DYNAMIC RIDESHARING USING SOCIAL MEDIA

Tejas Talele[1], Gauresh Pandit[2] and Parimal Deshmukh[3]

[1]Department of Computer Engineering, Pune University,Pune City, MMCOE
talele.tejas@gmail.com
[2]Department of Computer Engineering, Pune University, Pune City, MMCOE
pandit.gauresh@gmail.com
[3]Department of Computer Engineering, Pune University, Pune City, MMCOE
parimaldeskmukh.comp2@mmcoe.edu.in

ABSTRACT

This document is Intended for the purpose of Enabling the power of social media to Empower Ridesharing. this entails the creation of an ad-ridesharing Initiative with a view to tackling real-world problems such as traffic congestion and the ever-increasing fuel prices. The main objectives include creating applications, both web and mobile based, to seamlessly integrate the app's functionality into and everyday user's routine.

KEYWORDS

Ridesharing, carpooling, dynamic, web, android

1. INTRODUCTION

In recent times, due to population explosion, the affordability and mass production & distribution of automobiles, the possession of an automobile has changed from being a luxury to a necessity [1]. The increase in use of fuel-powered vehicles has resulted in a drastic increase in fuel prices as well as traffic congestion. It has also impacted the environment in the form of global warming and air-pollution.

A few methods devised to reduce the impact were public transport, non-conventional fuel resources [2] and walking/cycling to reach one's destination. The merits of the above solutions were the reductions in the amount of pollution as well as lesser road congestion. However, public transport is not a well-developed system in India and apart from the inconvenience with respect to time, it is also usually unreliable. Though non-conventional fuel resources attempt to stem pollution, there has not yet been devised a cost effective manner in which to harness it for automobiles. Physical means of transport are not an option when faced with a transit of long distances [3].

Our intended system aims to remove all of the above discrepancies. We plan to create a carpooling system which gives users the same flexibility that a private car gives and which reduces the number of vehicles used at the same time. Availability and convenience issues can be solved through connectivity to an online social media (Facebook) and a smartphone application (android) for creation of dynamic carpools.

DOI : 10.5121/ijans.2012.2403

Section II of this paper defines and elaborates the problem as it is faced today. In section III, the existing solutions, their merits and disadvantages are discussed. Section IV explains the advantages that the proposed system provides over existing solutions. Lastly, in Section V, the implementation details of the system are proposed.

2. PROBLEM DEFINITION

The purpose of this project is the creation of an ad-hoc ridesharing initiative with a view to tackling real-world problems such as traffic congestion and ever-increasing fuel prices. The main objectives include creating applications, both web and mobile based, to seamlessly integrate the app's functionality into an everyday user's routine through in-built social media platform integration. Major emphasis will be placed on the ease of dynamically spawning car-pooling groups and collaborating once a link is established. The user-base is intended to be obtained by tapping into the open social graphs of a social networking site while the ease of usability will be achieved by the development of a universal accessible web portal and an Android OS compatible mobile application. Furthermore, route-tracing will also be undertaken to reduce the complexity that users generally have to face while trying to initiate real-world contact. We hope that undertaking this project will provide a feasible solution for all the above intended features to be assimilated into a single product which can be used by any individual with a nominal amount of effort.

3. Literature Survey

The transportation sector is a significant user of energy. Encouragement of carpooling is one known strategy for reducing traffic that some suggest is second only to a driving ban in its potential for reducing energy use.

Around 20 lakh vehicles are present in Pune city, out of which, 65% of the travellers, travel occupying a single seat. Nearly 13.5 lakh litres of petrol is wasted per day, according to an article in Times of India. Even if a fraction of the city populace participates in this carpooling venture, we can still hope to save about 1 lakh litre of petrol per day.d

Facebook has 800 million active users [4], thus the great advantage to launch on social media platform is to get ready users.

There have already been many similar projects put into motion, enlisted below
Carpooling.co.in:- It is an Indian carpooling site established in 2008 and is one of the most successful Indian carpooling website [5].It has about 1300 members and many carpools. It has not been marketed as well as it should have and thus the number of people aware of such a site is less.

