Carpooling Project Proposal

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Carpooling is thought up to solve transportation problem in Kenya. Moreover, it is intended to help work towards safeguarding the environment by reducing pollution.

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# Carpooling Project proposal

# Executive Summary

Carpooling system is thought up to solve a transportation problem in Kenya. Moreover, it is intended to help work towards safeguarding the environment by reducing pollution.

Currently, Kenyans are accustomed to using public means of transport or using personal vehicles to ferry themselves to work. Though the system works for individuals, from a broader perspective, it is ineffective and adversely affects the nation in the form of time, economy, and pollution.

Carpooling helps to solve these problems by joining different people to use one vehicle on their way to work or different destinations and have them split costs. The solution is more convenient with the advent of the Internet of Things. The carpooling solution can be accessed from a smartphone. In the past, these solutions mainly failed because they came too soon and required a new platform and depended on a complete behaviour change, especially when big companies were in question.

# Background

Ridesharing is on the up and up, courtesy of Uber, and Lyft, two of the largest taxi transportation companies in the US and across major cities in the World. Uber for instance, started as taxi companies and has made billions since its inception with multiple investments from different sources including private companies and individuals like Toyota and Jeff Bezos, respectively.

In the past decade, Uber has come up with a new transport product – Rideshare, and by 2018 had made $10 million. It started as a high-end market product but it's now available to the masses. So far, it has helped customers save on transport costs. The product is available through Uber's app. It leverages Geo Maps to give customers insight on uber riders in their proximity. They can then call for an Uber as a group and pay less.

Uber doesn't own the vehicles. Instead, it signs up drivers with their vehicles. However, with a pending deal with Toyota, it will own a fleet of fuel-efficient cars. Fuel-efficient cars are their 'small' way of helping to preserve the environment as they target profitability.

In Kenya, smaller companies have started penetrating the industry and throwing the conventional taxi business off balance. Companies like Swvl offer 'ride-sharing' through mini-buses on specific routes including Thika Road and Waiyaki way. Their existence proves that there is a market for the product. However, both Uber, and Swvl (the two companies we focus on), miss out on an important aspect – recruiting regular drivers onto their platform and helping them save on fuel costs, reduce traffic and preserve the environment on their way to work.

Our project seeks to use the existing ecosystem of customers with vehicles and those who use public means. The product will bring the two parties together without disrupting their normal routine.

According to (Irungu, 2019) AI is a perfect solution to the never-ending traffic problem in Kenya. According to the articles, rapid population growth is the leading cause of traffic in Kenya. It's expected to worsen by a whopping 3.92% by 2020.

With carpooling, the number of vehicles on the road every morning reduces significantly. Consequently, the amount of carbon released reduces as well, thereby protecting the ozone layer and reducing the effects of global warming.

# Problem Statement

Ideally, transportation ought to be smooth, cheap, and offer a minimal negative effect on the environment. Envision a country with fresher air, quieter roads, and faster commute to work or school. Transport is a key part of any country's economy as it influences the other key parts of the economy greatly, so it is not anything that can be swept under the rug.

With this in mind, the situation on the ground is completely different. Just a trip into Kenya's capital, Nairobi, gives just a sample of the transport situation. Let us indulge in the details of how differently the situation is affecting our country.

*Economy*– Although there are numerous vehicles on the roads, each vehicle needs to be fueled. For those using public transport, they pay the fare. The amount of money going into this every single day cannot be ignored. Sometimes the fuel prices hike, which makes the commute even more expensive. Most people are affected as their income does not grow as exponentially as their expenses, especially in the transport sector.

*Traffic*– a claim by africacheck.org is that traffic in Nairobi is the world's second-worst, with the average travel time in the city at a shocking 57 minutes. This amount of time wasted in traffic is unaccounted for in terms of the productivity of the people towards the growth of the economy.

