PROGRAM: CISC

PROPOSAL FOR APPLIED PROJECT

TITLE: ROAD TRIP PLANNER

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ABSTRACT

We will design and build an Android based application to help users plan road trips. Application will allow user to access different information such as weather and road conditions, attraction and scenic routes along the way, places to stay, camp or take a quick shower and best places to eat along the route. Will also provide information about best places to take a pit stop for vehicle repairs. Application will be providing suggestions based on the user's preferences, and making decision by pooling information from various APIs. Application will make it easier for the user taking away the hassle of juggling various applications and websites to make decisions. Furthermore, application will allow the user to team up with their friends, share trip plans, playlists and instant messaging among themselves. Users will be able to share the trip moments with others via social media applications such as Facebook, twitter and Instagram. Friends can even split the expenses for the trip via the app making it easier to manage trip expenses.

KEYWORDS:

JavaScript, React, Android, Maps, Navigation, Google Maps, API, Weather, Lodging

1. INTRODUCTION

To take my degree to a logical conclusion I want to do a project that will implement different aspects of the computer science that I have learned through the course of my degree. I will be doing an Applied research effort aimed at solving problems and developing new processes or techniques to solve these problems. I believe that solving a practical applied project will be the best way to learn and implement the fundamentals of software design in real business scenarios. I plan on developing an application that will help users plan for their road trips. Application's target demography will be young and tech savvy users who want to make a thought-out approach to planning road trips.

There are various applications that provide different services like weather data, maps, navigation, hotel and restaurant information individually but could not find any application which provide these in one place. I plan to provide the users with a platform where they have access to all the information at one place.

2. PROBLEM STATEMENT AND JUSTIFICATION

Problem I am thinking about is the Road trip planning, we all have been in a position where we want to take a road trip but will have to jumble many different information sources like what's the weather like on the way and at the destination, where should we plan the sop overs and what all activities we can plan along the way, but doing so takes lots of planning, looking up information from various sources. I plan to develop an easy to use android app for my project, with future provision for an IOS and Windows

market place versions too. Application will primary be focused in USA region with future scope of expanding it to other regions and countries.

