**CHAPTER ONE**

* **Introduction**
* **Background of the project**

Currently in the city of Gondar transportation is one of the hot issues. More than the availability of transportation, the Cost and security of transport are major sources of concern. Meter taxi applications like Taxiye, ZayRide, and others present a solution to the security problem but they are very costly. Further such systems are inapplicable in the city of Gondar as a result of their costliness.

* **Statement of Problem**

The main reason for the inapplicableness of already existing systems like ZayRide or Zoble Ride is first they are developed in wide cities with low transportation availability signified by long lines of taxi queues in mind and are mostly developed for cars. And the even bigger problem is their initial count of around 90 birrs. In a city like Gondar, the longest transport journey costs a maximum of 30 birrs with a taxi and 35 birrs with a bajaj.

Since it's impractical to pay 90 birrs or more for a trip that costs 30 birrs or so and since only cars register meter taxi services in a city with a larger number of bajaj than cars that is one big problem area.

The second problem area is the availability and security of bajaj transport, cost of a private contract driver bajaj costs a minimum of 100 birrs and even that is not readily available. They are signified by a large variance in cost between drivers and a low sense of security in passengers as a result of the current rise in the number of criminal activities.

* **Project objectives**
* **General Objective**

The general objective of the project is to develop a system that communicates with bajaj drivers and passengers providing availability at the exact time and place of need and at a cost that is acceptable to both parties.

* **Specific Objective**

The specific objectives the project aims to achieve and meet are the following

* Collect data, analyze, design system requirements and identify problems in the existing systems in detail
* Design a new system that solves the identified problems
* Design an easy-to-use and responsive user interface that allows users to track details of their orders and travel information
* Create a backend store that stores the users’(driver and passenger) information
* Evaluate the system
* **Scope of the project**

The various activities performed by the system are; it allows for bajaj drivers to register their services, users to create an account and register to use the services, an interface to select start and destination, and a payment page that shows the travel details and cost of the travel according to system fare agreed to by both parties.

The other function provided by the system is for frequent users to keep a list of favorite locations and frequently traveled places for selection.

* **Limitations of project**

The system does not provide an electronic payment system and follows cash on delivery of service model. This limitation is currently not addressed because the crediting system is a large system on its own or it requires the implementation of banking contracts. This can be addressed in future improvements and updates.

* **System Development Methodology**
* **System development Approach**

The chosen development methodology for its adaptiveness and with the limitation of time in mind is Rapid Application Development(RAD).

* Allows to move back and forward between design phases, for updating and changing
* Easy to make improvements to the design and implementation
* Important issues addressed before final system delivery
* Allows for faster code generation

The drawback of this methodology is it needs huge collaborations and joint efforts from more than the development team. The other main problem is flexibility, since it's easy to change and update t requirements coming from users the changes made may end up dragging the project beyond the scheduled scope.

* **System Development Tools**

The tools that were used for the execution of the project both hardware and software are as follows

**Hardware tools**

* **laptop Computer**: - To store files, prepare documentation, install and use required software for development
* **Internet Connector (broadband cable)**: - To get relevant information from the internet.
* **Printer:** - helps to print documentation
* **Mobile phone:** - to check the design implementation of the system
* **USB type-c cable: -** to connect the development PC with the mobile phone
* **Mouse**

**Software tools**

* **Window 10:** - This Operating system is to be used to install and run the development software needed for this project.
* **Browser:** - like chrome, used for retrieving information for designing and developing and also used for running designing tools like.
* **Microsoft Word:** -For writing documentation.
* **Microsoft PowerPoint:** -will be used for preparing the presentation of this project documentation.
* **Draw.io:** - used to design the UML diagram for the project.
* **Visual Studio code:** - code editor used for implementation.
* **Figma:** - for UI/UX designing
* **GitHub:** - version controlling and team collaboration tool, also used to contact the advisor.

**Implementation languages**

* **Significance of Project**

After the completion of the project, the system developed will provide the listed important services to the following parties:

For Bajaj drivers:

* Solve the availability problem of passengers
* Provide places where their services are required
* Ensure their security
* Provide means to save fuel consumption
* Provide means for work as a side job

For passengers:

* Make bajaj readily available when the need arises
* Ensure their security
* Removes the need to stand by the side of the road and wait for bajaj
* Pick their start and finish location and know how much it cost beforehand
* **Beneficiaries of the project**

We can see our beneficiaries as direct beneficiaries and indirect beneficiaries.