*Pollution* – it goes without saying, the amount of pollution that the environment experiences having hundreds to almost thousands of vehicles on the road. Vehicles are the primary source of Carbon (II) Oxide in the environment. CO2 is an odourless, colourless, and poisonous gas that is formed by the combustion of fossil fuels such as gasoline. Studies show that this gas is the main culprit to Global Warming we are now experiencing, and we have no one to blame but ourselves.

# Problem Solution

Having this in mind, Carpooling or Ridesharing is the antidote to this virus.

*Economy –* As not everyone will be using their car, the amount of money spent on purchasing fuel will considerably reduce, as well as fares for those using public transport. This money would better be used to help individuals and their families in other important aspects of their lives like food and medical care.

*Traffic –*the less number of vehicles on the road, obviously the lighter the traffic will be. Less traffic saves time as people will be getting to their destinations (especially school or work) in a short time. Saving time means that the productivity of people in their places of work will exponentially improve.

*Pollution –*with fewer vehicles on the road, there will be a drastic drop in the amount of Carbon (II) Oxide emitted to the environment. As we continue to fight Global Warming, we can confidently say that Car Pooling is one step in the right direction.

# How the project will work

There will be the creation of a mobile application and a website that will be used by both the clients/customer (who are the people using the transport system) and the individuals who are registered as personal drives (this are the people who own cars).

In the software created, there will be two types of people. Some will register and update their profiles as either personal drivers or persons using public transport/sharing ride. After registering both the personal drives and the clients (passengers) can easily login.

When persons using public transport log into the system, they choose the route that they are traveling to and the system sorts out the number of drivers travelling to that route, form the listing the user is expected to choose a drive of their liking before the end of the day in preparation of the following day. Thus, helping the drive to know and prepare in prior who and who his going to be picking up (sharing a ride with).

The driver chosen by the user owning the car gets to accept or reject the request to carpool depending on their convenience, and this is done before the day of travel.

The payment will be made through the platform (application) either by M-Pesa or Visa, payment by cash is not accepted. A certain percentage goes to the company and the drive for compensation for things like vehicle wear and tear (maintenance) and to also assist in day to day fuel cost.

There will be the rating of the drives by the users of how the ride-sharing was and comment section to give feedback on their experience.

# Project plan

# The objective of this project is to provide easy-to-use platforms where car owners will be able to get in touch with other people commuting in the same route, so that they can share a ride and consequently share on the cost. This will also come with big benefits to our towns also because even traffic jams will have been reduced.

# To make this possible, we will develop an android application and a website, both of which will be served by remote database. The android application and website will be under development concurrently.

# *Evaluation of the Plan*

# In evaluating the project, there will be continuous updates of the application and website until the completion of the project.

# *Development tools*

# We are going to use laptops owned by our development staff during the whole process of developing and testing the two platforms. We will be using Android Studio as the IDE for developing the Android Application. The developers will use their phones and emulators for testing during development.

# To develop the website and database, we will be using a python environment and Django frameworks. Server software and Xampp, will be installed on one of our laptops for development and testing.

# After the platforms have been developed, they will be integrated and shared widely for Beta testing.

# *Carpool matches the list of users.*

# It contains those that provide information regarding users who wish to carpool but provide no explicit carpool matching services. In this category, several carpooling services are based on textual posting information, integration, and searching.eg features online classified advertisement and providing carpooling information for users in different metropolitan areas.

# The challenging part for carpooling services is that the system rarely suggests a match between drivers and riders.it provides a listing of those who may want to carpool, and the users need to search on their own to find other users with similar commute patterns.

# *Hardware approaches*

# We will design architecture to assist commuters in defining a group of people with similar commute routes and schedules. This architecture is hardware-based using a carpooling device to collect commuter routes and schedules. We can also extend for use of a smartphone. Wireless devices and accelerator sensors are used to collect commuters' information and establish routing trees to deliver vehicle trajectory information to nearly parking lots. These hardware and sensor-based carpooling matches the approaches provide promising methods for the collection of commute information, and they encourage communications between potential carpoolers

# Human resources

The following individuals will be involved in the actualization of the proposal in various fields of their expertise.

