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Dynamic Real time taxi ride-sharing android Application

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Abstract - *Taxi-sharing system is developed using mobile cloud architecture. This project use temporal indexing method to locate the active user position and searching algorithm to track the driver and user positions and scheduling algorithm to schedule the user requests. Proposed taxi riders and drivers can access same mobile app. Passengers submit real time ride request using the same app. On receiving a new request, the server will first search for the taxi with minimal the travel distance and check with existing booked details .if any match found based on the user request then the list of available taxis will show to users .user can select any taxi by touching the taxi details .once, user touch the driver details, the user request will send to driver. If drivers select agree to pick up a new passenger, then the total amount will get divided and refund among them. There is no direct cost for public agencies, since the systems arrange ridesharing payments between drivers and riders.*

***Key Words*: Spatial database and GIS, taxi sharing, ridesharing;**

1. INTRODUCTION

Taxi is an important transportation mode between public And private transportations, delivering millions of passengers to different locations in urban areas. However, taxi demands are usually much higher than the number of taxis in peak hours of major cities, resulting in that many people spend a long time on roadsides before getting a taxi. Increasing the number of taxis seems an obvious solution. But it brings some negative effects, e.g., causing additional traffic on the road surface and more energy consumption, and decreasing taxi driver's income .

To address this issue, Real-time ridesharing (also called dynamic, or instant ridesharing) is an automated system that matches drivers and riders on very short notice or even en-route, differing from formal ridesharing by not requiring pre-planning or recurrence. Though most commuters prefer to pre-arrange commutes at least the night before, real-time ridesharing promotes taxis regardless of the time available for planning.

Formerly, people used hand signals for getting taxi Ride's by the side of roads. In peak times, they had to wait for long hours to get a free taxi. But after the Introduction of mobile applications rider use one of many private services through an application on their smartphone that automatically pairs them with a driver, this problem was addressed to some extent. It not only helped the road side passengers but also arranged home pickups. Whether it may be an instant ride request or a preplanned request, obviously the mobile applications made a huge impact on the taxi passengers. But the service providers still faced some difficulties in searching nearby taxi's as the location of a taxis available was highly volatile and it is was not determined by according to the passenger's request instantly. Taxi sharing is a technique in which many people share one vehicle during real time rides. It is highly encouraged because it is said to a renewable and an eco-friendly way, because sharing ones ride with others can reduce carbon emissions, road traffic congest ions, fuel intake and the need for parking spaces. Ride sharing is an economical way in which both the passengers and the drivers gets mutually benefited. The major technologies which are Commonly used in real time ride sharing are GPS(Global Positioning System) navigation devices and smart phones that accepts taxi passengers' real-time ride requests sent from smart phones and schedules proper taxis to pick up them via taxi-sharing with time, capacity, and monetary constraints (the monetary constraints guarantee that passengers pay less and drivers earn more compared with no taxi-sharing is used).

2. PROBLEM STATEMENT

Taxi is an important transportation mode between commercial and private transportation, delivering millions of passengers to different locations in urban areas. However, the number of taxi is much less than its demand in peak hours of major cities, due to this many people stand at roadside waiting for the taxis. To overcome the problem one optimal solution is to increase the taxis. But it brings some negative effects, e.g., causing additional traffic on the road surface and more energy consumption, and decreasing taxi driver's income. To address this issue, we introduce a Taxi sharing system that accepts passengers' real-time ride requests sent from smartphones and schedules proper taxis to pick up them via taxi sharing with time, capacity, and monetary constraints.

3. System Architecture

Fig. 1 shows the architecture diagram of Taxi-ridesharing system. The System consists of two participants - Driver and Rider. Both of them access the ride sharing system through the ride sharing application installed in their mobile device. To participate in the ride sharing, both of them have to register for the first time using their mobile application. This registration and login process is affected by the registration service and the user account data is stored in the Accounts profile database. Apart from the login data, the accounts profile database also comprises of other details such as the user address, Phone no, number of seats and the car type in case of a driver. The process begins with the rider registering his ride through the mobile application. The ride registration data comprising of source, destination address and start time of the ride is then passed on to the Google geo coding service through the ride sharing service module. This module converts the physical address into Geo location coordinates and stores them in the Google fusion tables. The rider after login searches for the ride through his mobile application. The ride request is processed by the ride sharing service. The filtered search result is presented to the rider along with the driver details and cost. After the rider selects a driver, rider request is passed on to the driver's mobile application by the ride sharing service. After the driver's approval, driver send confirmation message on rider's mobile phone and rider are enabled to communicate through the ride sharing application. Once the ride starts, ride tracking service starts tracking the ride using the GPS data from the user's mobile device. This data is temporarily stored in the accounts profile database to provide assistance in case of an emergency. After the completion of the travel, rider provides the rating and comment for the driver which is processed by the riding service and stored along with driver's profile data in the accounts profile database. The cost of the of rider is calculated based on the distance and cost propose by driver.

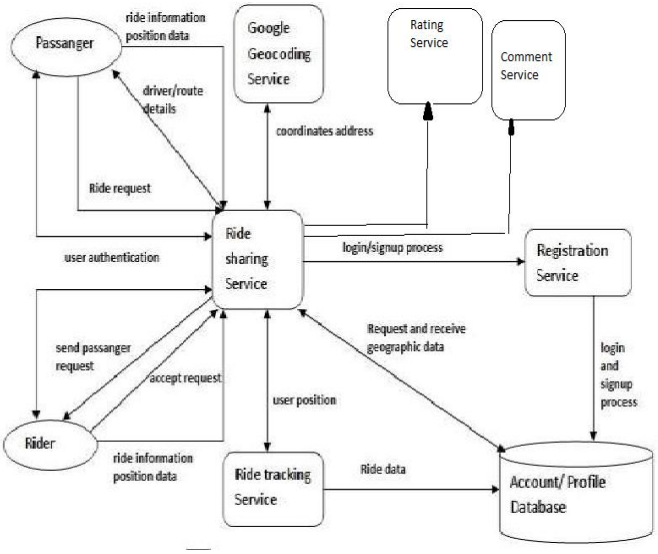

Fig -1: The architecture of real time taxi-sharing system

4.Module

There are three main module in the paper and they are as follows

Module1 (Mobile Client Module)

Smart Phone (android)which is interface to the user (driver/rider).After completing user registration they mark their source and destination in real time period. Using this information client display his ridesharing option. Using this information they can communicate with each other.

