IN PARTNERSHIP WITH PLYMOUTH UNIVERSITY

Name: **N.N.D.G. Liyanage**
Student Reference Number: **10707256**

Module Code: **PRCO303**	Module Name: **Computing Project**
Coursework Title**: First Interim Report**	
Deadline Date:**24 January 2022**	Member of staff responsible for coursework: **Project Supervisor: Dr. Rasika Ranaweera**
Programme: **BSc (Hons) Software Engineering**	

Please note that University Academic Regulations are available under Rules and Regulations on the University website www.plymouth.ac.uk/studenthandbook.

Group work: please list all names of all participants formally associated with this work and state whether the work was undertaken alone or as part of a team. Please note you may be required to identify individual responsibility for component parts.

We confirm that we have read and understood the Plymouth University regulations relating to Assessment Offences and that we are aware of the possible penalties for any breach of these regulations. We confirm that this is the independent work of the group.

Signed on behalf of the group:

Individual assignment: ***I confirm that I have read and understood the Plymouth University regulations relating to Assessment Offences and that I am aware of the possible penalties for any breach of these regulations. I confirm that this is my own independent work.***

Signed : *Dulyana*

Use of translation software: failure to declare that translation software or a similar writing aid has been used will be treated as an assessment offence.

I *have used/not used translation software.

If used, please state name of software……

Overall mark _____% Assessors Initials _____ Date_____

School of Computing and Mathematics

PRCO303
Final Stage Computing Project

BSc (Hons) Software Engineering

N.N.D.G. Liyanage
10707256

Real Time Courier Tracking Mobile Application

2020/2022

Contents

1.Introduction

1.1 Abstract

These days, e-commerce stores have been growing as a result of changes in consumer behaviour as more consumers choose to shop online. The latest figures show that Sri Lanka has 6 million online shoppers, comprising 29 percent of the population, and 35 percent of online mobile users. The growth of online shopping requires the modernization of parcel delivery services, especially daily deliveries. In Sri Lanka, the number of courier companies has been increased to support the demand for parcels. In the Courier Tracking Mobile app, parcels must arrive on time to satisfy customers. To ensure fast delivery of packages to customers, it is necessary to find the fastest route with the least amount of traffic from the delivery point to the destination customer. At the same time, customers should be notified during continuous delivery or on time. Responsive communication between the two organizations will improve the efficiency of the messenger service and customer satisfaction. The goal of the mobile app is to improve the Android and iOS mobile system that can help build a more intelligent package delivery system by integrating the use of current communication technologies such as Google API, QR Reader, Push Notifications, and Android-iOS tools. It will help to track the mobile app to intelligently manage the parcel delivery process and deliver parcels on time to customers. In developing the application, a delegation tracking system was discussed. However, the system courier service provider will be able to indicate the number of parcels to be delivered per day in a simple way that can be delivered to the map in order of address and distance. The proposed sender tracking app can be easily used to provide better user information for consumers to track and interact with the delivery service provider to avoid unnecessary problems.

1.2 Introduction

In ancient times, all transportation had to be done by humans. These people were not able to move to other regions without extensive training. The training involved familiarizing ourselves with the network of roads and traffic conditions in the area. The advent of the internet has caused changes in many industries, and this includes all courier tracking systems in the world. As the goods and products, the company makes increase, the burden on the transportation department also increases. This creates a huge need for such software to be available and used by many industries. Today such software is used to increase the accuracy, speed, and efficiency of their transportation. Companies that need courier tracking software have a high production value and usually make many products. The company also suffers from the task of organizing products into phases. There are tools within the courier tracking system that make this easy. There are tools that send courier space whenever a client or company requests it. The software also provides automated submissions, delivery function filters, reminders, and real-time analytics solutions built into it. They also come with plugins to manage internal eCommerce delivery and integration that help track sender in real time.

1.3 The Process So Far…

Remember the above, my final year project Real-Time Courier Tracking Mobile Application. E-commerce has grown exponentially over the years. Growth has been reflected in the strong demand for consumers and the growing number of different products available online. This creates a transportation problem and increases the need for an efficient courier service to support growing markets. It is very important for the courier service provider that the delivery of the parcel is done as soon as possible. One of the most important and important processes of the courier business is the delivery of parcels. This is where effective service delivery will be a priority. An efficient system needs to be built to facilitate interaction between the courier service provider and the buyer to accurately determine the complete package delivery route.

I decided to use React Native as I thought it would be quick to get a beta version of the App Store. And the idea of releasing the same app on Google Play also plays a role. It's amazing how easy it was, and I as one engineer can easily support 2 platform applications and daily ship updates. I have chosen to create a tracking API with Node.js. To keep the Node.js API running smoothly, I have supported many processors using the PM2 process manager, and I am still amazed at how well it works.

1.4 Project Objectives

- ✓ Project development consists of several phases with the aim of providing a comprehensive courier tracking service that will enhance the efficiency of courier service in terms of cost and customer experience. An application server integrated with the database system was upgraded to support the Internet management system.

- ✓ App roaming function is based on Google Maps, while notification or notification function will be sent using the SMS (Short Message System) service. All of these functions are integrated into the customer package website in the management system.

- ✓ The principal objective of the project on courier tracking systems is to deal with the subtleties of courier tracking, tracking number, customer, and address. It deals with all the data about couriers, delivery, addresses, and couriers. The undertaking is completely worked at the authoritative end, and along these lines, just the director has ensured the entrance. The goal of the task is to put together an application program that will reduce the amount of manual work involved in dealing with the courier, tracking, delivery, and tracking number. It tracks every one of the insights regarding the tracking number, customer, and address.

- ✓ Analyse the customer, the location of the parcel, the date and time of delivery, the current location of the courier service provider on a map, and so on.

- ✓ To analyse the convenience of the courier service providers' analysis of the number of parcels to be delivered in a working hour, customer details and special messages, and the number of parcels to be delivered in the easiest way.

- ✓ Analysing how to get track of the delivery service provider's current location to map out the location of the customer's location

2. System Architecture

System framework and frameworks provide a complete overview of the system and functionality of the application. This diagram shows the system connection between each module and the forums to be used in each component of the system.

From the framework, several components or modules should be developed. Backup copy services such as packages and user information management, routing management, and software provision will be developed as Software in the cloud space. A framework is a platform where all the components will come together and be able to simplify the operation of the system. It will be able to manage requests and responses from the system administrator, messenger service provider, and customer request. The Android and IOS mobile app should be upgraded to a postal and customer service.