Kevin Kibet, Charles Irungu, and Gladys Ndichu will work together in the designing of the website, carpooling project website. They will focus mainly on the external features of the site (functionalities) and how the website will look (User Interface and User Experience). Website design is a very crucial stage because it acts as the backbone of the project.

Peterson Mwangi will develop the website defined earlier, but he will mainly focus on the front-end of the site – bringing the UI and UX design into reality. Joseph Maina will work on the back-end of the website – creating all the functionalities running the front-end. Moreover, he will deal with the website security for protection against cyber-attacks that may expose users' details – he will ensure the overall safety of the website to both the users and developers.

Benson Githua and Ignatius Maina will join hands and work on another crucial part of this project. They will develop a well-defined database system for the carpooling project. They will come up with a database that will not cause any hitches while users are accessing the website. The database will store all the user records and other crucial information relevant to the project's success.

We also have a very qualified team of experts comprising of Peter Gachuru and Lewel Kimathi, who are well equipped with the necessary skills to create an android application containing all the mentioned functionalities in it.

Teamwork and collaboration will ensure that the project becomes a success.

Since the project is new, some people will be working on the marketing side to make the project accessible and pitch the ideas to various potential investors to boost our operations.

# Project Schedule

The process of developing the project will start with designing a prototype of the whole website. The project schedule will clearly outline the main components and how they will be displayed on the monitor. A good prototype of both the website and the application will take one month. The second item scheduled will be a database. The database will first be filled with test data and later, the actual data collected in the field. The collection of actual data will commence immediately after the database layout has been set. The field agents will, therefore, feed the data directly to the system. This database will be shared by both the website and the application concurrently. This process requires about two months completing the database. The third scheduled activity process will be to develop the front end. Front-end development will require a good Graphical User Interface design that is easy and fast to use by clients, and it will take about one month. The last activity is to develop the back-end and to integrate it with the front end and the database. The integration will take a maximum of one and a half months. The whole system will then be tested and any bugs and errors either in the design, code or data processing, and operation corrected. Testing will take two weeks. Therefore, the total work will take six months for the project to be fully operational, as shown in Figure 1.0 – Appendix section.

# Proposed Project Budget

Completing the Car Pool project requires some substantial resources ranging from human, technical, and computer resources that must be considered before commencing the project. The cost of coding and setting up a fully operational website would be approximately KES 30,000. This amount will be used in front end development, database system development for the website. The project also requires some internet connection for research of unclear design and module development. The cost of the internet will amount to KES 5,000.

Theoretically, it is expected that the website will start operating on an online basis once complete, and therefore, we will be required to pay for web hosting services which would cost us approximately 5,000 KES per month. Moreover, this will ensure that the website and application load as fast as possible when being used by the users. The cost per year will amount to KES 60,000. To secure a good domain name for the site will require KES 500.

The next expenditure will be incurred during data collection from various car owners, commuters, and other necessary information for the project. Data collection, analysis, and processing will cost an amount of KES 200,000 because it is a field activity that requires about ten field agents and a lot of traveling. With this amount, the development process of an operational website and a mobile application would take the least approximated time as per the work schedule.

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# Appendix

Proposed Project Time

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Tasks** | **Timeframe**  **(6 months)** | | | | | | |
| Designing the prototype | **1month** |  |  |  |  |  | |
| Creating the database |  | **2months** | |  |  |  | |
| Developing the front-end |  |  |  | **1month** |  |  | |
| Developing back-end and integration |  |  |  |  | **1.5months** | |  |
| Testing |  |  |  |  |  |  | **2**  **weeks** |

# References

Irungu, J. (2019, May 24). Using Artificial Intelligence as a solution to Kenya's traffic:*Standard Media*. Retrieved from <https://www.standardmedia.co.ke/business/article/2001326944/using-ai-as-a-solution-to-kenya-s-traffic>