Waze.com:- The application is a social mobile application provides the navigation based upon the condition of road.It gets better, the more you drive and is 100% powered by users[6]. Waze is developed by Israeli start-up Waze Mobile for mobile phones. The platforms which Waze supports are Android, Symbian , Blackberry, Windows Mobile and iOS. Application is a real-time application ,it takes information from users' driving time and provides routing with real-time traffic updates. The information about the route, map data and other conditions regarding road is gathered from the users using this service, thus it is a free application to download an use . The users of this service, can also provide additional information, like, hospitals, landmarks, traffic jams, accidents, etc[7].

Waze is available for use in every part of the world, with some countries having full basemaps and others still needed to be updated by the users. Currently Waze has a complete base map in the

United States, Canada, France, Germany, Italy, Netherlands, Belgium, Israel (claimed to be the best map for that country), Ecuador, (parts of) Argentina, and Panama, but the company has plans to make it available in other countries in Europe and elsewhere [8].

The Waze provides additional benefits such as, sending anonymous information, including your speed and location, back to its database to improve the service, along with turn-by-turn voice navigation, real-time traffic, and other location-specific alerts. The Waze community is able to detect mapping and navigation errors, as a result of crowdsourcing which is easily achieved by running the app while driving. It uses gaming conventions such as cupcakes for involvement of users in providing more information to the Waze[9].

Zimride.com:- Logan Green, Matt Van Horn and John Zimmer, initiated Zimride in year 2006. Zimride was the first online carpooling site to integrate Facebook to show potential riders who might be riding with them [10]. It received $250,000 from Facebook in 2008 and is profitable with millions of rides served [11]. The major drawback of Zimride is that, it is only available in US and doesn't have a mobile application but is still one of the leading ridesharing site in US.

Zebigo.com:- Zebigo is an on-demand, ride share matching site. Basically it keeps track of two people with respect to location and time. It is a dynamic ridesharing system. The information which you provide during the trip is only available to the users who are paired with you. Zebigo manages the monetory transaction between the driver and hitchhiker [12]. Zebigo is another website which primarily focuses on US for its user base.
Although there is a lot to be learnt from the existing initiatives, our project is unique in that it rectifies the collective shortcomings of the present products.

4. HOW THE SYSTEM MAKES A DIFFERENCE

We intend to tap into the user base of Facebook.com which is roughly 800 million active users[4]. Collaboration between both parties will be sorted not only through social media connectivity, but also with Geo-location tracking via a native mobile application based on Google's Android OS.

Privacy concerns are addressed by the post visibility of Facebook which can be customised. This will ensure that the audience that views the availability of a ride or a request to a ride will be just as public as the user wishes it to be. This is a very high level of control and an apprehensive user may choose to share a ride or request with only a few selected people will find this very beneficial.

The success of interactive games on the Facebook platform gave us the idea of linking this real-world initiative by awarding points based on successful rides offered, passenger satisfaction, miles covered etc. An online rating feature enables both the driver and passenger to rate each other after a ride. After a certain period of time over which a user can build a good reputation, he/she may also be considered trustworthy by someone whom he/she has never met before and so on.

