WolfPool: An Easy way to plan your rides

Shyam Katta
Computer Science
N C State University
skatta3@ncsu.edu

Santhosh Dharmagadi
Computer Science
N C State University
sdharma@ncsu.edu

Sai Harsha Suryadevara
Computer Science
N C State University
ssuryad3@ncsu.edu

Sai Sri Harsha Kanamanapalli
Computer Science
N.C State University
skanama@ncsu.edu

ABSTRACT

Most of us fancy to commute at a cheaper cost. Discerning the rapid growth of cities and connectivity, one can clearly notice the limited connectivity of public transportation and other transport services to certain places. There is a need to effectively manage the transportation as well as travel costs while having minimal impact on environment. Today, we have several applications such as Uber, Lyft which provide transportation services but is there an application which allows the users to pre-book a ride to a certain destination on a particular date and selected preferences and travellers, with a pre-estimated cost? The aim of this project is to create such an application which provides the users a platform to pre-book a ride and commute to different places in a cost efficient manner with selected riders. This paper discusses the idea of the application, the feasibility of the application and the basic features that will be provided in the application.

1. INTRODUCTION

Who does not like to avoid public transport while commuting to different places in a cost efficient way. Nowadays, car sharing has become so common that everyone prefers to share the ride, cost and travel comfortably. There are applications like Uber and Lyft which provides transport services and ride sharing but what if there is an application which lets the user communicate with other users in the application and share a ride with them to a particular destination? Will it be easy for the users to ride with known people in a cost efficient manner? As this is not a commercial organization, the cost for each trip will be equally split for the cost of the ride. What if the user can also book the ride well in advance of the travel date and have multiple rides booked in advance? Will this be helpful for the user who travels to different locations on a daily basis?

WolfPool is an application which allows the users to commute to different destinations by sharing the rides with known people in a cost efficient manner. The users can register in the application and search for the plans already existing and join the plan if the conditions set by the users in the ride matches or the user can always go ahead and make a new plan by talking to other users. The user can get a vehicle and make a plan or the user can join the plan as another rider. This application also lets the user have an estimate of how much it's going to cost for that trip and the users can pay by different options one being virtual wallet option. A survey based on feasibility of the application and different features of the application was given out and the results were positive and the feasibility of the application was accepted.

2. LITERATURE REVIEW

Mobility is one of the most basic features of our modern society. People and goods move around the entire Earth in a continuous and broad attempt to fulfill economic, safety and environmental goals. The Mobility Management or Transportation Demand Management is a collection of strategies for encouraging more efficient traffic patterns towards achieving specific planning objectives [1]. For example, people can choose to switch from peak hours to a non-peak time, or to cycle instead of using the car. Administrative regulations could introduce incentives or reimbursements when alternative commuting modes are used [1]. Governmental policies could include fuel tax increases or pay-as-you-drive freeway taxes or car insurances. The applications integrate diverse computing languages with platforms, standards, and technologies.The experimental results are encouraging, allowing us to consider that seamless integration of hybrid management systems for transportation could have tremendous economic and social impact on a global scale [2].

Gathering people into common trips leads to individual and social efficiency. At a personal level, it reduces the total traveling cost and the driving stress as well.Although it is less comfortable than using the personal car and people usually need more time for performing the travel, the broad acceptance of the shared-use. From the social point of view, less fuel consumption, less CO2 emission, less traffic congestion and more social interaction are the benefits of sharing cars or vans [3]. By saving natural resources like oil, by producing less pollution and by cutting the travel expense, using a car for many persons is an advance to sustainable transportation systems. As an alternative to public transportation and taxi services, sharing a car combines the benefits of a shared cost with the flexibility of a taxi ride.The main idea of shared-use mobility is to share the transportation cost between multiple participants [4].

The number of transportation booking applications have ex-

ploded over the last few years primarily due to the increase in GPS enabled devices, fast and reliable mobile connectivity.These apps offer real benefits to customers and companies and location plays a critical role for all of them. Google Maps APIs enable many feature-rich capabilities that can provide the best location-based information and user experiences for booking and tracking the perfect ride. Google Maps APIs are available for Android, iOS, web browsers and via HTTP [2]. All of the services allow you to embed maps within your application on each platform and place markers on top of the maps showing the location of any customers or vehicles. Using the Google Maps API for your customer-facing applications may be the first start to incorporating intelligent location into your business. [3].

3. SURVEY

3.1 Survey Goals

The survey is an important source to get a real feedback from the intended users. A subjective approach might be intuitive in the initial stages, but it is highly recommended to move forward only with the objective information. Before launching a new product or application, we need to consider various factors such as acceptability, trust, willingness, and feasibility. Positive survey results reinforce the fundamentals of the product or design and provide some insights necessary to improvise to reach the target audience in an effective way. As WolfPool is a relatively new idea, it's very important to scrutinize the acceptance and feasibility of this product.