Application development will require a throughout understanding and implementation of some advanced graph (map) traversing algorithms, database management and web development. We could use some market research to get more details about the target audience and available market size. However, those things are out of the scope of the project and not directly related to our subject of interest, we would focus only on the technical aspect of the app development.
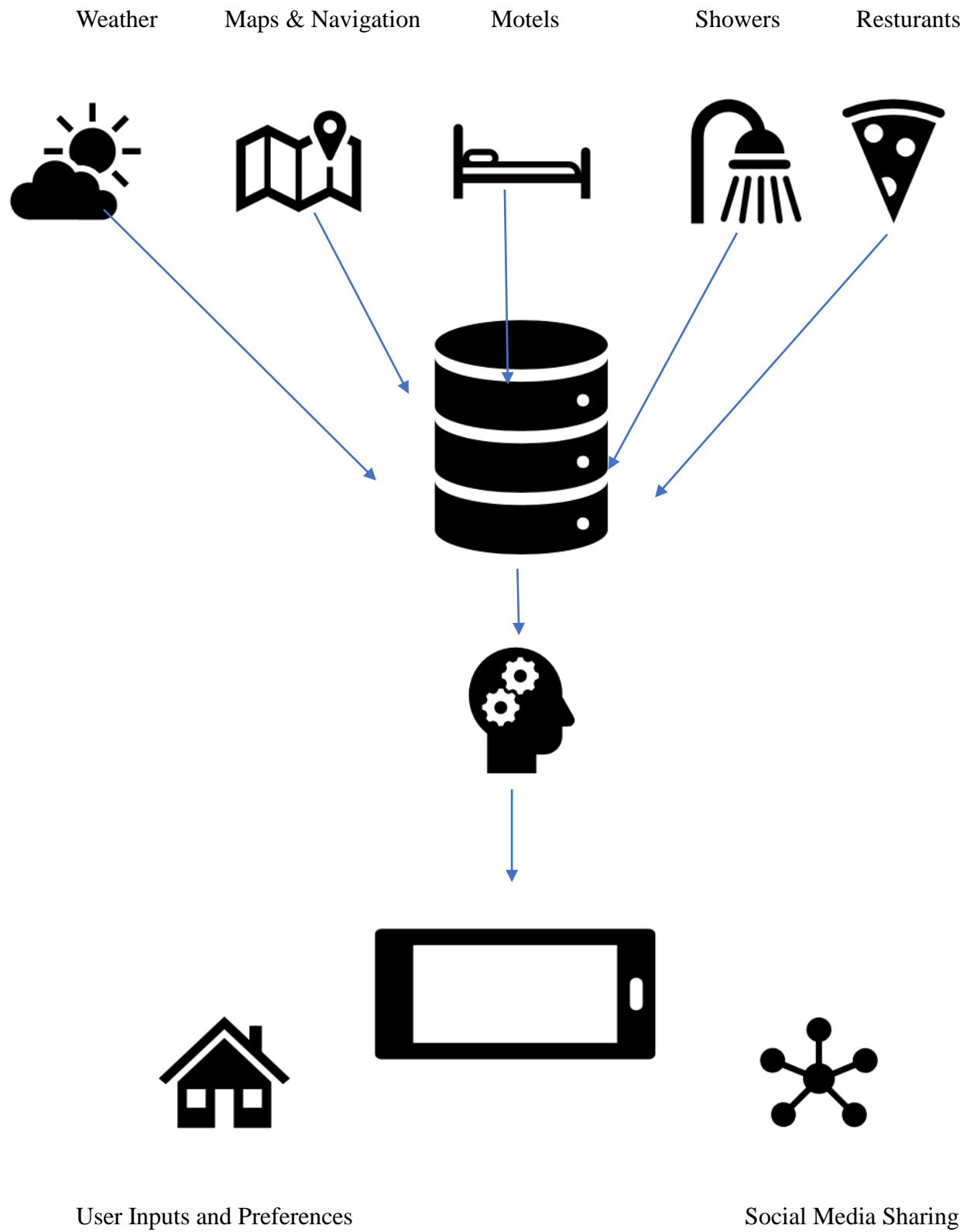
Application will have different aspects that will be required

1. Front End and User interface

2. Backend

3. Database

   Challenges that we foresee will be

1. Protecting user information - Authentications and Authorizations

2. Finding reliable data APIs

3. Fetching data from various Data API services such as Maps, Weather, Yelp etc.

4. Interfacing with external social media applications

It seems to be excessively ambitious project which will require a great deal of coordination and cross commits. We might have to expand or contract on some aspects to make the application viable in the time frame. Please refer to a brief over view of the application provided as a block diagram on the next page.

Weather   Maps & Navigation   Motels   Showers   Resturants

User Inputs and Preferences   Social Media Sharing

I plan on developing an application that will help users plan for their road trips. A natural question arises what problem will the application solve, why it needs to be solved and who all will want to have an application that would solve those issues. In this paper an effort has been made to discuss why we need to solve this problem and who will be benefited by this application. During trip planning you will have to take into consideration various aspects Numerous time we have to plan a trip but are worried which route to take, where to make pit stops or are there any site seeing that can be accomplished while on route. Sometimes the trip is too long to be taken in one day and needs to be split into multiple days. On any road tip where to stay for the night is the most difficult and important decision. Choosing the place to schedule the night halt at a place takes into multiple factors, such as a decent and cheap place to stay for the night, where should we do the pit stops to have food or vehicle maintenance. Apart from that we also keep checking weather how it is on route and on destination. Add to this mix, keeping track of the trip expenses is also a big aspect and needs to be managed to have a stress-free trip. Our application will help user to keep track of the expenses and share expenses with the other members on the trip, when friends are taking the trip together they need not bother about who is paying for expenses, they can just enter the amount of expense and who paid it, app will calculate who own whom what.

To understand what are the challenges that we are proposing to solve, we need to define or give a brief outline on what are these challenges. Below is a brief outline of the various elements required for a decision-making process followed when planning for a road trip.