Module2(Web service)

Mobile client will transmit user data to web service. Web service transmits data to store in database. When user request

Ridesharing option web service queries data from the database, filter the data who do not fit and send only appropriate user to mobile client.

Purpose flie

Only riders are considering for rider and driver are consider for driver.

Timing constraint

Only the user who have upload the data before one hour.

Route Filtering

The route of te user are compares and if there are sufficient matching points on the route they are considered.The above filter give the number of users who can be pooled with the requesting user in the path he/she has chosen

Fare Calculation

The fare calculation function F=Pd where D is the traveled distance and p is some constant price for unit travel distance

Module3

Google table serves as database to our project.This is free service which is provided by google to efficiently store geopoints online.Rider provide rate and comment for driver which is also store in database.

Following figure 2 shows some of the Experiment Result of Project

(a)Login form (b)Riders search (c)Display information about driver (d)Comment and Rating (e)Show on map driver and rider location

Fig2

5. Taxi Searching Algorithm

The taxi searching module quickly selects a small set of candidate taxis with the help of the spatio-temporal index.

Single-Side Taxi Searching

Suppose there is a query Q and the current time is tcur : g7 is the grid cell in which Q:o is located. g7's temporally-ordered grid cell list g7 Fig. 2. g7 is the first grid cell selected by the algorithm. Any other arbitrary grid cell gi is selected by the searching algorithm if and only if Eq. (1 holds, where ti7 represents the travel time from grid cell gi to grid cell g7. Eq. (1) indicates that any taxi currently within grid cell gi can enter g7 before the late bound of the pickup window using the travel time between the two grid cells

$$ti7 \text{ Þ } tcur \_ Q.pw.l \quad (1)$$

find all grid cells that hold Eq. (1), the single-side searching algorithm simply tests all grid cells in the order preserved list g7 finds the first grid cell gf which fails to hold Eq. (1). In Fig. 2, grid cell g3, g5 and g9 are selected by the searching algorithm.

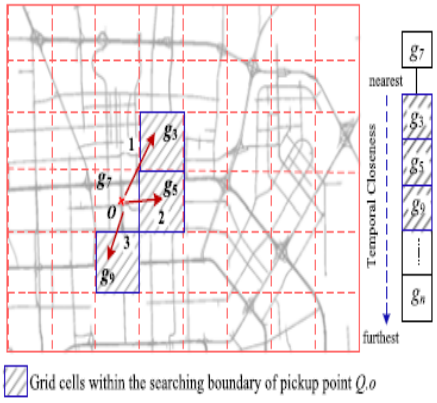

Fig3 Single side taxi searching algorithm

Dual Side Taxi searching Algorithm

The dual-side searching is a bi-directional searching process which selects grid cells and taxis from the origin side and the destination side of a query simultaneously

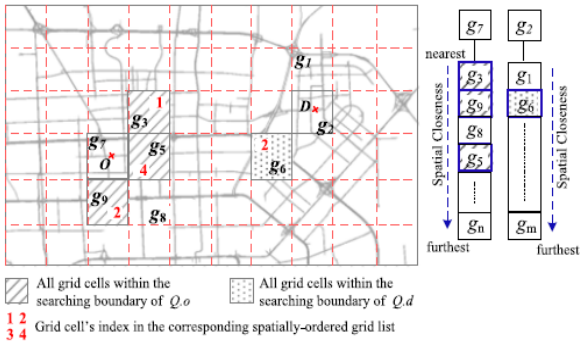

Fig 4 Dual side searching algorithm

Consider the ride request illustrated in Fig. 3 where g7 and g2 are the grid cells in which Q:o and Q:d are located respectively. Squares filled with stripes stand for all possible cells searched by the algorithm at Q:o side. These cells are determined by scanning the temporally-order grid cell list of g7 which holds Eq. (2) is a candidate cell to be searched at the origin side. Eq. (2) indicates that any taxi currently within grid cell gi can enter g7 before the late bound of the pickup window using the latest travel time between the two grid cells.

$$tcur + ti7 <= Q.dw . l \quad (2)$$

Squares filled with dots indicate the candidate grid cells to be accessed by the searching algorithm at Q:d side select all grid cells which holds Eq. (3), which indicates that any taxi currently in gj can enter the g2 before the late bound of the delivery window In this example, g6 is the only satisfying grid cell as shown by Fig. 3

$$tcur + tj2 <= Q. dw . l \quad (3)$$

6. Conclusion

Real time taxi sharing system is very effective means to reduce pollution and the congestion of vehicles in cities. It also provides an eco-friendly way to travel. It also provides an opportunity to meet new people. System saves the total travel distance of taxis when delivering passengers. Our system can enhance the delivery capability of taxis in a city so as to satisfy the commute of more people. The system can also save the taxi fare for each individual rider while the profit of taxi drivers does not decrease compared with the case where no taxi sharing is conducted.

7. Future Work

In this proposed system the basic concept of taxi ride sharing through real-time request generation and its acceptance In future work may use social networking sites for real time request.

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