3.2 Survey Results

In this section, we shall briefly go through various questions posted in the survey and responses on the same. The survey was conducted on roughly 25 students from North Carolina State University.

3.2.1 Survey results

Below responses and questions are collected, with 21 people surveyed representing a normal user of this application.

Question 1. Should the app have a panic button which delivers mail or text to registered contact ?

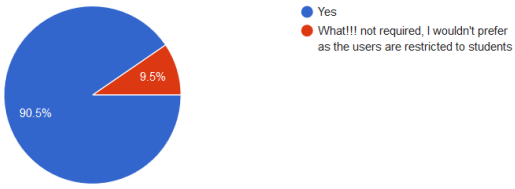

Figure 1: User Question 1

This question was put in the survey to find out if the users are interested to have a panic button options so that the registered contact will be notified if something goes wrong in the trip. More than 90 percent of the users wanted this feature in the application.

Question 2. Will you take the user ratings into consideration for joining an already existing plan?

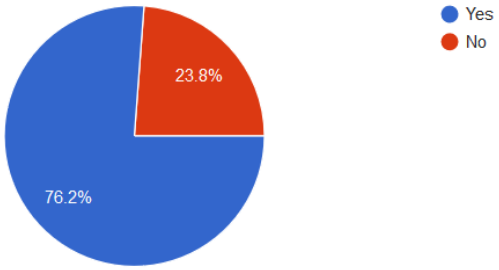

Figure 2: User Question 2

This question was posted to find out if the user who wants to join the trip considers the other user ratings who are already on the trip the plan. Most of the users wanted to have this option in the application and wanted to decide to join a trip by considering the ratings of other users.

Question 3. Select applicable constraints you would like to have for a ride?

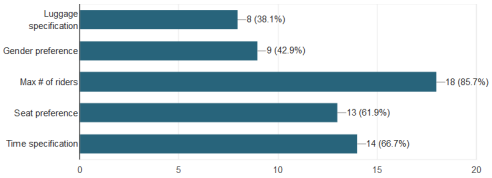

Figure 3: User Question 3

This question was aimed to find out what additional options the users are looking while searching for a trip match. Few options like luggage specification, gender preference, the maximum number of users, single destination were provided in the survey. Most of the users wanted all the options for searching a trip match with the favorite option being the maximum number of users in the ride followed by specific time preferences, seat preferences, gender preferences and finally luggage specifications.

Question 4. Do you want to add any further specifications to share a ride by typing the specifications in a text area provided?

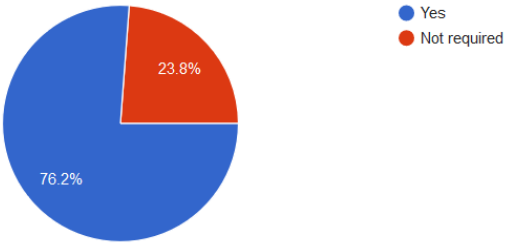

Figure 4: User Question 4

The above question was put in the survey to find out if the users are very specific about the other users and their preferences while searching for a trip so that they get a perfect match. Most of the users wanted these options for searching the trip so that they can get an accurate match.

Question 5. Which one of these do you think is a better cancellation option?

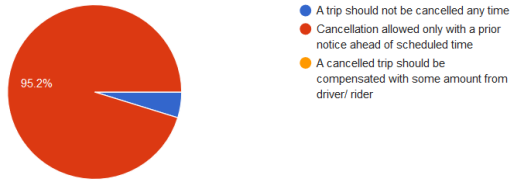

Figure 5: User Question 5

This question was posted to get an idea of how the cancel trip feature should be implemented. Most of the users wanted to have an option to cancel the trip in advance or before a specified amount of time. Very few of the users did not want the cancel option to be in the application.

Question 6. Do you want the expense tracking feature to be integrated in the application?

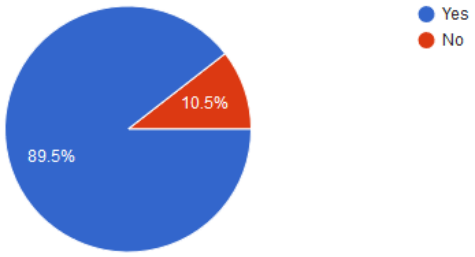

Figure 6: User Question 6

This question was posted to find out if the user is interested to have the expense tracking feature in the application. Majority of them wanted to have expense tracking feature included so that the users can easily split the bills among themselves. Few of them were not interested in this.