2.1 Project Core

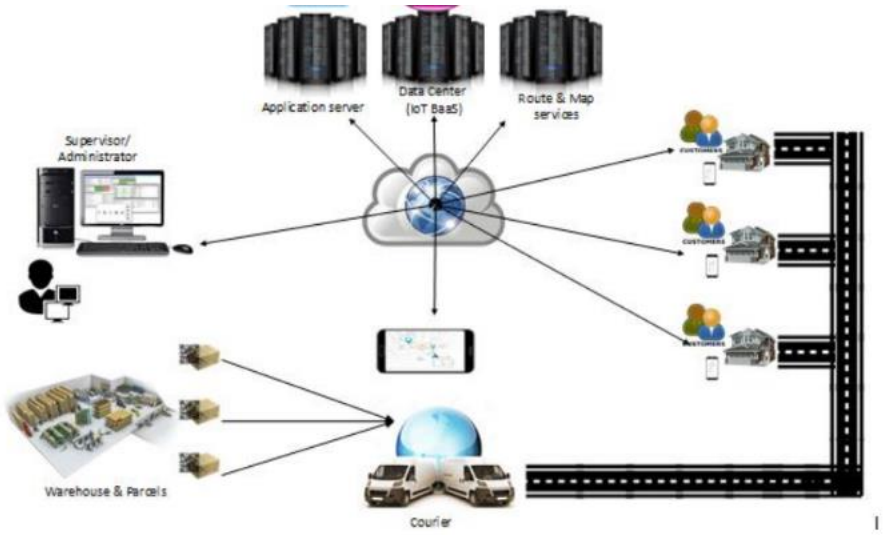


Figure 1: The framework of the system development

2.2 Project flow diagram

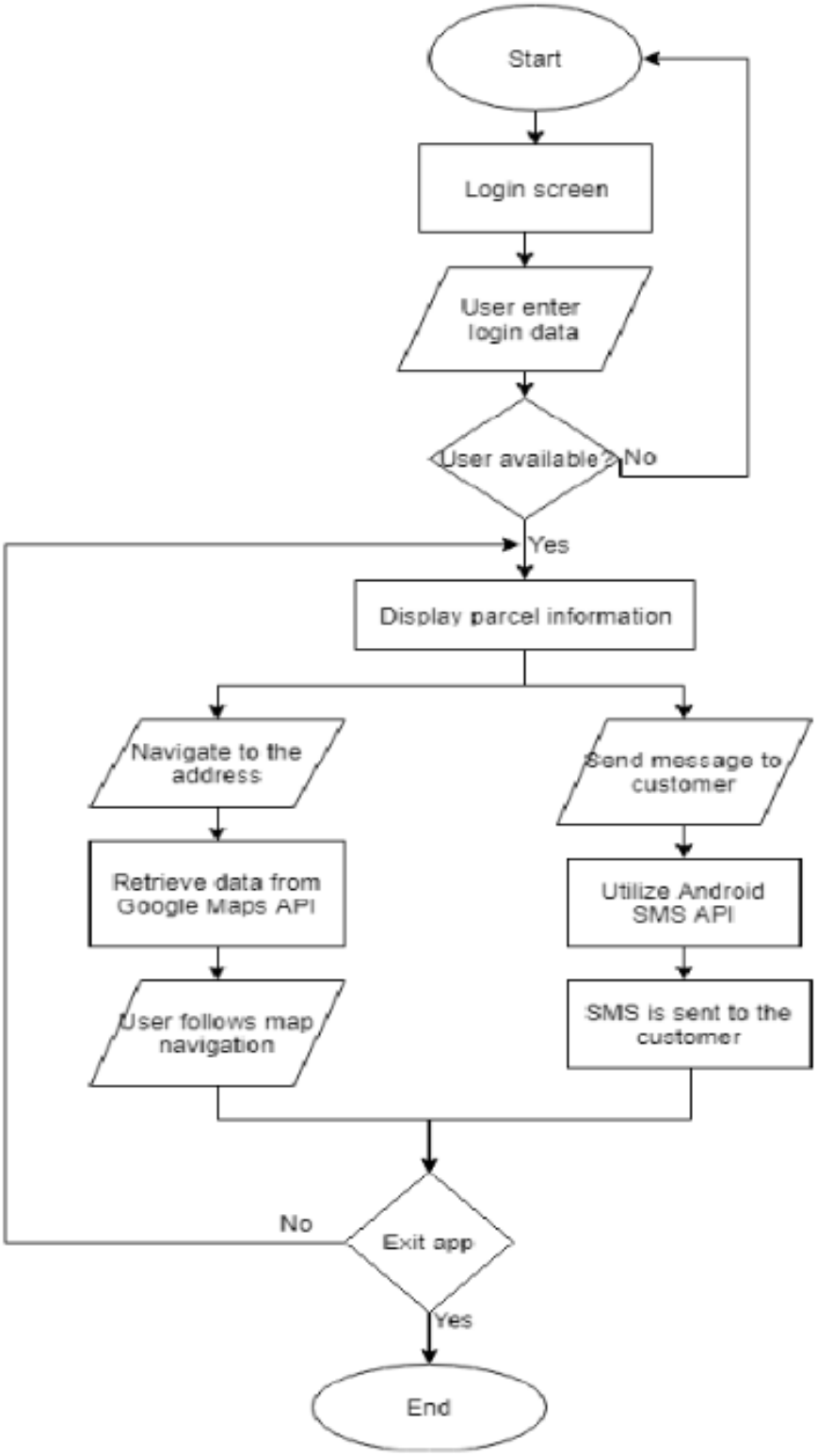


Figure 2: Flowchart of the Android-based Application

3.Tasks Undertaken and Outcomes

As explained in previous sections, the main components of the system are the entire system control of Android and IOS based mobile apps and package tracking. The real-time mail tracking app will provide package service and customer information management. It will be integrated with a mobile application that will be used by courier service staff responsible for delivering packages to customers.

- ✓ **Navigation and Route Development**

You will not be able to make courier logistics software without the navigation feature.
As a rule of thumb, it looks like a standard in-app map where users can build a line between two points. Download and download locations can be manually entered by courier or automatically set up in the app according to order details.
In addition, this feature is required to upgrade a courier tracking system. It keeps your managers up to date with the exact location of your messengers. Therefore, they can easily check the driver's distance to the destination or provide emergency assistance in an emergency.

- ✓ **Product QR Code Generation**

Especially if you are using QR codes as part of a marketing campaign, using QR Code Tracking lets you understand whether this campaign has been successful or not. It also shows patterns so you can customize current campaigns and improve future campaigns.
Dynamic QR codes are traceable, which means that once completed, their usage records will be tracked. This includes information such as the scan location, the scan number, when the scan was performed, and the operating system of the device used. The great advantage of Dynamic QR codes is that they can be programmed at any time. This, of course, is very beneficial in the event of any errors in the linked information. In addition, if you plan to make changes to QR Code campaigns while it is in operation, it is highly recommended to use Power QR Codes to make any necessary changes.

- ✓ **Delivery tracking system**

Route tracking system uses GPS (Global Positioning System) to determine the exact location of the vehicle and the package. This is forwarded to delivery agents and delivery managers in real time. There is therefore no possibility that the package will be lost or lost. If for some bad reason any delay occurs, customers are sent the same notice. This eliminates the risk of such situations and increases the speed and efficiency of the transportation department.

- ✓ **Route optimization**

The software is provided with route upgrade services that use the latest technology to select the fastest route possible. This route has been selected and sent to delivery truck drivers. Drivers can make changes to the route if necessary. Drivers can also identify the delivery number and use the map function properly.

For a courier service provider, timely delivery is important, but even more important is the proper management of the delivery process. Fortunately, courier tracking software makes it as easy as pie. It helps the driver to understand the best route and carrier to understand the condition of the package.

Courier tracking software provides GPS tracking services via GPS (Global Positioning System). It automatically updates the driver of the vehicle about the best route available to save time and improve the delivery process. However, the driver can change lanes based on low reality. The software also shows the driver the total amount of goods they need to deliver.

Since the package delivery system is based on GPS, everything from package to delivery takes place in an integrated way. Therefore, there is no possibility that the package will be lost or misplaced. However, if the package is somehow delayed, the software notifies both the customer and the network company. Such speed increases the efficiency of the letter delivery partner and increases customer confidence.

4. Product Produced and Product Quality

Currently, the project is in the first phase where the mathematical model is used Similarly, GUI design is complete again implementation is underway. User Interface Design is about communication between user and computer. It pertains to everything from system startup or system login to final presentation of the inputs and outputs you want. The full flow of screens and messages is called dialogue.

The courier package or package tracking system starts with courier tracking or shipping software solutions. The software makes the delivery system smooth and seamless.
Modern software tracking software is cloud-based and can be accessed from any part of the world (depending on the company's performance). Software (or part thereof) can be accessed by the carrier, sender, and sender. It speeds up and simplifies the delivery process by making the delivery more manageable and manageable.

Without software delivery solutions, it is almost impossible for professional courier services to perform their functions on a large scale. The software controls the delivery part of the delivery system and keeps the customer and the messenger company on the same page.
In addition to allowing, you to track your orders or shipments, the software also makes payments much faster by reducing processing time. It also retains the information of the previous order and assists in the research process. Moreover, since the whole process is online, there is no damage to the environment.
Therefore, courier tracking or shipping solutions software enhances customer satisfaction and makes package tracking much smoother.

Quality check	Strategy
1. Requirements to use	May be requirements checked and sure that are correct.
2. Validation of the design	May be design checked against requirements.
3. System validation	May be conducted within stages

4.1 Project Implementation

Model View Controller or MVC as it is commonly known, is a web design software development software. The model view control pattern is made up of the following three components:

- ✓ Model-Very low level of pattern responsible for data storage.
- ✓ View - This is responsible for displaying all or part of the data to the user.
- ✓ Manage Code-Software that controls interaction between model and view.

MVC is popular as it separates the app from the user interface and supports anxiety separation. Here Controller detects all application requests and works with Model to adjust any data required by View. View and use a control data set to generate a final silent response.

5. Risk Management

5.1 Risks to be Materialized

In the Project initiation Document (PID), potential risk was identified. Some materialized and were mitigated with the solution mentioned in the risk management plan. Going forward, there could only be more. From all constraints risks are independent of all other constraints and is inevitable. And so, given below are a list of risks that can potentially occur in due time.

1. Time stabilization is tightened resulting in more deviations and unevenness in width. This will lead to a decrease in blood sugar and cause inflammation. In a metal triangle, given software and project management see how time can create fluctuations scope and resources. This, if not handled properly, could be detrimental to the latter elimination. The product will be a failure or dissatisfaction, during client time acceptance phase.

Chances - 40%
Solution - research and perform unit tests by building component prototypes required. The time management schedule from here onwards will allow for construction planning and risk reduction in time.

2. Accumulating Projects - As the final semester of the final year draws to a close, we have other projects that need attention and development. Sometimes, our priorities are set it can deviate from this and can be good or bad unless there is time manager.

Chances - 40%
Solution - Sprints will allow me to monitor the progress of any project. Ongoing manager meetings can also compare if I am on the right track.

3. Feature creep- This is a common occurrence during the final stages of a project development, when we try to prioritize the 'fun to have' over 'the need to have it. This it is dangerous as it may fail the required performance requirement.

Chances - 30%
Solution - early preparation and performance research can provide me the confidence of moving forward rather than closing, reluctantly results.

4. Certain technologies may be difficult to learn and apply at this stage – For e.g., Internal navigation documents are very small and require one to do so chat.

Chances - 40%
Solution - Analyse similar technologies, adapt, and improve, so that performance can be achieved. If this is going to happen in the future, always have a support system that will enable you to change routes but focus on the same way. This is where using the Agile approach helps. Agile as it goes it means you are open to change and flexible. At this point the project is everything changes, and alterations should be recorded.

As such, these are potential risks but only if appropriate diagnostic criteria it is considered, we can reduce and control risk already it is synthesized and can reduce the likelihood of accidents.

5.2 Existing risks and how to resolve them.

1. Minor documents to be reviewed to set internal performance navigation to work.

Resolved - Reviews and analysis done on existing methods to determine how common they are Strong code recognition with strong code can be considered as personal identification current location.

2. Feature Creep - on the management side, after working and working performance, there came a time when I felt like, some certain features should be added again as I clung to the rotating function of the union.

Resolved - You did more research on performance and passed almost every forum given in unison with Vuforia.

3. Spatial projects are of high importance

Resolved - show me when and where I should work on some of my projects as well, I have done my best to complete some of the requirements related to this project, in morning hand.

5.3 Risk Assessment of the risks yet to materialize

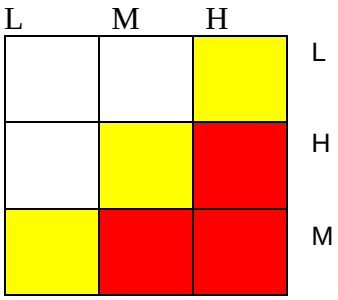
Risk probability	Risk Level Definition
High	50% or > chance of happening
Medium or Significant	30% - 49% chance of happening
Low	>30% chance of happening

Risk Assessment Matrix

Low

Medium

High



5.4 Risks that have materialized and responses

Risk	Management strategy
1. Overrun in the schedule	✓ A contingency has been added to the project plan. ✓ Highlights from reports will serve as a regular monitoring schedule. ✓ In the event of a more than one-week delay, an exception plan will be established and approved by the project supervisor.
2. Lack of knowledge	Many issues will come because of not having complete understanding while developing. So, I'm hoping to learn additional knowledge to complete this project.
3. Technology failure	Standard technologies will be used to deploy the system, and daily backups will be taken.
4. Platform Up gradation	To maintain a continuous functioning environment, I aim not to upgrade my developing platforms.
5. Time	Working with daily basis, that can I reduce the pressure about to this task.
6. Unfamiliar in React Native development	Refer some tutorials related React.js, Native.
7. Bugs	Refer stack overflow or google and fix those bugs.
8. Difficulty learning	A very simple system prototype will be developed.
9. Technology limitation and Failure	The system will be deployed using standard technologies, and system backups will be taken daily.