1. Purpose of the Trip

2. Destination

3. Time

4. Mode of transport

5. Weather

6. Where to Stop

7. Site Seeing on way

8. Expenses

Planning a trip takes lots of decision making, first decision is the road trip itself, are you just trying to get to point B from A or do you want to enjoy the journey itself. Are you taking the trip for leisure, business or emergency? Depending upon the objectives of the trip your layout, for an emergency, you would want a fastest route or Business trip you would want to take a fastest or most fuel-efficient route. On contrast if it's a leisure trip you might want to take a more scenic view with possible sightseeing or attractions visit on the way. You might want to avoid tolls or take country side roads to enjoy and making explore the country side on your trip.

Another aspect of the trip that is based on many different factors to be accounted for deciding is the time you want to reach your destination. If you are planning a multiple day trip you might want to spread out your driving time over the days to enjoy without exerting and driving all thru the day, or you just want to reach your destination as soon as possible. It's always difficult in choosing where to stop for the night. You would want to pick the stopping point that would match your trip objective. One might want to schedule

the night stay where you get a cheaper place to stay or you might want to camp for the night. Or you want to may be swing by a big metropolitan to enjoy city life.

On top of all these there is always the factor or weather, no one likes driving in bad weather and we always check weather how's the weather at the destination and at various points along the route. No only you would want to check the weather along the route you also must anticipate how the weather will be along the route when you get there. This is one of the most important factor influencing your decision, you might want to avoid taking a route based on the weather. Or you might want to delay or leave early to avoid bad weather.

We also want to keep in mind what time we want to reach our destination. You want to reach your destination early in the morning or late in the evening, these factors makes a significant impact on the place we choose to halt before or the time we need to leave in morning to make it in time.

Managing expenses of the trip is also one of the most important aspect of the trip. Any trip comes with inherent expense, tool, fuel, food etc. We want to keep track of the trip expenses and capture receipts for the business trip. If you are taking the trip with your friends you would want to share the expenses among friends.

These options cost in terms of your decision-making resources and cause a headache. So many times, we wish we just had an app where you feed in some of the parameters and out comes the response suggesting a trip. Not many applications are available that cater to these needs, there are individual apps that gets information about

individual needs but that bring a lot of overhead for the user. Although there are many different applications which provide information about various aspects Application will allow user to access different information such as weather and road conditions, attraction and scenic routes along the way, places to stay, camp or take a quick shower and best places to eat along the route. Will also provide information about best places to take a pit stop for vehicle repairs. Application will be providing suggestions based on the user's preferences, and making decision by pooling information from various APIs. Application will make it easier for the user taking away the hassle of juggling various applications and websites to make decisions. Furthermore, application will allow the user to team up with their friends, share trip plans, playlists and instant messaging among themselves. Users will be able to share the trip moments with others via social media applications such as Facebook, twitter and Instagram. Friends can even split the expenses for the trip via the app making it easier to manage trip expenses.

There are various applications that provide different services like weather data, maps, navigation, hotel and restaurant information individually but could not find any application which provide these in one place. I plan to provide the users with a platform where they have access to all the information at one place. Our application will capture data from different APIs and consolidate the data in one place.

Our application will target the young tech savvy people who want to go in more detail about planning and to make a thought-out approach to planning road trips. We are focused on the demography that like to have more planned trips. Application will support USA region with future scope of expanding it to other regions and countries.

For developing an app, it's very important to make sure what your application is providing is different from the others available in the market. I believe for an application to be different from another we can quantify the differences on the following parameters

1. Presentation

2. Features

3. Customizations

4. Social Media integration

5. Performance

6. Cost of Service

7. Anonymity(Privacy)

8. Ease of use

3. LITERATURE REVIEW

I have tried to review many applications that were providing services to help people plan their travel. I reviewed the following applications and compared them on some of the features I believe is of value to the user of such an app.