Question 7. Which of following feature do you recommend for chat feature ?

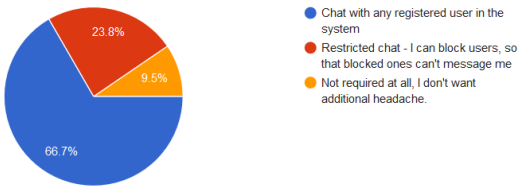

Figure 7: User Question 7

This question was posted in the survey to find out if the user wants the chat option in the application. Most of the users wanted the chat feature in the application and most of them were willing to receive messages from any registered users in the application so that they can join the plan if the preferences are matched. Few of them wanted extra options to block few users and get messages only from selected users. Very few of them did not want the chat option.

Question 8. Do you like to have an estimated trip cost for the ride?

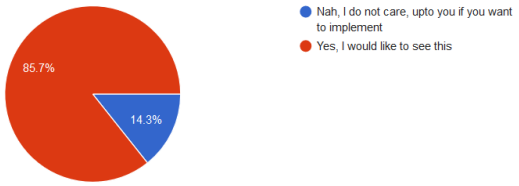

Figure 8: User Question 8

This question was posted to find out if the users want a cost estimation feature in the application. More than 85 percent of the users wanted this feature to be in the application so that they can have an idea of how much the trip will cost them.

Question 9. On a scale of 1-5 how much do you prefer to use Wolf Pool provided above features?

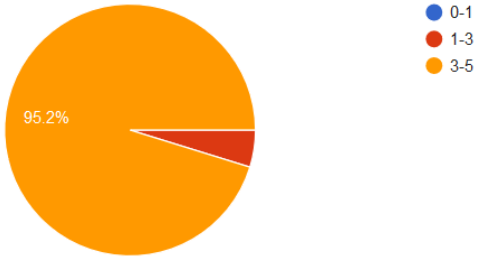

Figure 9: User Question 9

This question was added to find out how many users are willing to use the application on a scale of 1-5 after adding the new features. More than 95 percent of the users are willing to use this application on a scale of 5 which is the main motivation for the application and this also shows the feasibility of the application.

4. SYSTEM ARCHITECHTURE

4.1 MEAN stack

This project was implemented using MEAN Stack. The frontend was developed using AngularJs and to maintain the same language the backend was developed in NodeJs. The middleware in the server was implemented using ExpressJs to handle the API calls received from the frontend. MongoDB was used to store the data.

4.2 Database

MongoDB is an open source document-oriented NoSQL database. Instead of storing the data in tables made out of individual rows, like a relational database does, it stores the data in collections made out of individual documents. In MongoDB, a document is a big JSON blob with no particular format or schema. MongoDBs document data model maps naturally to objects in application code, making it simple for developers to learn and use.

4.3 Amazon Web Service

Amazons Elastic Beanstalk which is an easy-to-use service for deploying and scaling web applications and services. Elastic Beanstalk automatically handles the deployment, from capacity provisioning, load balancing, autoscaling to application health monitoring. For the backend framework, we are using Node.js.

4.4 Karma

Karma is a JavaScript test runner created by the AngularJS team. The application's tests are being run on karma test suite runner and jasmine is the testing framework used to test the application.

5. WHY WOLFPOOL

There are few questions about the uniqueness of this project. Let's go through them.

Why Wolfpool?

Wolfpool is an application mainly focused to provide a platform for the users to make plans and travel with known people in a cost efficient manner.

What is new in Wolfpool when compared to other transport service applications?

- Wolfpool provides an option to plan multiple trips far advance in time compared to book a single trip in shorter time for Uber pool.
- The users in wolfpool can share the ride with known people as compared to strangers in Uber/Lyft pool.
- WolfPool is a cost efficient application as the cost of the trip can be equally shared among maximum number of people.
- The users can chat with other users in the trip to settle on common terms over various preferences.
- The user can decide to join a trip if the user is satisfied with the ratings of other users.

Are the users secure when they travel to different destinations?

- Wolfpool lets the users to register only if they have an .edu email id.
- Wolfpool provides an option of sending notifications to the registered contacts when the user presses on the panic button.
- The users choose whom to ride with instead of travelling with strangers.

6. FEATURES

6.1 Security

WolfPool ensures complete safety of travellers by limiting the access to the application to only university students and only users with legitimate email ids can use the application. Moreover, the users can choose whom to travel with which ensures more safety.

6.2 Make a plan

Wolfpool lets the user create a plan by setting the source, destination and start time. The user can also set some specifications like minimum rating, gender specification and luggage specifications so that other users with a perfect match can join the ride.