5. IMPLEMENTATION

A. Data Flow

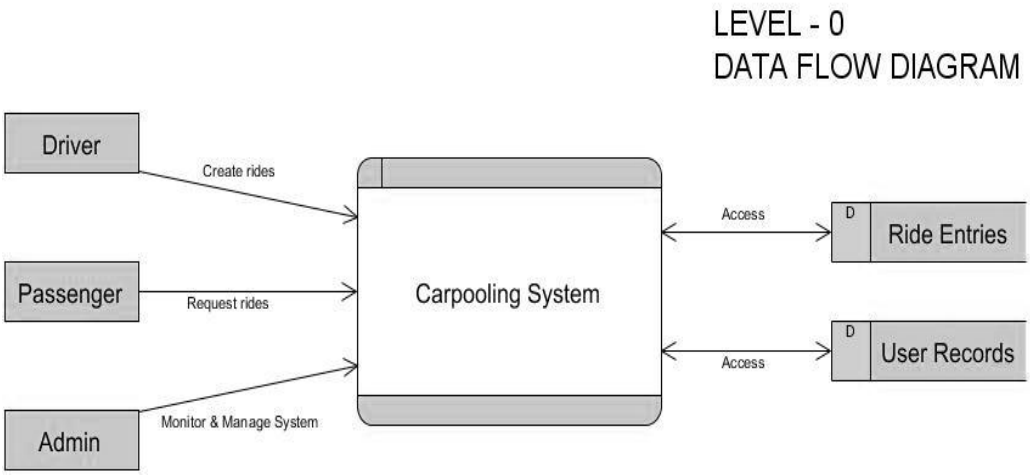

Fig 1. Level 0 DFD

The Level – 0 takes driver, passenger, Admin are inputs to the carpooling system which registers rides, searches for rides, manages these rides and later gives Ride Entries and User Records as output.

Level – 1 Data Flow Diagram

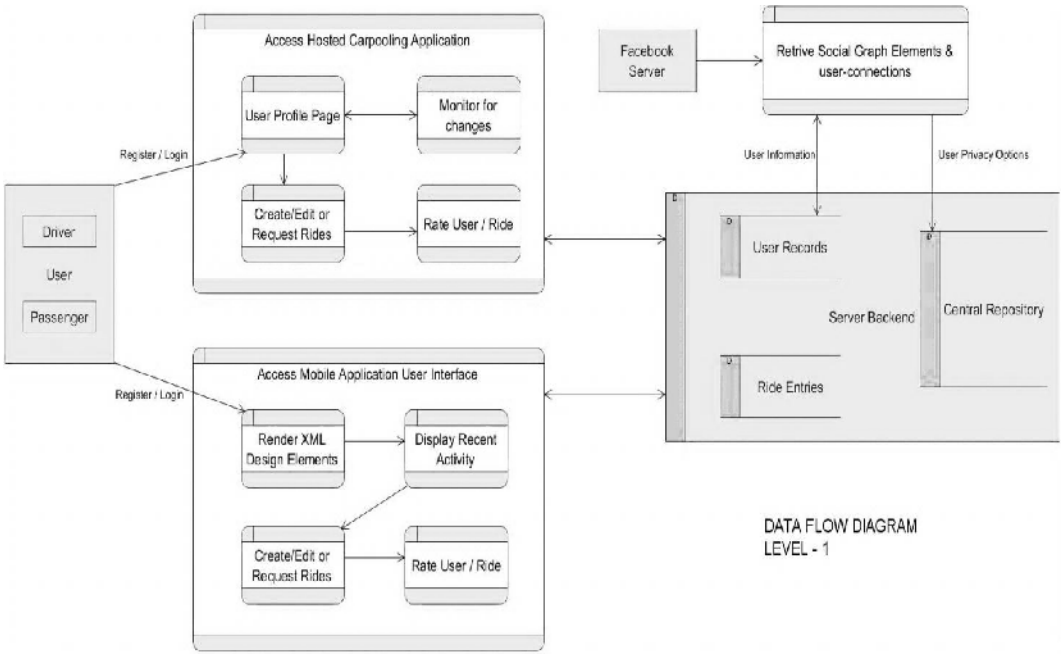

Fig 2. Level 1 DFD

The Level-1 DFD contains two important physical modules one for the website and another for the mobile terminal. These perform similar functions like User Profile registration, Creating/requesting for rides, rating different users and Monitoring Rides. These than interact and communicate with the server which has all the backend entries stored. The server is the one that communicates with the social media platform (Facebook) which provides user data.