6. Schedule

The current plan was undertaken to accustomed to time management of project completion.

Stage	Deadline	Deliverables
Sprint 1 Constructive planning and Scheduling. Further research and implementation of resources. UI design and login page development		Interim report Part 1 Video on progress.
Sprint 2 Further research and unit testing of functions. Debugging and Maintenance Instantiating Databases and checking platform viability.	27/01/2022	Requirement Progression
Sprint 3 Back – End Development Part 2(final) Detailed design according to H.C. I	17/02/2022 20/02/2022	Interim Report Part 2
Sprint 4 Hosting and connections Integration testing Debugging and Maintenance	25/02/2022	
Sprint 5 System testing Corrective maintenance	27/02/2022	Maintenance Report
Sprint 6 Debugging and Error correction Final System testing	05/03/2022	The Software Application
Assemble and complete final report	20/03/2022	User manual Final Report

7. Resources Used

- ✓ React Native for mobile application development
- ✓ React Native and NODE.JS
- ✓ Firebase as the Centralized Database
- ✓ Tracking system as the Google API
- ✓ Adobe xd for UI development
- ✓ An app navigation function based on the Google Maps or Navbar bar
- ✓ Data gathering - Used React native.io gathered more components for implementation in the User mobile application.

8. Learning Undertaken

- ✓ Code properly
- ✓ Connect to the proper network using better technique
- ✓ Install suitable tools and components
- ✓ Check connectivity
- ✓ Configure the threat detection tools and software's
- ✓ By using the node.js how to create the mobile applications
- ✓ How to use pre-created node modules.
- ✓ How to use advanced features of the react-native
- ✓ Finalize the project (physically)
- ✓ Finalize the documents and user guide
- ✓ Knowledge of new software components and applications.

8.1 Student Learning Undertaken

React Native is a popular JavaScript-based mobile application framework that allows you to create iOS and Android mobile apps. The framework allows you to create an application for different platforms using the same codebase.
Before the P.I.D was deployed, I personally had to train myself with a traditional response for two good months to identify most of its resources. More basic JavaScript information is required to interact with different applications. Become a medium programming language that works in a virtual studio near a firebase. Further research was conducted in the area of tracking systems.

8.2 Studies required

This research comes with future implications, as into how the rest of the components will be integrated. Agile Planning has paved the way for uncertain change to be welcomed, especially in the concern of the main function which is data loading for customer review. There were two options to go with. Depending on which becomes experimentally successful it will be implemented but for the experimental stage to be conducted, research on both possibilities needs to be conducted. Hosting of data on the cloud is open to the client through an inbuilt QR scanner and tracking courier parcel. These options both will take research and as documentation on such is also very limited prototyping and researching of similar implementations and improvisations will be done.

9. Feedback

9.1 Supervisors Guidance

The support received from the supervisor is very helpful in order to perform background research on various techniques such as Abstract Real-time Courier tracking and also for the implementation. Regular meetings with the supervisor have happened and the guidance received from the supervisor meetings lead this project to this much distance.

Meeting Minute 1:

Final Year Project – Supervisory meeting minutes

Meeting No: 01

Date : 22/10/2021

Project Title : Real Time Courier Tracking Mobile Application

Name of the Student : N.N.D.G. Liyanage

Students ID : 10707256

Name of the Supervisor : Dr. Rasika Ranaweera

Items discussed:

Discussed my problem statement of mobile Application to improve connectivity between courier service provider and customer.

Items to be completed before the next supervisory meeting:

Improving the scope of the project.

Research about Courier tracking system.

.....

Supervisor (Signature & Date)

Meeting Minute 2:

Final Year Project – Supervisory meeting minutes

Meeting No: 02

Date : 29/10/2021

Project Title : Real Time Courier Tracking Mobile Application

Name of the Student : N.N.D.G. Liyanage

Students ID : 10707256

Name of the Supervisor : Dr. Rasika Ranaweera

Items discussed:

Get some advice and re correct PID and get approval for start project.

Items to be completed before the next supervisory meeting:

User interface and Database

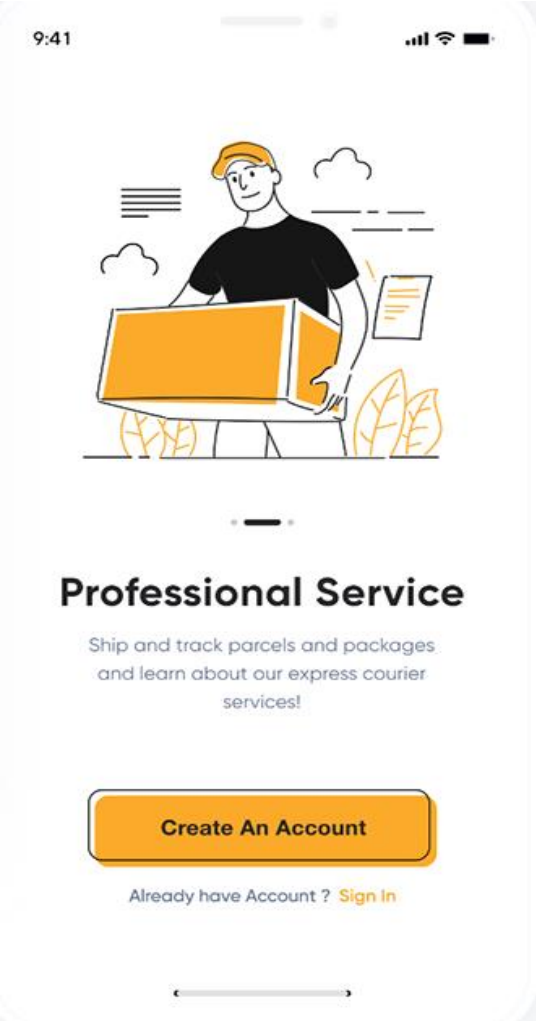
Tracking System implementation.

Real time code generation

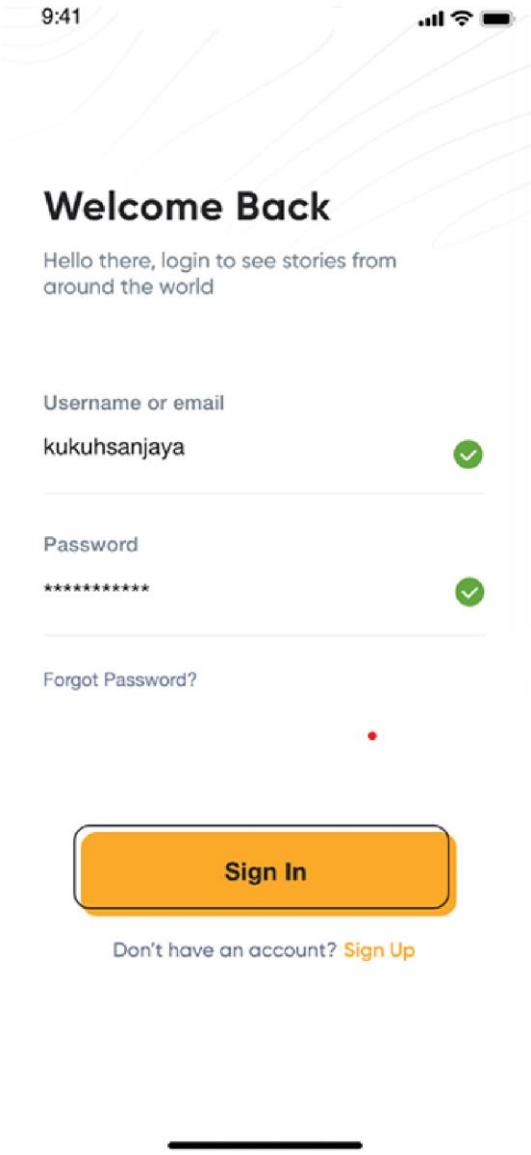
.....

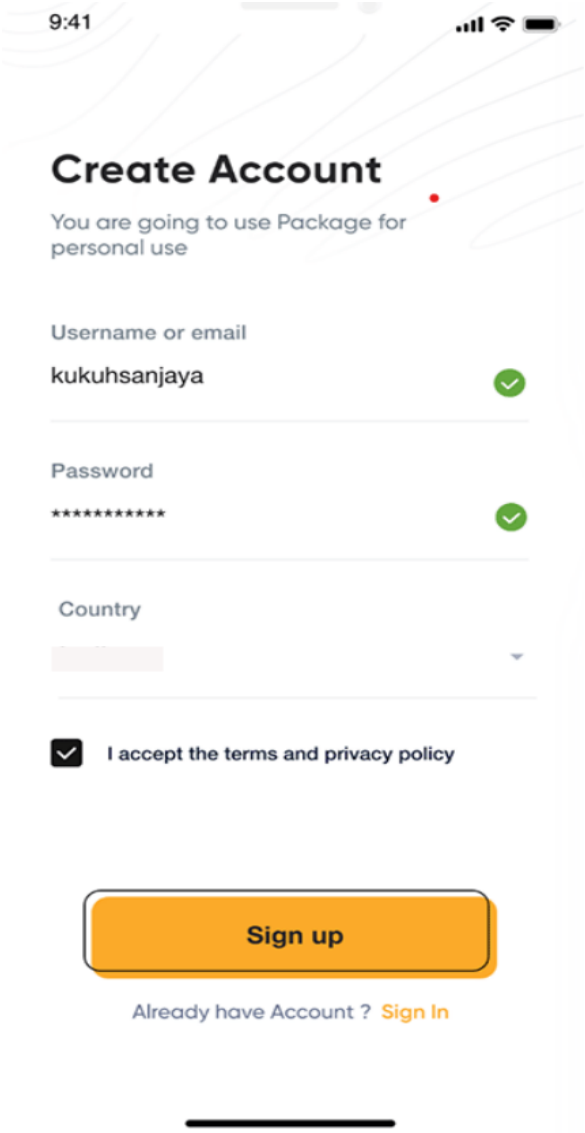
Supervisor (Signature & Date)