1. Google Maps

2. Roadtrippers

3. Road Warrior Route Planner

4. RoadAtlas - Trip Planner

5. Road Trip Planner

6. Trip Planner

7. Accu Weather

8. Yelp

9. FindEat

10. Gas Buddy

11. Hotels

12. RV Parks & Campgrounds

A brief overview of the features is presented as a matrix in the

App/Feature	Core Feature	Navigation	Weather	Restaurants	Lodging	Gas Stations	Expense Sharing	Sightseeing
Google Maps	Navigation	X		X		X		
RoadTrippers	Trip Planner	X		X	X			X
Road Warrior Route Planner	Trip Planner	X		X	X	X		
RoadAtlas - Trip Planner	Trip Planner							
Road Trip Planner	Trip Planner	X		X	X	X		X
Trip Planner	Trip Planner						X	
AccuWeather	Weather		X					
Yelp	Review	X		X		X		
FindEat	Restaurants			X				
Hotels	Lodging				X			
Gas Buddy	Gas					X		
RV Parks & Campgrounds	Lodging				X			

Table 1: Features of Applications reviewed presented below.

App/Feature	Core Feature	Navigation	Weather	Restaurants	Lodging	Gas Stations	Expense Sharing	Sightseeing
Google Maps	Navigation	X		X		X		
RoadTrippers	Trip Planner	X		X	X			X
Road Warrior	Trip Planner	X		X	X	X		
RoadAtlas - Trip Planner	Trip Planner							
Road Trip Planner	Trip Planner	X		X	X	X		X
Trip Planner	Trip Planner						X	
AccuWeather	Weather		X					
Yelp	Review	X		X		X		
FindEat	Restaurants			X				
Hotels	Lodging				X			
Gas Buddy	Gas					X		
RV Parks & Campgrounds	Lodging				X			

Table 1: Features of Applications reviewed

Since Maps and Navigation is one of the most important aspect of our application, the quality, detail and ease of use of the map function is of utmost importance. One of the most widely use application used for planning travel is Google maps. While the application is the most informative, efficient and easy to use, but does not provide

Most of the applications we reviewed offer free services, however a few of the apps provide premium service features for a certain fee. Certain applications such as FindEat offer anonymous usage without any need to sign up for service. In today's day and age when the consumer is informed and quite aware of their privacy and security concerns, I believe it's a highly desirable feature to have.

One of the application that is most closely related to what I propose to do is Road Tippers. The application provides a map and navigation tool with suggestions of nearby attractions along the route. It provides information about millions of places, like local diners and quirky roadside attractions, or scenic points, national parks, and hotels. Application also provide a webbased product that be directly accessed from web browsers. Application provides special features for fees as a pro service along with different coupons from various partner businesses. It also allows for to share road trip plan with friends and family, different users can edit and modify the trip plan which is a really nice feature to have and makes trip planning with friends fun. Users can plan trips directly from the app or on the web at roadtrippers.com, then share them with a group. Friends can add suggestions to the itinerary and travel with their favorite navigation app (google maps or waze etc). Saved trips or places are synced automatically across different devices. This application currently provides services only in USA region

Another such application is Road Warrior Route planner, Road Warrior claims to have solved one of the most complex challenges known to computer science, the Traveling Salesman Problem (TSP, TSPTW). It uses a custom genetic algorithm to elegantly solve the TSP with a custom genetic algorithm specifically tailored for the mobile professionals. This type of productivity software is has been used by large transportation companies (FedEx, UPS) for decades to optimize routes for high levels of efficiency. Another unique feature that this application provides in comparison with other applications is that it provides real time traffic for planning trips while most applications other than Google Maps does not provide this feature. This app also takes into account the starting time and the desired time to arrive at the destination. This app is particularly useful for planning business road trips. Application also allows for prioritizing which locations to be visited in a fuel-efficient way and schedule stops with more efficient routes. The Road Warrior application is widely used by the professional couriers like Fedex, UPS and DHL drivers to sales representatives, realtors, insurance agents, delivery drivers and even small businesses. The free version provides for planning with up to 8 stops on the route while the paid version can add 120 stops at a given route. Pro version also offers a lot more added features that are not available in free version. It also takes in to account the objective of the road trip to efficiently plan the route. A unique feature for this app is that it can be integrated with 3rd party app Glympse which will automatically send text updates to friends or customers about the trip progress.