B. Architecture

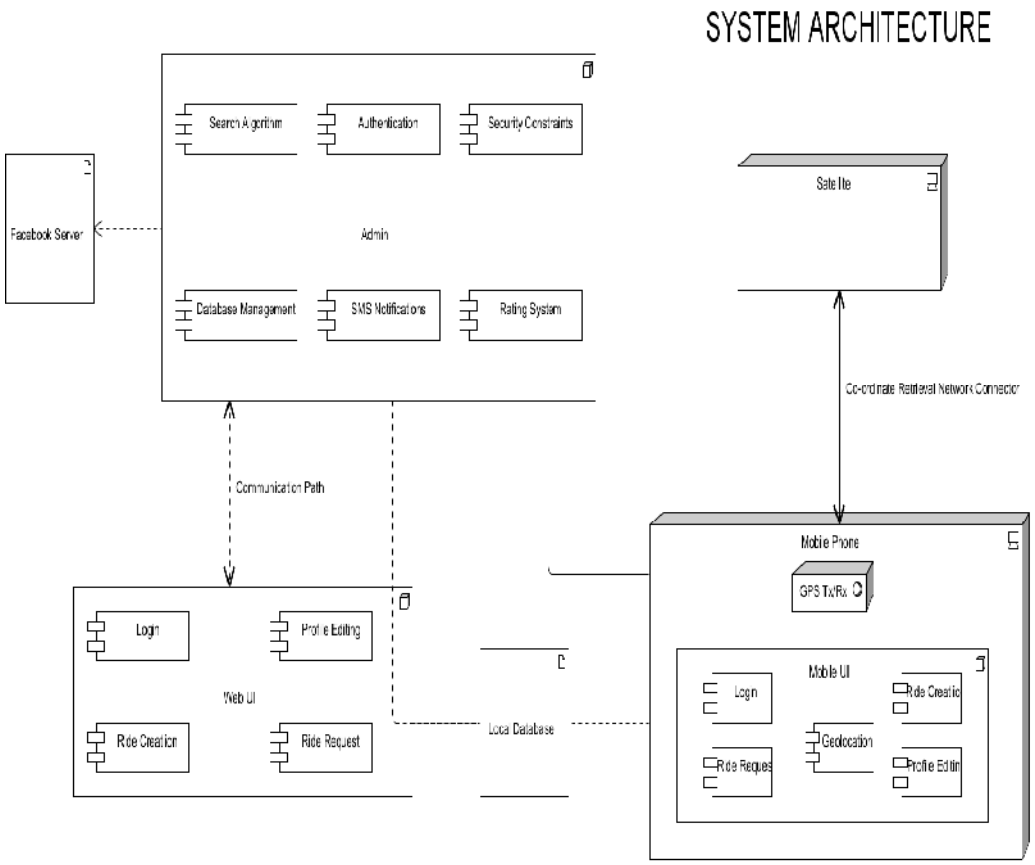

Fig 3. System Architecture

The above figure is a representation of the layout of the intended system architecture. It is inclusive of a general overview of all the components in question and is a static representation showing physical connectors.

C. Operating Environment

i. Client System (web application)
Processor – Pentium 4 and above (1 GHz)
OS - Windows (ME/2000/XP/Vista/Se7en), Linux (Any flavour), Mac OSX, Solaris
Browser – JavaScript compliant (Firefox, Chrome, IE, Safari, Opera)

ii. Client System (mobile application)

Processor – 100 MHz and above

OS – Android (v2.1, Éclair) and above
GPS – Geolocation tracking ability

iii. Server System

OS – Apache Linux (v2.2.15)
Scripting Language – PHP (v5.2.13)

Backend - MySQL (v5.1.45)

D. **Design and Implementation Constraints**

i. To use the web interface, a latest browser incorporating JavaScript libraries is required.
ii. The working of the mobile application will be restricted to Google's Android OS.
iii. Users must possess a Facebook account for direct login and must grant the required permissions to the requesting application.
iv. Users must have unique OAuth token while logging in through Facebook.