10. Screenshots

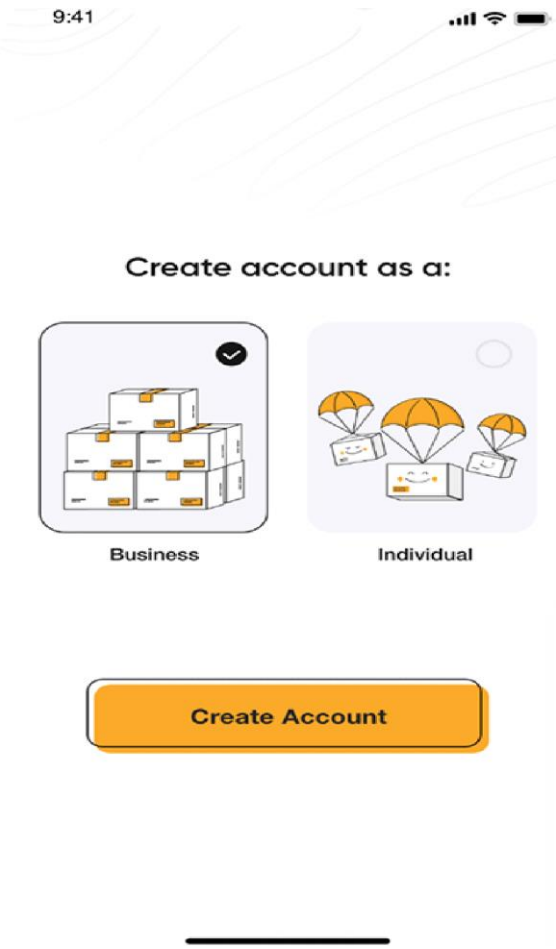


This is a welcome page. So first, you already created this account using a username and password. If you do not have an account, you want to sing. Many companies are also taking advantage of the opportunity to change the delivery environment as they develop software for courier services. Thus, your customers will receive real-time status updates on their post orders.


9:41
Welcome Back
Hello there, login to see stories from around the world
Username or email
kukuhsanjaya
Password
****
Forgot Password?
Sign In
Don't have an account? Sign Up



As agents, your managers and supervisors should first register. The default registration option "Username or email + and password" should work fine here. However, to prevent unwanted invaders from entering the entire courier management system, we also recommend that you use additional security layers.

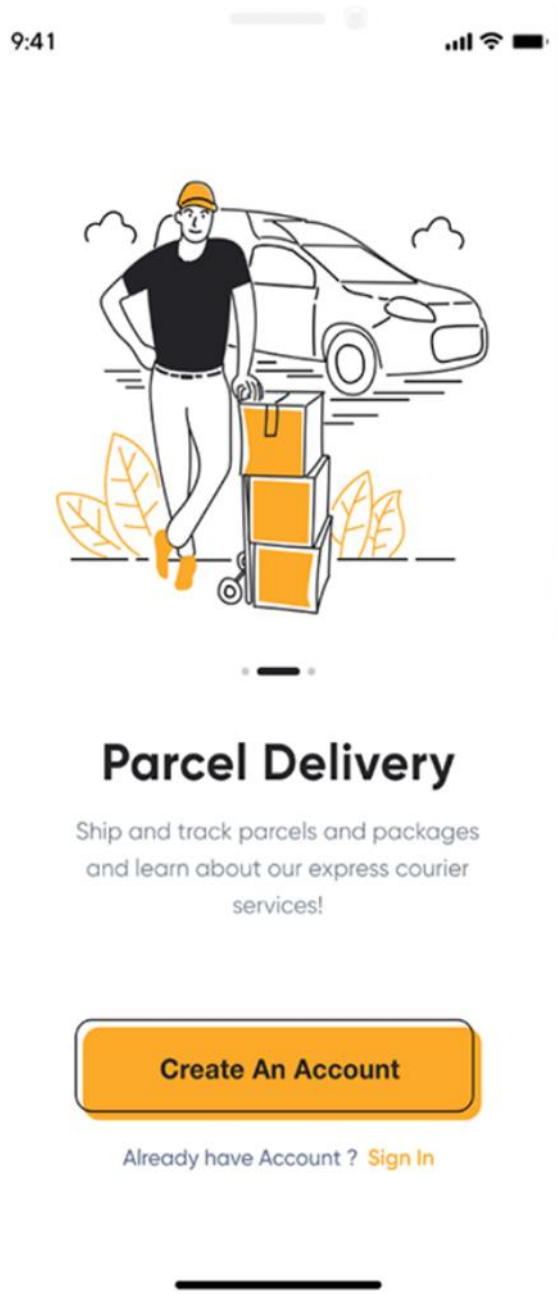

9:41
Create account as a:
Business
Individual
Create Account

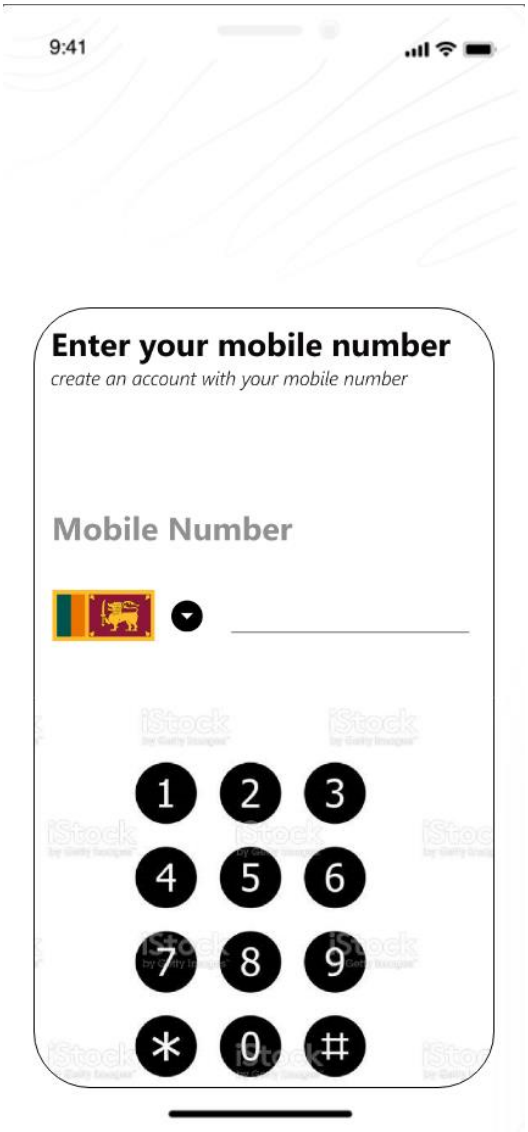
Good Services

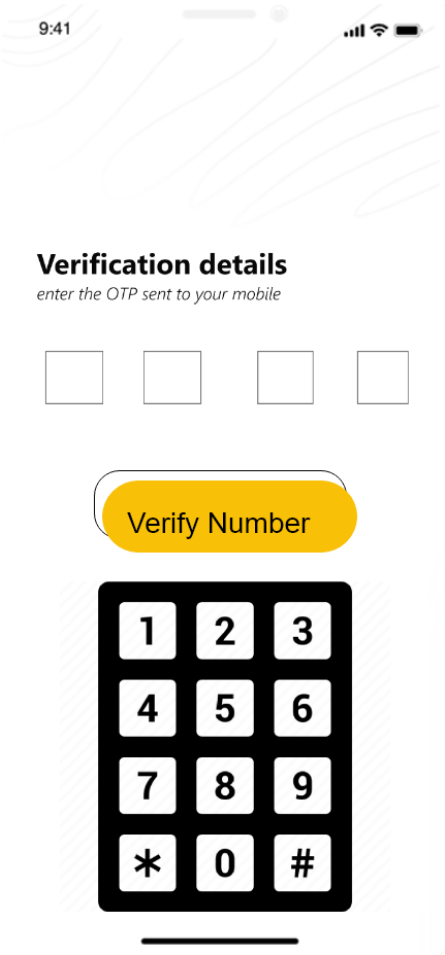
Ship and track parcels and packages and learn about our express courier services!