Another application with similar purpose as the one suggested by me is Road Trip Planner. It's a delight for people concerned about the environment and considerate about the fuel they will burn for the trip. This app provides the user unique features that current map / direction

applications lack. By providing the user with the ability to plan ahead and set different pit stops between their set origin and destination, this is one of the many reason how Road Trip Planner stands out from the rest. These pit stops include food, gas stations, lodging options, and many attractions.

Since its always desirable to take into account the cost of the trip, Road Trip Planner takes into account your vehicle information to provide you with specific gas station results and how much money you will spend on gas during your trip. It provides a fairly accurate estimate of the Total Cost Of Gas and Total C02 Output. It takes into account city and highway mileage for the vehicle. It also helps the average person to be more aware of their carbon footprint by tracking the CO2 emissions outputted by their vehicle over the course of their trip. It allows for adding different points of interest along the route and will provide option to get the phone, website and other information for the establishment.

Trip Planner application provides a option to share the trip summary with your contacts. Users can share the trip summary data via email, other sharing apps or upload it on Google Drive. This app allows users to save older trips. Different functions like Trip mode, stay, activity, trivia, to-do, mate, expense, route, odometer, google docs and summary where user can view or define trip details after tapping listed trip. Trip details screen would show the tiles of these functions.

Another important aspect of planning trip is to keep track of weather, AccuWeather weather forecast & real-time rain, storm, ice & snow reports: enjoy Superior Accuracy™ wherever you are with AccuWeather. You can Track severe winter weather with weather radar maps, real time weather alerts & the AccuWeather hurricane tracker feature. Get your holiday weather forecast: plan any journey with precision and confidence. Never get caught in the rain again. Users can use this app to Plan travel with MinuteCast®: rain, snow & ice forecasts,

displayed minute-by-minute for the next two hours, hyper-localized to your exact location. Track Temperature with RealFeel Temperature®: AccuWeather's unique weather widget shows you not only the temperature in Fahrenheit or Celsius, but how warm or cold it actually feels outside. Avoid winter snow & road ice with certainty & get your accurate holiday weather forecast. Provides real time weather maps & weather radar animations with your personal blizzard & hurricane tracker. Stay out of the storm with pushed severe weather alerts.

Track conditions wherever you are: get weather maps, weather radar, blizzard reports & the AccuWeather hurricane tracker. AccuWeather lets you personalize your weather forecast any way you want, anywhere you are in the world in 33 different languages, Fahrenheit or Celsius.

Provides Daily Snapshot weather widget when you open the app and find out at-a-glance what you can expect from the day's conditions, from wind speed to humidity. Scroll through your Local Forecast Summary to get your concise and precise weather forecast for the next two weeks, so you can plan your weekends around holiday weather.

We also looked at an application providing information about food options. Find Eat application lets users discover the best restaurants near you according to TripAdvisor, Yelp and Google. This application does not require user to make a login and don't have to bother about sharing personal information. Restaurants near you and find the best according to TripAdvisor, Yelp and Google and have one click reservation. This application is available in about 500 cities worldwide. Findeat specifically targets that are tired of spending a lot of time looking for good restaurants when we travel. This application takes in to account reviews for the best restaurants on Yelp, TripAdvisor and Google, as these tend to different to each other, provides a much accurate review.

Lot of the newer applications are presenting some of the features that we have planned on, which were not there a few months back. With ever changing and updating apps, applications are improving upon the functionality and performance along with a better user experience. To be of any significance we need to move quickly and get the application out there as quickly as possible or come up with better user-friendly features.

In our previous exercises we reviewed different applications already available in the market, while some of the applications are downright unappealing some had some pretty good and cool features. We have established that we want to deliver an application that would present the user with all sorts of tools required for planning a road trip, while not overwhelming the user and providing them with a fun solution.