E. Mathematical Model

The following mathematical model represents the functionality of the system in tuple format.
5-tuple format of an FSM (Finite State Machine)

(Σ, S, s0, δ, F)

a. Σ is the input alphabet (a finite, non-empty set of symbols).
b. S is a finite, non-empty set of states.
c. s0 is an initial state, an element of S.
d. δ is the state-transition function.
e. F is the set of final states, is a subset of S.
f. Σ= username, password, login-ID, locations

S=login, authenticated, create-ride, search-ride, search-results, accept-user, request-ride, publish, logout, login-failure

s0= login
F= logout

δ1 =login X {username, password} P1(S)
P1(S) = {authenticated, login-failure}

δ2= create-ride X {locations} P2(S)
P2(S) = {publish}

δ3= search-ride X {locations} P3(S)
P3(S) = {search-results}

6. TEST DATA & RESULT

Input	Expected Result	Pass/Fail
(On login page) Username, Password	Redirect to app's main page, customised for user.	Pass
(On ride creation page) Source, Destination, Departure Time, Arrival Time, Owner	Create a ride with corresponding details.	Pass
(On search page) Source, Destination, (optional =) Time, Owner, Arrival, Departure.	Search database with rides matching maximum of given fields	Pass
(On search results page) Choice of carpool to participate in.	Request should be sent to owner of carpool.	Pass
(On login page of carpool owner) Notification to accept/deny carpool participation requests	Participants should be notified about their acceptance or rejection.	Pass

7. CONCLUSIONS

Thus, a comprehensive carpooling system is suggested along with the necessary implementation details. Such a system will help in tackling the growing problems of pollution, traffic congestion and fuel prices. The system is planned in a way that makes it easy to implement without compromising user functionality and ease of use.

8. ACKNOWLEDGEMENTS

We would like to take this opportunity to thank everyone who helped and supported us during the preparation of the seminar.

Our deepest thanks go to our guide during the course of our project design and analysis phase, Prof. Rahul Dagade. Apart from being a constant source of inspiration to look at our project from different perspectives, his valuable inputs have always been thought-provoking and have greatly helped us to envision the project as it is today.

We would like to express our gratitude toward our Head of Department (Computer), Prof. R. B. Joshi and the rest of the faculty members for being as accommodating as they are to our ideas and sparing time from their busy schedules to aid and motivate us.

We are grateful towards our institution and its Principal, Mr A. N. Gaikwad for allowing us a chance to showcase our idea to a larger audience.

Lastly, we would like to thank all of our family, friends, and well-wishers without whom, this endeavour would not have seen the light of day.

9. REFERENCES

[1] Automobile Domestic Sales Trends, Society Of Indian Automobile Manufacturers, 20/12,2011,http://www.siamindia.com/scripts/domestic-sales-trend.aspx

[2] "Revealed - how the hybrid car "works" | Claverton Group". Claverton-energy.com. 2009-02-24, http://www.claverton-energy.com/revealed-how-the-hybrid-car-works.html

[3] Geetam Tiwari. "URBAN TRANSPORT IN INDIAN CITIES". London School of Economics. http://www.urban-age.net/0_downloads/archive/_mumbai/Newspaper-essays_Tiwari.pdf

[4] Facebook Statistics, 21/10/2011, http://www.facebook.com/press/info.php?statistics

[5] Carpool.co.in, 21/10/2011, http://www.carpooling.co.in/worldmap/home.php

[6] Waze Iphone App, 6/8/2009, http://news.cnet.com/8301-13772_3-10305132-52.html

[7] Waze: Way to Go, 21/10/2011, http://world.waze.com/about/about_us/

[8] Waze Now Available Internationally, 10/11/2009, http://www.waze.com/blog/waze-now-available-internationally/

[9] Waze In New York Times Blog, 6/5/2010, http://wheels.blogs.nytimes.com/2010/05/06/filling-in-the-map-gaps-with-waze-games/?src=twt&twt=nytimeswheels

[10] America's Best Young Entrepreuners, 9/10/2009, http://images.businessweek.com/ss/09/10/1009_entrepreneurs_25_and_under/26.htm

[11] Zipcar Plans Partnership With Zimride, 8/4/2009, http://online.wsj.com/article/SB123915473346099771.html

[12] About Zebigo, https://zebigo.com/about.php, 10/12/2011