Our direct beneficiaries are:

* Bajaj drivers
* Passengers
* The owning company that gets profit from the users

Our indirect beneficiaries are:

* The government further divided to
* The financial sector (Tax and revenue minister)
* Regional police force
* The community of Gondar
* **Feasibility Study**

**Economic Feasibility**

The proposed system is economically feasible because the opportunity cost of the proposed system on the market is very compensating in the long run. Since the market is open for the service, the production and deployment cost is high but the financial gain to be extracted from it is higher.

**Technical Feasibility**

In terms of technical feasibility, the project uses already existing technologies and concepts we have already learned. Thus, we have both the technology and the required personnel for it.

**Operational Feasibility**

The proposed project is operationally feasible because the earlier identified problems are addressed to the best extent. Further, the users will be presented with an easy-to-use UI hence promoting use.

* **Project schedule**

The project schedule is more extended than initial estimations. none the less the schedule Gantt chart is developed with the initial given start date. The chart was developed using an online tool called `teamgantt.com`.



Figure 1.1: Schedule Gantt Chart

* **Project Budget**

**The budget for the project for tangible expenses is collected from a team member, but most technology expenses written are used on a trial basis thus their costs are not incurred expenses but rather estimated expenses.**

|  |  |  |  |
| --- | --- | --- | --- |
| *Item* | Quantity | Unit Price | Total cost in birr |
| *Paper* |  | ETB 2 | ETB 50 |
| *Google API* |  |  |  |
| *Transport cost* | 5 | ETB 20 | ETB 100 |
| *Total* |  |  | 480 |

**CHAPTER TWO**

* **Requirement Analysis**
* **Current System Description**

The existing transport system is a manual one. From the passenger’s point of view whoever needs to use a transport goes directly to the road and waits for a transport to come whether a taxi or bajaj. After that, if they have any luggage, they go back to their houses for loading transportation or go out with their luggage to the road, sometimes if they have the phone numbers of bajaj drivers they call from home. As for the driver’s point of view, they drive around looking for passengers or stay in place waiting for a client to call or come talk to them.

* **The major function of the current system**
* Negotiable pricing
* Found everywhere
* Doesn’t require literacy
* **The problem with the Existing System**
* Time wasting
* No record of travels
* Prone to criminal activities like theft, kidnapping, rape, and murder
* Costs more than the set tariff
* not accessible to everyone
* the feeling of insecurity by both driver and riders
* **Requirement Gathering**
* **Requirement Gathering Methods**

The methodologies that were used to gather information for the development of the project are interview and document analysis.

**Interview**

As an interview, we went to the transport bureau of Gondar city and talked with \*\*\*\*\*\*\*.we asked for the required information and we got referred to Mrs. Tigist Ayeragn. And from the information we got, we found out about the existence of ZayRide in Gondar and went to their office too.

**Document analysis**

Since there are similar ride applications, we used their documents to learn and understand more about the project requirements. we found documents on the mode of operations of systems from abroad.

We reviewed various diagrams and documentation(developers’ and users’) from Uber.

* **Business Rules**

A business rule is a statement that defines or constrains some aspect of the business. we have listed the business rule statements below.

* Drivers must follow traffic laws and drive safely at all times.
* Riders must treat drivers and other riders with respect and refrain from any behavior that makes others feel unsafe or uncomfortable.
* Drivers and riders are prohibited from using drugs or alcohol while using the platform.
* Both drivers and riders must adhere to community standards and policies, including those related to discrimination, hate speech, and harassment.
* Drivers and riders are encouraged to report any safety concerns or issues
* A driver currently have a client must identify himself as occupied
* A driver can not serve more than one order at a time without the rider’s permission
* A rider can not refuse payment after a service
* A rider refusing to pay is enforceable by law
* A rider cannot cancel an order after the order has started
* **Proposed System Description**
* **Overview**

We are in a technology era. This is signified by large access to smartphones, the internet, and other technologies. In this technology era, by exploiting this access a lot of countries and cities have changed the way they operate a lot of things from manual to computer-based. The transportation system is one of them. Similarly, many cities in Ethiopia have adopted systems like rides as a possible alternative for transport.

