending options to taxi drivers and passengers. They presented a model for passenger who are waiting for taxi and taxi drivers who want trip. The recommendations are based on passengers trip data, pick-up and drop-off locations data of taxi drivers. From this system taxi drivers are getting recommendations about places where they can find passenger and route till that place which is shorter to reach. Even passengers are getting suggestion from system about nearest place where vacant taxis can be found easily based on historic data of taxi trips. One more work is done in this case is presented in [11] by Yu-Ling Hsueh et.al. This system is for taxi drivers to improve revenue. In this paper they decided four factors which are very effective on taxi driver's revenue calculations. That means if these factors are kept in mind while designing system then system will surely increase revenue. Those four factors are distance to next location for trip, waiting time, expected fare and occupied trip start location. From their study they mentioned that expected fare and starting location of trip are less important than waiting time and next passenger pick-up location. For this to work properly they used grid based clustering to divide city in fixed size of cluster. They created on-off and off-on graphs based on taxi trip historic data. From these graphs they did calculations about next trip from drop off location of current passengers.

These are few ideas from previously done research work by lots of scientists. As we know, now a day new system of taxi is in trend. That is passenger centric in some manner like OLA cab, Uber, Meru, TAXIFORSURE, and etc. These systems provide help to taxi drivers to get passengers easily. And passengers cab book taxi from their current locations. Still many taxi drivers are doing business at their own. They are not working under any of these companies. The systems which are discussed in this paper are helpful to them to decide at their own where to go for next passenger.

CONCLUSION

The aim of this paper is to study different options available for recommending location to taxi driver and passenger. There are many methods available to increase revenue of taxi drivers and decrease waiting time of passengers for trip. In each paper different techniques have been used for recommendations like parking candidate detection algorithm or selecting hotspot using algorithm. Some authors used k-means clustering, some used DBSCAN algorithm and some used grid based clustering method to divide city in cluster so to manage large city data in few clusters. From these different papers new researcher will get few ideas about how to improve revenue of taxi drivers keeping in mind that passengers should also get some help form system. Then only taxi drivers revenue will increase rapidly.

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