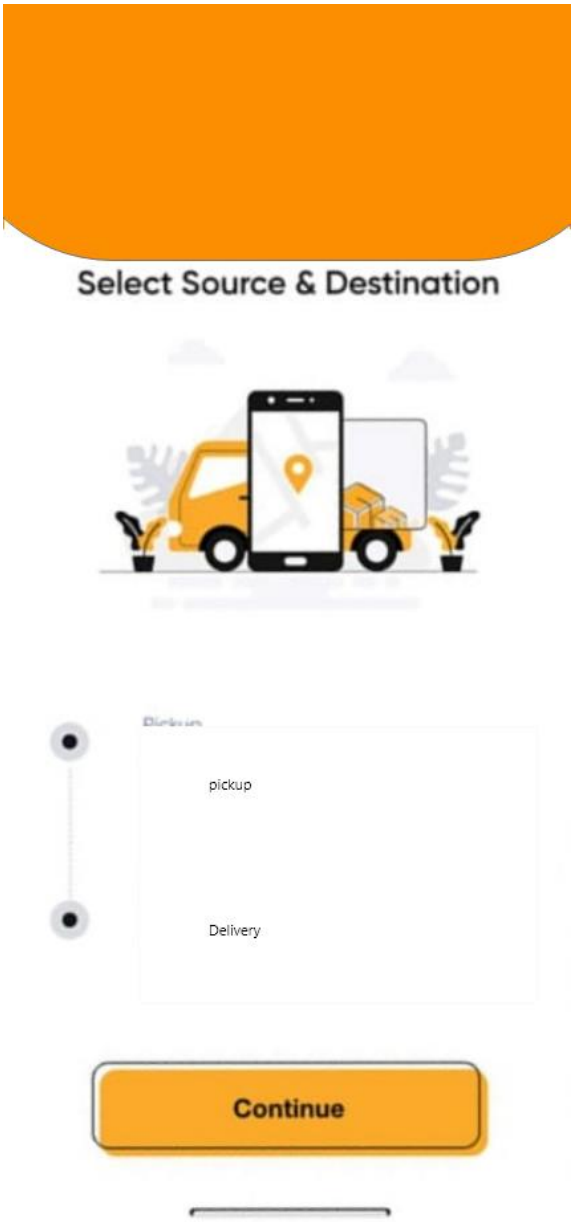
Create An Account

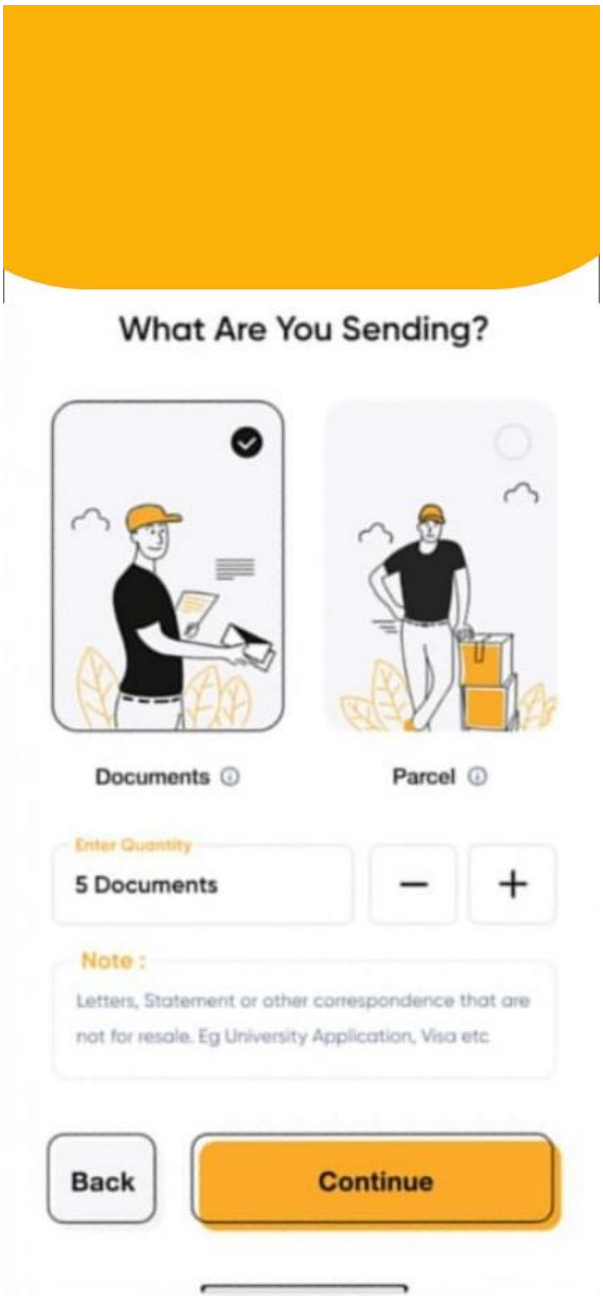
Already have Account ? Sign In

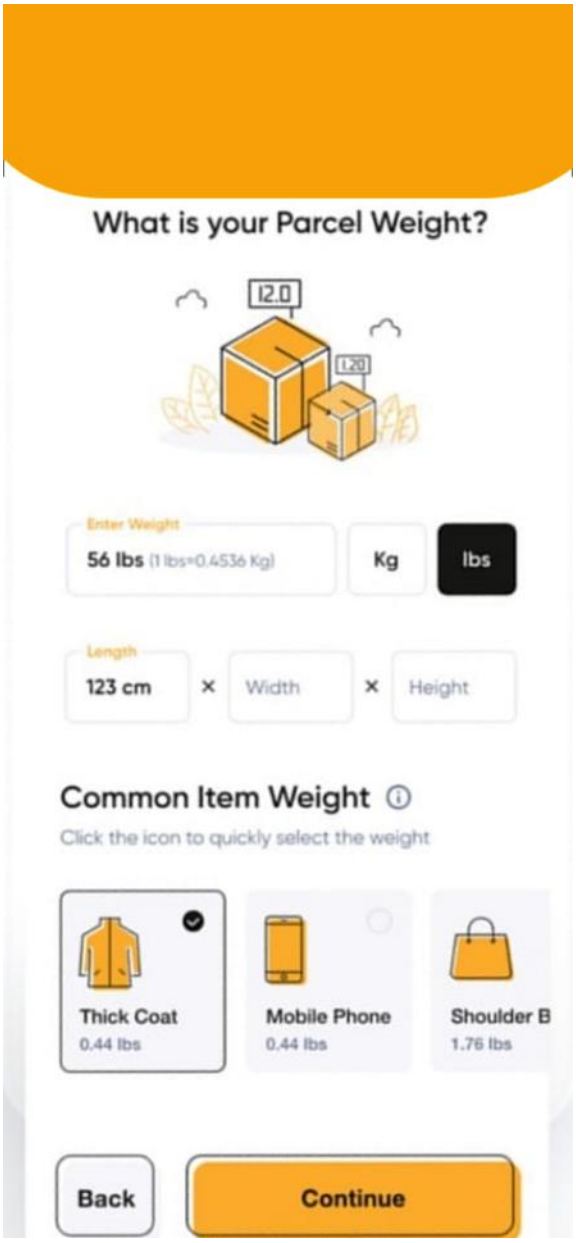

9:41
Parcel Delivery
Ship and track parcels and packages and learn about our express courier services!
Create An Account
Already have Account ? Sign In

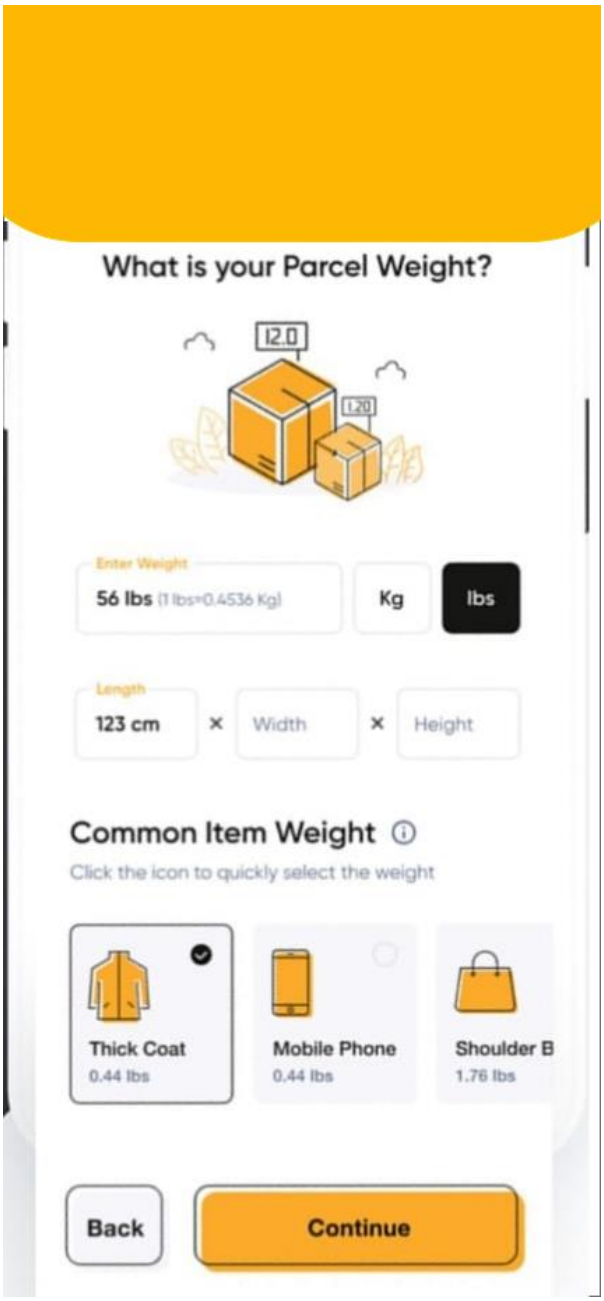

9:41
Enter your mobile number
create an account with your mobile number
Mobile Number
1 2 3
4 5 6
7 8 9
* 0 #

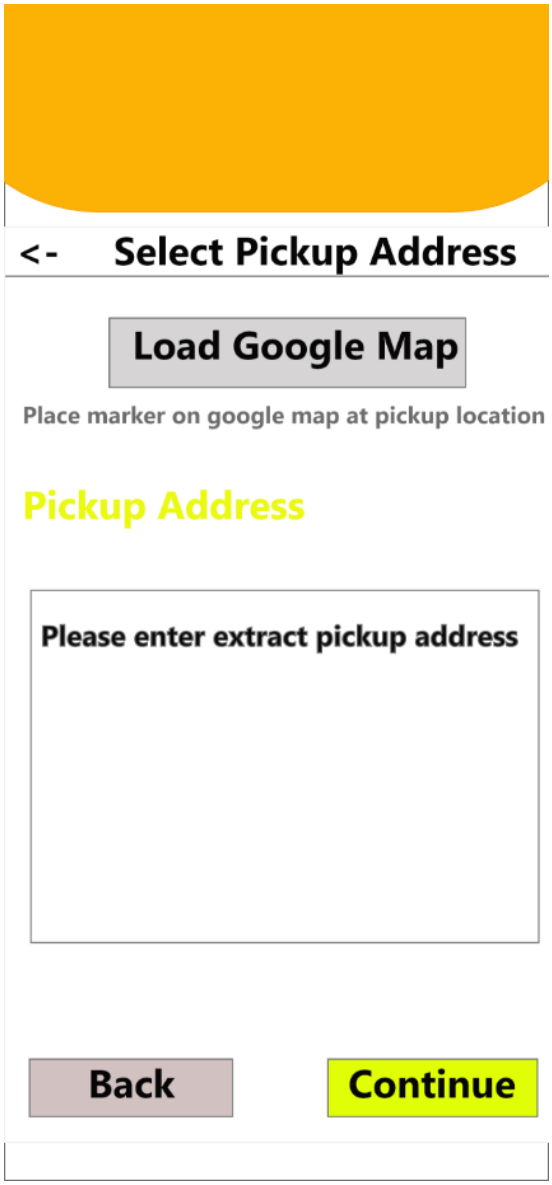

9:41
Verification details
enter the OTP sent to your mobile
Verify Number
1 2 3
4 5 6
7 8 9
* 0 #