That being said such systems have not been implemented in Gondar city administration. The current high demand for transportation and high number of thefts related to bajaj transports, as more kidnappings related to bajaj make such systems appear in demand.

The system we propose is similar to that of the others currently operational in Addis Ababa and others. The extra capability we propose is for it to support bajaj drivers as service givers. The proposed system is signified by live GPS tracking of the trip, easy UI/UX both for the rider and driver, storing the history of travel details, and they can know how much kello meters they are travling and how much left.

The proposed system will have big impact on being visted by travlers around the world becuase of convinent transportation especially like such type of historical citys with old castle and old churchs. so our system will play great role on the sustainable development of Gondar.

The other sector our system provide will be in the work of gondars city police addminstration.in gondar crimes in using bajaj is becoming

* **Functional Requirements**

The functional requirements of the proposed system are classes of functions that have further subfunctions and are listed as follows.

* **GPS tracking:** the system must keep track of location details with the identity of users at given locations. The data it is to keep track of is as follows:
* **Riders**: location details of riders currently ordering a ride, their pickup and drop off location
* **Drivers:** location details of drivers available for orders and on duty
* **Trip:**  start location and finishing location of an ordered trip
* **User details registering:**  the users identified are both the riders and the drivers, the system keeps track of both users' detailed information for controlled sharing on later orders.
* **Calculating trip cost:** calculate fare based on factors more than travel distance
* **Nonfunctional requirements**
* **Performance**

In terms of performance, the system proposed is aimed to address various aspects to the maximum possible. The first is number of user requests. Others are fast response time and efficiency, which are designed to work by demanding low CPU, memory, and the already existing operating system on the device.

* **Scalability**

As for the scalability aspect, the system proposed will have an elastically scalable character, this will be good for current small user starts and still give the intended service regardless of increasing user traffic on the system.

* **Availability**

The availability of the system is a server-side concern, as long as the server that’s leased is up the system is designed to be up 24/7 and the availability of night shift bajaj drivers becomes the key controller too.

* **Reliability**

The system proposed is not designed to have failures raising from prolonged use because of intended periodic updates. But worst case, if it was to happen it can be reported via user feedback and resolved promptly.

* **Maintainability**
* **Security**

Since the account creation process is designed to work with OTP and not create individual accounts with usernames and passwords the security issue is not a big concern. All that is because accounts are created with phone numbers and OTP(one-time password) confirmation numbers sent directly to the registering users' phone number.

* **Environmental**

According to environmental nonfunctional requirements, the system we propose doesn’t even need any actions. It uses already existing technologies like smartphones. Thus, it doesn’t affect the environment significantly making the requirement of addressing green computing issues and reducing carbon footprint motions useless.

* **Usability**

The design of the UI is aimed to be easy for all users whether proficient with smartphones or not. It's designed to be easily understandable with clear instructions and steps of application.

* **Interoperability**

**Chapter Three**

* **System Model**
* **Scenario**
* **Use Case Model**

Actors**:** In the use cases an actor interacts with the system to perform a piece of meaningful work that helps them to achieve a goal and has access to define their overall role in the system and the scope of their action. Depending on the above explanation, the actors in this system are the following:

* Driver: These are individuals who use the Bajaj ride app to accept ride requests, pick up riders, and provide transportation services.
* Riders: These are individuals who use the Bajaj ride app to request rides and make payments for the service.
* Admins: These are individuals who are responsible for managing the Bajaj ride platform, including overseeing driver and rider accounts, monitoring safety and security, and maintaining the technical infrastructure.

Use cases: Use Case represents the interaction between a user (human or machine) and the system. which can include another Use Case's functionality or extend another Use Case with its behavior. The most important and basic use cases of this system are the following: -

* Request ride
* Accept ride
* Start ride
* Cancel ride
* End ride
* View earnings
* Rate driver
* Manage payment
* Manage driver
* Manage rider
* **Use Case Diagram**
* **Description of Use Case Model**
* **Activity Diagram**
* **Object Model**
* **Data Dictionary**
* **Class Model**
* **Dynamic Modeling**
* **User Interface**

**Chapter Four**

* **System Design**
* **Introduction**
* **Current software architecture (if any)**
* **Proposed software architecture**
* **System Decomposition**
* **Hardware/ software mapping**
* **Persistent data modeling**
* **Access control and security**
* **Detailed class diagram**
* **Package Diagram**
* ***Deployment***