4. PROPOSED SOLUTION APPROACH

Our approach will be primarily focused on leveraging different APIs freely available by different services providers. Our solution to providing a great app for road trip planning will be to package all the services and information in a way that would be quick and customized to the needs of the user. Most applications available in the market are very focused on their approach of what they offer or specialize in. We realize user needs a concise one stop shop where they can access all their requirements.

Another privacy and info security concern that has come up in the wake of Cambridge Analytica and Facebook user data. One of the major issue that has been come to forefront and expressed by publics opinion is the user privacy, public is getting more aware and concerned about their privacy, for that reason our application will not create username and passwords and will not try to capture user details that could impact their privacy. So instead of trying to offer

them a slightly modified solution our approach is to bring all the different services to them at one platform. Our application will try to provide a better alternative to applications available in the market by address the following parameters

1 Presentation and User Interface – First impression is the last impression - Any application is as good as the user interface it provides to the user. To provide the user with a clean and crisp presentation we will explore and decide on the proper UI technologies to use and implement them in a way to handle the complexity of the

   a. User experience – a better user experience will be explored and will try to provide an easy to use and interactive interface to make the user experience fun.

   b. Rendering technology – for fluent and dynamic flow, we will be reviewing and utilizing the best UI technologies that are available these days for a dynamic look and feel to the application. We will review performance and suitability of front end technology stacks like Angular, React, Vue and Backbone to decide which one makes more sense for our application.

   c. Native or Hybrid App, Application

2 Performance - Optimizing data by prefetching and caching - we will explore and decide on the backend technology stacks like Database management systems and the server technologies that will be used to deliver or serve the application content. We will review popular technology stacks available like LAMP (Linux, Apache, MySQL and PHP) or WAMP (Windows AMP) to ascertain if these fit our needs. An optimum technology stack that will cater to our needs better will be selected and implemented.

3   Hosting the application – Hosting an application you need an extensive setup servers, dev and production environments etc, for the starting we will use Amazon webservices to host our application as it provides a reliable and great quality service at a fraction of costs. We will use GoDaddy.com to secure a domain name for our application.

4   Features – We will consume multiple APIs to plan and chart out the road trip planned

   a. Maps and Navigation – will be the most important data and core feature provided by our application, we will select the best API that can talk easily with our technology stack will be selected. We will use Google Map API to get map related data

   b. Weather – AccuWeather API is to be used to provide this information about whether at any given point and place, our application using the Maps and navigation API will calculate at what point a person is going to be and will fetch weather information for the location at the anticipated time to reach

   c. Traffic – Traffic updates will be captured from Waze API, it provides

   d. Sites - fetch nearby attractions along the route

   e. Places to eat – Yelp API will be integrated and data will be fetched for a buffered area around the navigation route

   f. Places to stay – Hotels.com API will be integrated to get data regarding hotels available along the route

5   Customizations – What all a user can do with the app

   a. Avoid tolls – if the user wants to avoid the tolls, the routing will be done such that the tolls are not encountered on way,

b. Avoid highways – for users wanting to enjoy more scenic views or having a

   relaxing drive without being bothered about heavy and fast vehicular traffic.

   c. Taking a leisure trip or want to just get to destination in time

6 Social Media integration – Provide a method for user to link out to social media

   applications, any trip is not complete unless you share your pictures and status with

   your loved onces, we will provide user with option to share pictures and trip details

   with their friends and followers on the social media.

5. PROPOSED WORK PLAN

I plan on completing the final deliverable an Android based application by the end of

Summer Semester in Aug 2018. Will follow the pattern of a 2-week sprints to deliver at the end

of each sprint. Following is my plan to develop and deliver my project

Weeks	Dates	Proposed Work to be Completed
1 and 2	TBD	Prepare and chartout specifications and user experience for App
3 and 4	TBD	Come up with wireframes and mock ups for the application
5 and 6	TBD	Documentation and API research
7 and 8	TBD	Finalize the Technology Stack for the Application
10 and 12	TBD	Develop User input and customization section
12 and 14	TBD	Develop User Response and Output
15 and 16	TBD	Testing and finalization
17 and 18	TBD	Soft release of application for User likability and feedback

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