Select Source & Destination
pickup
Delivery
Continue

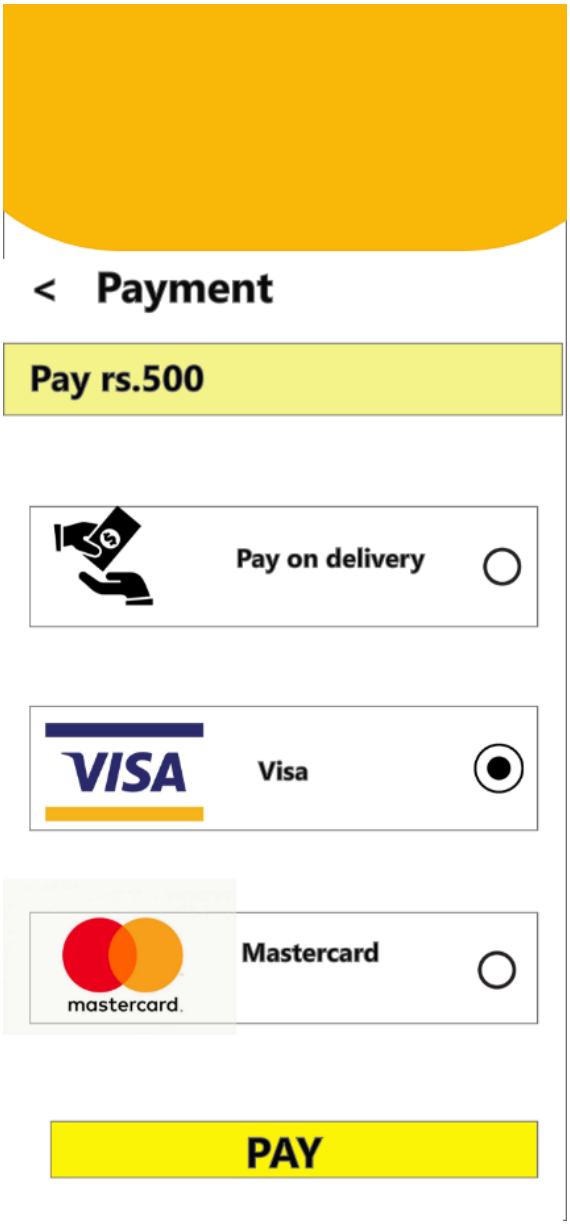

What Are You Sending?
Documents
Parcel
Enter Quantity
5 Documents
Note :
Letters, Statement or other correspondence that are not for resale. Eg University Application, Visa etc
Back
Continue


What is your Parcel Weight?
12.0
1.20
Enter Weight
56 lbs (1 lbs=0.4536 Kg)
Kg
lbs
Length
123 cm
×
Width
×
Height
Common Item Weight
Click the icon to quickly select the weight
Thick Coat
0.44 lbs
Mobile Phone
0.44 lbs
Shoulder B
1.76 lbs
Back
Continue


What is your Parcel Weight?
12.0
1.20
Enter Weight
56 lbs (1 lbs=0.4536 Kg)
Kg
lbs
Length
123 cm
×
Width
×
Height
Common Item Weight
Click the icon to quickly select the weight
Thick Coat
0.44 lbs
Mobile Phone
0.44 lbs
Shoulder B
1.76 lbs
Back
Continue


<- Select Pickup Address
Load Google Map
Place marker on google map at pickup location
Pickup Address
Please enter extract pickup address
Back
Continue

This feature is required if the company has its own collection of delivery vehicles. In this case, it is best to build a courier management software capable of handling these vehicles. On the other hand, it will be easier to keep everything clear and in control, as you will be able to check the number, status, and details of your vehicles and bikes at any time. On the other hand, the system will remind you of unresolved technical issues, standard car tests, and more. Your supervisors should also be able to assign the car a specific vehicle and track its performance and location of the vehicle.



*(This User interfaces here may change in the future)

11. References

CodeCanyon. (n.d.). *No results found*. [online] Available at: https://codecanyon.net/category/mobile?term=courier%20delivery.

ResearchGate. (n.d.). *(PDF) Development of android-based apps for courier service management*. [online] Available at: https://www.researchgate.net/publication/339802344_Development_of_android-based_apps_for_courier_service_management [Accessed 23 Jan. 2022].

Stormotion Blog. (2020). *How to Develop a Courier Management System: Top Things to Consider*. [online] Available at: https://stormotion.io/blog/how-to-develop-courier-management-system/ [Accessed 23 Jan. 2022].

www.deliforce.io. (n.d.). *How Does A Courier And Package Tracking System Work? | Deliforce*. [online] Available at: https://www.deliforce.io/blog/courier-parcel-package-tracking-system [Accessed 23 Jan. 2022].

Bunger AC, Hanson RF, Doogan NJ, Powell BJ, Cao Y, Dunn J. Can learning collaboratives support implementation by rewiring professional networks? Adm Policy Ment Health. 2016

Neta G, Glasgow RE, Carpenter CR, Grimshaw JM, Rabin BA, Fernandez ME, Brownson RC. A framework for enhancing the value of research for dissemination and implementation. Am J Public Health. 2015.

Nadeem E, Olin S, Hoagwood KE, Horwitz SM. Understanding the components of quality improvement collaboratives: a systematic literature review. Milbank Q. 2013 Gulc, A. (2017). Courier service quality from the clients' perspective. *Engineering Management in Production and Services*, *9*(1), 36–45. https://doi.org/10.1515/emj-2017-0004

Mohd, A., Rashid, R. A., Abdul Hamid, A. H. F., Sarijari, M. A., Rahim, M. R. B. A., Sayuti, H., & Abdul Rashid, M. R. (2019). Development of android-based apps for courier service management. *Indonesian Journal of Electrical Engineering and Computer Science*, *15*(2), 1027–1036. https://doi.org/10.11591/ijeecs.v15.i2.pp1027-1036

Okemiri, H., Henry, O., Nwogbaga, N. E., & Nwebonyi, F. N. (2017). Critical Review Of Courier Service Management System With Empasis To Its Relevance If Adopted In Nigeria Queuing Theory View project Smart home control system View project Critical Review Of Courier Service Management System With Empasis To Its Relevance If Adopted In Nigeria. In *Journal of Multidisciplinary Engineering Science and Technology (JMEST)* (Vol. 4). www.jmest.orgJMESTN423516887738

12. Appendices

12.1 Project Proposal

Real Time Courier Tracking Mobile Application

Proposer

N.N.D.G. Liyanage [10707256]

Proposed supervisor

Dr. Rasika Ranaweera

Problem statement

My proposal for the final year project is a Real Time Courier Tracking Mobile Application to improve connectivity between courier service provider and customer. Using courier service for delivery is expanding business service in Sri Lanka. Courier services are being used widely by the people in Sri Lanka.

So, using and app for courier service industry can be a boost. So, by using an app the following problems can be eradicated easily.

- ✓ The first problem is difficulty in finding the location of customer and courier service and vice versa.
- ✓ There is no correct idea of the time between the goods are handed over to the courier service and to the customer. That mean wastage of time and the courier service provider can't manage the delivery of goods within working hours.
- ✓ The third problem is the customer has no correct idea whether delivery charges are paid or not. Until courier service provider meets the customer.
- ✓ The fourth problem is the people in remote areas are unaware of the closest courier service center.

Project description

Real time courier tracking mobile application is an android and iOS based mobile application. I have developed this project in React native and Node.js. The main purpose of react is to be fast, scalable, and simple. I will choose to build tracking API with Google API.

I hope to develop this app to use by courier service, courier service provider and the customer. The main objective of developing mobile application on the courier tracking system facilities' both the customer and the courier service. With the increase of using courier service the demand of a simple and easier methods for courier industry has been increased. Because of these I would like to propose my project to develop an app on courier tracking system. I hope this app would help all to minimize the problems arising with the use of courier service.

In this project there are various types of modules available to manage courier, delivery and customer. Courier module can manage courier, Tracking module is normally developed for managing tracking, Customer module manages customer operations , Delivery module has been implemented to manage delivery.

Modules of the Courier Tracking System

- ✓ Courier Module: All the operations related to courier, is managed by this module.
- ✓ Tracking Module: Tracking module is used to manage the tracking.
- ✓ Customer Module: It has been developed for managing customer.
- ✓ Delivery Module: It manages the delivery.
- ✓ Office Module: Office operations will be managed by office module.

Features of Courier Tracking Mobile Application

- ✓ Just like in any other app, it all starts with a login. Among all possible login options (like social, password less , email, etc.) I recommended sticking to the phone number or email and password login.
- ✓ Courier tracking mobile application is based on app, from which user can easily manage Tracking details, and Customer details.

- ✓ Admin user will be able to track all information of Courier, Tracking etc.

- ✓ Search module has been implemented to search courier, delivery, office.

- ✓ Admin has rights to edit, add, delete, and update records of customer, delivery, and office.
- ✓ The courier service provider will be able to show the numbers of parcels to be delivered per day in a convenient way that can be delivered by a map in the order of address and distance.
- ✓ After the logging app the customer must create an account a QR code is sent to the customer by courier service after filling the details. After the customer receiving the parcel the courier service provider must scan the QR code. Then a message sent to the courier service after every successful delivery.
- ✓ I hope to be implementing push notification feature when you develop a courier tracking system. Its main purpose is to keep courier service providers updated on the most important matters (New delivery orders, Changes in current orders, Status updates). It helps couriers never miss and timely react to anything important.
- ✓ This app allows the customer to pay the delivery fee cash or online payment methods.

- ✓ This set of features is the very special part of the courier tracking mobile application. From here a courier can access an active order.
    - Oder Number
    - Oder Description
    - Name of the recipient
    - The recipient's mobile phone number
    - Estimated delivery time
    - Payment details
    - Pick-up location
    - Drop-up location
    - Notes

Project keywords

React Native, Node.js, Firebase (Languages) QR Reader, Push Notification (Technology) , Android, iOS, Google API (Tracking system).

Requirements

I have to learn about React Native and database connection thoroughly.

Finance

Cost for internet facilities and for required software.