6.3 Search for a ride

The users can search for a trip by setting theur source, destination and start time and wolfpool will search and give multiple matches and highlight the best match. More additional features can also be added for trip matching like maximum number of riders in the ride, luggage preferences, gender preferences. The user will get the best match and will know which preferences are not available. If the user is not satisfied with the available matches, the user can always go ahead and create a new plan.

6.4 Expense Tracking

Expense tracking featrue can be implemented in the application so that the cost of the trip is divided proportionally among the users and is updated in the application.

6.5 Trip cost Estimation

An estimate of cost can be provided to the users by integrating few APIs provided by Uber nad Lyft. If the user has an own car and the user create the own trip then the user can always have a choice to charge appropriate amount for the trip.

6.6 Cancel or Update a trip

The user can always cancel a trip and let others know that the user will not be sharing the ride with the other users. The user can also update the destination in a trip or the user can also update the date and time of the trip only if the user has started the plan.

6.7 Email Notifications

Once the user joins a ride, all the users already in the plan will get email notifications about the details of the trip and the user joined. This will let the users to talk to other users or make a change in their plan if one user ins not satisfied with other user. Moreover, if a user updates the trip or cancels the trip, all the users in the plan will be notified via emails.

6.8 Chat box

The users can talk to other users in the application via chat box provided in the application. The users can negotiate on cost and other preference like luggage, any time change.

This will help the users not to cancel or update the trip by agreeing to some common terms.

6.9 User Reviews and Ratings

The users can give reviews to other users with whom the user travels. These reviews will be used for the new users as a feature to join a trip. The users can join trips only if the users have good reviews. The users can also rate the users if the user updates or cancels the trip in the last minute.

7. EVALUATION PLAN

An evaluation plan is very important to test any application and to check if the application has all the requirements given before the development started. Unit tests will be written to test the application and a beta version of the application will be given to different users once the application is developed. After the development phase is completed, few features to test the application are-

- The user must be able to update and cancel the trips.
- The user must get the best match for the trip based on the preferences set by the user. The user should also get other matches in the decreasing order of number of preferences matched.
- The user should be able to give ratings to the other users in the trip.
- The users in a trip should get email notifications whenever any of the users from the trip updates or cancels the trip. The registered contact for the user should get email notifications when the panic button is hit.
- The user must be able chat with other users in the application.
- The user must be given a feature used to track the expenses for a particular trip.

Quality Measures:

- Security: The application will provide a secure login of the user and will send an email to confirm the email.
- Concurrency: Load balancing is one of the important quality measures. The application can support multiple users at once.
- Availability: The application will always be running and the servers will always be up.
- Adaptability: The application can be easily changed to other technologies and is highly adaptable.
- Scalability: The application can always handle increased user base.
- Performance: The application will be fast and would load each page without any delay.
- Reliability: The application will turn to fallback server when needed.

8. CONCLUSION

Wolfpool is an application built to create a platform where users can plan rides in advance with other users in the application and share rides and cost with them. The basic idea is to let the users travel in an cost efficient manner by integrating features like chat box where users can communicate with others, make multiple plans way ahead of the ride days and have a schedule booked for travel. These features are currently not being provided by leading transport service providers like uber and lyft. Wolfpool also provides a safety option as the users can choose whom to ride with unlike uber where the user can not choose whom to travel with in uber pool. Wolfpool would be an ideal application for the users who would like to book the ride in advance with known people at a cheaper cost.

9. REFERENCES

[1] Intelligent Carpooling System A Case Study for Metropolitan Area *http://tiny.cc/dhn8ry*

[2] Use the Maps API to show the real-time location of the customer *http://tiny.cc/t0o8ry*

[3] Car Poolup Real-time Carpooling using GPS *http://tiny.cc/u2o8ry*

[4] School of Science and Engineering Carpooling Application *http://tiny.cc/z6o8ry*

[5] AWS vs Heroku: Cloud Platform Comparison for 2017. *https://hackernoon.com/aws-vs-heroku-cloud-platform-comparison-for-2017-5f2194c0673e*

[6] Cloud platforms compared: Heroku, AWS, Azure, Digital Ocean, Google App Engine. *http://selbielabs.com/cloud-platforms-compared/*

[7] Developers j Uber. *https://developer.uber.com/docs/riders/references/api/*

[8] Express - Node.js web application framework. *https://expressjs.com/..*

[9] Heroku vs. Google App Engine vs. AWS Elastic Beanstalk. *https://stackshare.io/stackups/aws-elastic-beanstalk-vs-google-app-engine-vs-heroku*

[10] I. Lunden. Disrupt NY 2016. *https://techcrunch.com/2016/05/10/uber-says-that-20-of-its-rides-globally-are-now-on-uber-pool/*