External organizations

None

Other staff

None

12.2 Project Initiation Document (PID)

School of Computing and Mathematics

PRCO303
Final Stage Computing Project

BSc (Hons) Software Engineering

N.N.D.G. Liyanage

10707256

Real Time Courier Tracking Mobile Application

2020/2021

Contents

1. Introduction

1.1 About Us

E-commerce has grown exponentially over the years. Growth has been reflected in strong consumer demand and a growing number of different products available online. This creates a transportation problem and increases the need for an efficient courier service to support growing markets. It is very important for the courier service provider that the delivery of the parcel is done as soon as possible. One of the most important and important courier business processes is the delivery of parcels. This is where effective service delivery will be paramount. An efficient system needs to be built to facilitate interaction between the courier service provider and the buyer to accurately determine the complete package delivery route. In this proposed project, a real-time Android and iOS mobile tracking app will be developed. A mobile app that helps mail delivery staff find their way to deliver parcels to a customer's door. The app will direct courier staff to obtain courier data such as addresses and contact information and then navigate to selected customer addresses. It will select the best route to the address and inform customers before it arrives so that they are ready to receive the package. This parcel delivery tracking will provide the basis for an effective courier service system. (Courier Tracking System Project, n.d.; Okemiri et al., 2017)

1.2 Introduction

These days, e-commerce stores have been growing as a result of changes in consumer behaviour as more consumers choose to shop online. The latest figures show that Sri Lanka has 6 million online shoppers, comprising 29 percent of the population, and 35 percent of mobile users shopping online. The growth of online shopping requires the modernization of parcel delivery services, especially for day-to-day delivery. In Sri Lanka, the number of courier service companies has been increased to support the need for parcels.

In the Courier Tracking Mobile app, parcels must arrive on time in place to satisfy customers. To ensure prompt delivery of packages to customers, it is necessary to find the fastest route with the least amount of traffic from the delivery point to the destination customer. At the same time, customers should be notified during continuous delivery or on time.

Responsive communication between the two organizations will improve the efficiency of the messenger service and customer satisfaction. The purpose of the mobile app is to develop an Android and iOS mobile system that can help build a more intelligent package delivery system by integrating the use of current communication technologies such as Google API, QR Reader, Push Notifications, and Android-iOS Tools. It will help to track the mobile app to intelligently manage the parcel delivery process and deliver the parcels in a timely manner to the customers.
In developing the application, a delegation tracking system was discussed. However, the system courier service provider will be able to indicate the number of parcels to be delivered per day in a simple way that can be delivered on a map in order of address and distance. The proposed sender tracking mobile app can be easily used to provide better user information to consumers to track and collaborate with a delivery service provider to avoid unnecessary hassles. (Mohd et al., 2019)

1.3 Background & Motivation

One of the main reasons I'd like to take on the proposed project is to learn about and become acquainted with new trends. Another reason is that the project holds an interesting plot for which critical thinking is necessary. Information in relation to the applications needed to build the project is scarce. As likely as it is to have its risks, it is also an innovative approach to the defined problems.

2. Business Case

2.1 Business Need

Currently, the package or courier tracking process involves the process of packaging local packages and packages separately during screening and delivery. Although the main problems of local mail delivery services are late delivery and goods delivered in an unacceptable condition, Competitive Prices, Poor Customer Service, and General Service Issues.

The concept of required delivery is an ongoing trend that is popular among customers around the world. Customers are initially looking forward to successful delivery, and if your business can supply them in the same way, you may have some loyal customers for the rest of your life. Organizations striving for excellence must come up with strategies that will improve the overall performance of the business. An effective tracking system helps an organization to regain its normal performance, improve customer experience, and remove additional steps while allowing them to operate faster and more efficiently. It is always important to have a strong commitment to delivery managers, customers, and business operators. The technological advancement of tracking systems enables us to provide professional delivery to our customers, improve performance management, and, ultimately, delight our customers. This not only helps to give customers a better sense of delivery but also helps the growth and development of the organization. Having an effective courier tracking system not only ensures business growth but also creates a strong customer base for a lifetime. (Mohd et al., 2019)

2.1.1 Underlaying Problem

As a result of globalization, businesses are rapidly expanding, and the book industry is growing at its best. The demand for fast, efficient, and trackable delivery is growing, and competition is fierce when it comes to delivery. Such situations present many challenges to the book industry. especially for those entering the market and even those experiencing the transition from conventional to modern services. The big question is how they can play shoulder to shoulder with great bullies, effective technology, and brand ownership.

Other problems with local mail delivery services are late delivery and goods delivered in an unacceptable condition, competitive prices, poor customer service, and general service issues. (Gulc, 2017)

2.2 Business Objectives

- ✓ **No Problem Online Booking**: Clients will want to book their download and transfer data in full quantity with this help. Clients alike can analyze the level of transfer of internet transfers from their new location to the target. So, they did not worry about the cost.
- ✓ **Real-Time Tracking**: In the past, firms will talk to Courier expert organizations to determine the situation in bulk. However, they can perform this action using the requested application by checking the default send marker or using the in-app GPS. Similarly, clients of your dispatch shipping application will want to track their packages continuously.
- ✓ **Push Notifications**: If drivers experience problems during the trip, the app will notify you immediately. Additionally, by sending push notifications, you can keep your customers up to date on all aspects of your delivery services, such as order recovery, download, process, dispatch, and delivery, and so on. Customers will feel greatly appreciated if they are kept up to date.
- ✓ **Reduced Papers**: Each item you provide comes with a host of texts that are difficult to manage. The application submission application, then, significantly saves the administrative function by storing each piece of hidden object and tracking it until it is transferred. Likewise, the portable app robs everything while at the same time getting a good deal of fix.

- ✓ **Multiple payment methods**: Users in today's generation prefer safer, easier, and faster payment methods. Make sure the standard payment gateway is integrated during the book delivery application development phase. This will allow your users to perform tasks using plastic cards, online payments, net banking, and other methods. You can also monitor and control everything you do online, eliminating the fear of late or failed payments.

- ✓ **Proof of Delivery**: It also makes sense to confirm the status of the transfer or suspicion of Pod Proof of Delivery. This feature can often be found on the Order Details screen as it combines details (eSignature, image, code) into a specific application. There are probably a few ways to get confirmation that a request has been successfully forwarded and approved by a client:
    1. eSignature is a customer.
    2. Scan QR code; code is generated by the client application.

- ✓ **Route-Route Improvement**: As a guide, it is similar to a standard application map where clients can build a smooth course between two focuses. Receipt and disposal sites can be physically accessed by the messenger or set naturally by the app as per hidden request. Also, the feature is a complete requirement to promote a glossary posting framework. It keeps the co-operative's professional co-operatives continuously updated somewhere in your dispatch. , the organization of the draft delivery specialist will really want to indicate the number of packages to be delivered each day in a practical way that can be conveyed by the guide in the address and distance request. As such, they can without taking long to check the driver's distance to the landing area or immediate assistance due to the critical situation

3. Project Objectives

1. Project development consists of several phases with the aim of providing a comprehensive courier tracking service that will increase the efficiency of courier service in terms of cost and customer information. An application server integrated with the database system was upgraded to support the Internet management system.

2. The navigation function of the app is based on Google Maps, while the notification or notification function will be sent using the SMS (Short Message System) service. All of these functions are integrated into the customer package database in the management system

1. The principal objective of the project on courier tracking systems is to deal with the subtleties of courier tracking, tracking number, customer, and address. It deals with all the data about couriers, delivery, addresses, and couriers. The undertaking is completely worked at the authoritative end, and along these lines, just the director has ensured the entrance. The goal of the task is to put together an application program that will reduce the amount of manual work involved in dealing with the courier, tracking, delivery, and tracking number. It tracks every one of the insights regarding the tracking number, customer, and address.

2. Analyze the customer, the location of the parcel, the date and time of delivery, the current location of the courier service provider on a map, and so on.

3. To analyze the convenience of the courier service providers' analysis of the number of parcels to be delivered in a working hour, customer details and special messages, and the number of parcels to be delivered in the easiest way.

4. Analyzing how to get track of the delivery service provider's current location to map out the location of the customer's location.

4. Chapter 4: Initial Scope

The starting point for my project is a study of simple courier service companies based in Sri Lanka and identifying patterns for customers and the cooperation of postal service providers. Although the scope and functionality of a product may vary depending on the business model and specification, there are certain basic features that every package delivery tracking application should have. Here are some of them.

With the customer tracking app:

- ✓ QR reader
- ✓ Customer profile, including address and personal information, preferences, orders, payment data, etc.
- ✓ Optional: Add a personal package (compact only) package tracking system with map view.
- ✓ Package management in real time: ability to change location address, recipient or delivery time, etc.
- ✓ In-program chat: the ability to communicate by courier or ask for help from sponsors.
- ✓ GPS-enabled tracking system with map view.
- ✓ Real-time tracking: Real-time tracking is one of the most important features of a parcel delivery service. This feature is common in the admin panel, driver app, and client application. In the client app, the user can track the location and status of their package in real time. This tracking feature plays a major role in improving customer satisfaction as it gives users the assurance that their package is delivered. Similarly, this feature also helps the controller to match the nearest driver available to deliver the package. Additionally, it supports multiple routes that allow the user to add multiple addresses to the list.
- ✓ Payment gateway integration: Payment gateway is another important feature that you should include in your desired mail delivery application. Payment gates such as wallets and credit / debit cards, bank transfers must be integrated with the system. This payment gateway offers the user many payment options such as COD, card, and wallet. Not only this, with this feature, users also get a digital bill receipt with all the important information like time and date of delivery, order ID, item description, shipping cost, etc.
- ✓ Administrator chat: This feature allows the administrator to chat with the user and the delivery person to improve service quality and customer satisfaction. This feature helps to maintain continuous communication with both delivery guys and customers.

- ✓ App notifications: App notifications help users to get live updates of their delivery status directly from the app. These app notifications provide users with important information such as the current delivery phase, the estimated delivery time, and changes to the delivery timeline if available. Not only this, but users also get contact details of the driver and the control panel with these notifications. Push notifications are also an important means of communication between stakeholders. App notifications are used to inform customers about various offers and promotions. This plays an important role in customer retention.
- ✓ courier reviews and updates: This feature allows the customer to rate the service and write a review based on their experience. Ratings and reviews are important features as they help you evaluate your services.

Through the courier app:

1. Login (using information provided by the administrator)

2. Courier account, which includes personal information, user rating, in-app wallet, etc.

3. List of available orders sorted by location, overtime, package size, etc. Alternatively, the system can use the same algorithm and automatically assign the order to the nearest messenger with the option to accept / reject the order.

4. Delivery status management - manually or automatically 5. Customer delivery status verification (eg, signature or scanning QR code generated by the customer application)

5. In-message messaging: the ability to communicate with the customer and discuss details of the time / place of delivery.

6. Completed order history

After feasibility study, the design, development, and implementation process will follow the steps listed below.

Stage A: Administrators application that provides a grid report on the flexibility of messenger information and connects that to the website, and then uploads some data from the UI to the UI.
Customer's destiny according to the mark found in the real world.

Stage B: Tracking the current location of the postal service provider and showing it on a map.

Category C: Managing the app in a way that the customer can work with on arrival.

Additional features that could be used as future implementation would be system utilization across all platforms and having a more detailed and easier-to-use GUI. Maintaining a database here will be easier as it is online and in one place. An app on the client side, the app will be used by the public about the manager while it is private.

5. Method of Approach

The improvement of the undertaking while primarily zeroing in on a more established form of a model, the waterfall, will likewise follow the coordinated methodology in plan and execution. Intending to utilize an overabundance to appraise assignments

I need to finish and know about it; I can guarantee a useful stand-up and review. The waterfall model will empower to give me the bit-by-bit process all through the improvement of the task. The improvement will utilize a steady methodology zeroing in on the route and information the executives of the association. Beginning from Stage An as referenced in the past and finishing it with the last.

Possible technologies used would include,

- ✓ React Native and NODE.JS
- ✓ Firebase as the Centralized Database
- ✓ Tracking system as the Google API
- ✓ Figma for UI development
- ✓ An app navigation function based on the Google Maps or Navbar bar

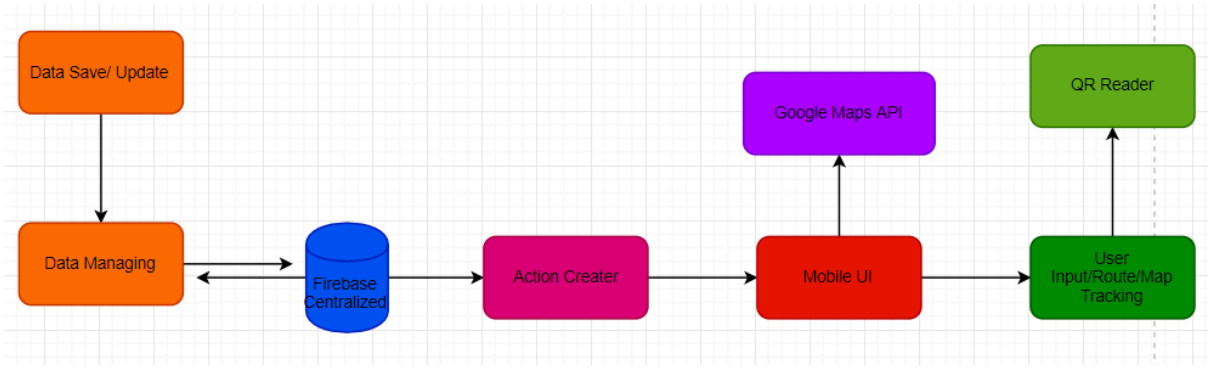


Figure 1. A diagram that can explain your project

6. Project Plan

6.1 Control Plan

- ✓ Using different methodologies, I will be using a Jira based control plan.
- ✓ Highlight Reports with the use of sprint reviews at the end of each Stage (A, B, C). (Would include reviews on the stage and its completion)
- ✓ Weekly review meetings with my project Supervisor (Dr Rasika Ranaweera) to review progress and plan for thereafter
- ✓ Risk management (see section 7)
- ✓ Communication plan (see section 6.2)
- ✓ Quality Plan (see section 8)
- ✓ Exception reports and plans if necessary

6.2 Communication plan

In addition to the interim director's meetings as required, scheduled review / response meetings will be held at the end of each phase to discuss the Final Phase report, the next Phase plan, and to review any technical submissions produced during the stage. Response meetings will also be held following the submission of two interim reports.

Stage	Est.Start date	Est.End date	Deadline	Deliverable
1.Initiation	01/11/2021	15/11/2021	17/11/2021	P.I.D
2.Investigation and Requirements	01/09/2021	10/11/2021		Analysis of similar projects, analysis of current process in convenient stores, analysis of the step by step build of the applications.

3.High Level design and Architecture(Admin)	17/11/2021	30/11/2021		Design documents(Architecture, UI, Database Schema, Modular Decomposition, Design EER Diagram, UML Diagram, Use Case Diagram, Class Diagram, Activity Diagram, Dataflow Diagram)
4.Increment 1 (Stage A)	01/12/2021	01/01/2022		Basic interface design of mobile application, Database Design
5.Increment 2 (Stage A)	02/01/2022	15/02/2022		QR reader, Tracking System , Implementing the Push Notifications Features, Implementing Route Planing system with a map view
6.Increment 3 (Stage B)	16/02/2022	16/03/2022		Navigation and testing development.
7.System and User Acceptance	17/03/2022	31/03/2022		Final Application testing
8.Assembling the Final Report	01/04/2022	07/04/2022		PRCO303SL Report

Table 1. Stage 1 Plan

Task	Est.Start date	Est.End date	Products/Deliverables /Outcome
Analysis of Similar projects & Analysis of existing business process	01/10/2021	20/10/2021	Document Processes
Elicitation and specification of user requirements	21/10/2021	27/10/2021	Requirement document
Requirement validation	27/10/2021	30/10/2021	Client sign- off
Evaluation of possible development technologies	01/11/2021	07/10/2021	Brief report discussing possible and adopted technologies, issues considered, and reasons.

Table 2. Stage 2 Plan

7. Initial Risk List

What can go wrong and what management strategies are you adopting now to deal with these.

Risk	Management Strategy
Schedule overruns	The possibility has been acquainted with the venture plan. Features and chief gatherings will screen progress and monitor all. More days added to the assessment of the culmination of each stage.
Other commitments	There will be different tasks running corresponding with this and complete consideration would be determined. A period the administration plan would assist me with being on target.
Difficulty learning/using the development technologies	Each stage will have a basic model worked to research and test legitimacy. Keeping a documentation of each stage.
Project complexity	Deeply usefulness would be carried out and would give a functioning item.
Loss of data/ technical failure	Keeping backups
Frequent Service Issues	Messengers that stay aware of the most recent innovation, for example, wise course arranging, are generally the ones that experience the least issues. Not exclusively does their inventive framework assist them with dealing with their everyday tasks effectively yet it likewise permits them to adopt a proactive strategy that implies they can manage issues before they become excessively intense.
keeping customers update	Investing in reliable delivery tracking software is the easiest way to update customers on the whereabouts of their orders. A good delivery tracking software will keep your customers informed about the current location of the order and also provide an estimated date of delivery, along with the courier service provider's contact details. Not just the receiver but the sender of the order can also make good use of last-mile delivery tracking and keep tabs on the order.

8. Initial Quality Plan

What quality checks are you going to apply to your products, and when?

Quality check	Strategy
Requirements	Continual unit testing will go on to check validity and relevance to the proposed business function after every phase. Prototyping and user intervention will be deployed. (Stage 2)
Design Validation	Will follow the principles under H.C.I Guidance and will be checked against backend functionality. User intervention will be deployed so that feedback would be retrieved. Database Normalization, Data Flow Diagrams (DFD0/1/2) & UML Diagrams would guide me through each phase. (Stage 3)
Validation	To be conducted after each phase(subsystem)
User acceptance	Testing To be conducted in Stage 8

Table 4. Quality Plan

9.References

Efficient Courier Tracking System Project. (n.d.).

Gulc, A. (2017). Courier service quality from the clients' perspective. *Engineering Management in Production and Services*, *9*(1), 36–45. https://doi.org/10.1515/emj-2017-0004

Mohd, A., Rashid, R. A., Abdul Hamid, A. H. F., Sarijari, M. A., Rahim, M. R. B. A., Sayuti, H., & Abdul Rashid, M. R. (2019). Development of android-based apps for courier service management. *Indonesian Journal of Electrical Engineering and Computer Science*, *15*(2), 1027–1036. https://doi.org/10.11591/ijeecs.v15.i2.pp1027-1036

Okemiri, H., Henry, O., Nwogbaga, N. E., & Nwebonyi, F. N. (2017). Critical Review Of Courier Service Management System With Empasis To Its Relevance If Adopted In Nigeria Queuing Theory View project Smart home control system View project Critical Review Of Courier Service Management System With Empasis To Its Relevance If Adopted In Nigeria. In *Journal of Multidisciplinary Engineering Science and Technology (JMEST)* (Vol. 4). www.jmest.orgJMESTN423516887738

pdfcoffee.com. (n.d.). *Project Report of Courier Tracking System*. [online] Available at: https://pdfcoffee.com/project-report-of-courier-tracking-system-pdf-free.html.

(Anon, n.d.)

(pdfcoffee.com, n.d.)*Efficient Courier Tracking System Project*. (n.d.).

Gulc, A. (2017). Courier service quality from the clients' perspective. *Engineering Management in Production and Services*, *9*(1), 36–45. https://doi.org/10.1515/emj-2017-0004

Mohd, A., Rashid, R. A., Abdul Hamid, A. H. F., Sarijari, M. A., Rahim, M. R. B. A., Sayuti, H., & Abdul Rashid, M. R. (2019). Development of android-based apps for courier service management. *Indonesian Journal of Electrical Engineering and Computer Science*, *15*(2), 1027–1036. https://doi.org/10.11591/ijeecs.v15.i2.pp1027-1036

Okemiri, H., Henry, O., Nwogbaga, N. E., & Nwebonyi, F. N. (2017). Critical Review Of Courier Service Management System With Empasis To Its Relevance If Adopted In Nigeria Queuing Theory View project Smart home control system View project Critical Review Of Courier Service Management System With Empasis To Its Relevance If Adopted In Nigeria. In *Journal of Multidisciplinary Engineering Science and Technology (JMEST)* (Vol. 4). www.jmest.orgJMESTN423516887738

Thank You