



**An Undergraduate Internship/Project on
Connect-A Cross Platform Social Networking App**

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Department of Computer Science & Engineering

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Attestation

I, Shoptorshi Rahman, hereby certify that none of the work that has been done in this report is plagiarized or copied from anywhere. Any resources used are mentioned in the reference section of the report. No help was asked for during the completion of the report from a third party organization except the one that I have worked for in the last 3 months as an intern. For any information, my internship supervisor Abu Hassan Md. Taufique at Kaff Limited can be contacted at any time.

Sincerely

Shoptorshi Rahman

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Signature

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Letter of Transmittal

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Md. Fahad Monir
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Subject: Submission of Internship Report.

Dear Sir,

With all due respect, it is a great pleasure to submit my report on the “Connect-A Cross Platform Social Networking App”. This report is solely based on the project that I have been involved in during the internship period. The main purpose of this report is to outline the overview of the current project and as one of the main requirements for fulfillment of undergraduate degree. I have tried my level best to make this report as clear and concise as possible.

It has been an excellent experience to have completed the journey of my internship. I have got the chance to work on the production level codebase and it provided me with the opportunity to enhance the professional development skill sets. It would give me immense pleasure if this report could serve its purpose and make a positive impact on the overall project. I am also very thankful to you for the support, guidance and advice that helped to to finally complete this report. Your kind responses to the queries throughout my internship journey have made it possible to come to this point of the project.

I have learned various technologies, development cycles and the process for a professional project development which I believe is only possible through hands-on development with a professional team.

I would be glad if you could kindly accept my internship report, and I would be available if there are any sort of queries regarding this report.

Sincerely Yours
Shoptorshi Rahman
ID: 1720360

Abstract

Connect is a cross platform social networking app where users can connect securely. This project was started to take into consideration some very basic yet very important aspects like accessibility, easy-to-use and highly secured platforms. Contrary to the other social networking giants, this Connect app provides a user data protection security, faster and reliable access in any time and state of the art technological experience. There are options to navigate user profiles, news feeds, real time chat, post creation and sharing, following other users, following interesting contents and many more. So effectively this app serves as an all in one social networking app which is not limited only to the casual usage, but can also be used as the educational and professional networking platform. Considering the global dominance of the social networking app, it has become really essential to develop a native app which not only be focused on the local users but also can participate in the global competition in digital advancements. In recent times, specially in this time of COVID-19 situation, the usage for various networking sites and apps has grown exponentially and it is high time to develop such a platform that will meet the local users needs.

This report has been prepared with different categories to explain the project in detail. In the first chapter, the overview and the main objectives have been explained. Then in the next chapter for the literature review, local and global market dominance of currently available social networking apps have been studied. In the third and fourth chapters, the project methodology and management and financing of the projects have been discussed. Considering the nature of this project, agile methodology has been followed. In the body of the project in chapter five, a comprehensive explanation ranging from the requirement analysis to the test table has been provided. All the supporting diagrams have also been attached to visualize the project structure. The next chapter describes the project surveys that have been conducted and outlined the results. In the last chapter, all the references have been input in IEEE format.

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Chapter 1

1. Introduction:

A cross platform social networking mobile application “Connect” is a platform where users can interact, share and connect globally without compromising any personal data. A smartphone app which is heavily focused on the user data protection and gives the chance to the user the best possible experience with latest technologies. Anyone can download and use the app as a daily basis for socially connecting where it is for personal stories, educational contents, emergency information, alerts or even for information regarding government services. A customized user news feed will be visible to everyone and can be used to only view the following user's contents and profile. In the context of Bangladesh, considering that around 45 million social media users, where a growing number of social media users are engaging in a different platform to share their views and publishing contents, it is getting really urgent to make a stable platform locally, and at the same time taking part in the global competition for the secured social networking channel. In a recent survey, it has been shown that the young generation and the local businesses that are relying more and more on the social media platform, are increasingly getting vulnerable to the data security breach, unparalleled competition among global users, tight regulation, charging high amounts by the platform to use their service. So it is high time to marginalize the unparalleled competition and raise awareness against the data security breach, and give the chance to the large number of users from Bangladesh to use a platform that is not controlled and monitored by the overseas company. So this app is essentially targeting the local market as well as the global market, ensuring to provide a secured and top notch user experience without having to worry about the security and privacy.

In this project, I am proposing to deliver a modern and high end smartphone based application for connecting people from all over the world and making it possible to take part in digital services which are booming in the current situation. With the increase in the number of internet users from Bangladesh and also globally, it is necessary to undertake a challenge where a social media platform ensures privacy and gives the utmost importance to data security. The mission of the project “Connect” is just aligning with the dreams of the million of the users from Bangladesh to continue to receive the best digital platform.

1.1 Overview/Background of the work

Social media has been a part of our everyday life where millions of users can share and connect with friends, family, coworkers, businesses, educational institutions and among many more. In light of this progress in digital space, users from Bangladesh are also not far behind. Since the prices and plans of using mobile devices or tablets are getting more affordable and accessible among mass users, the popularity of the social networking sites which can be used on handheld devices is increasing as well. With this sheer increase in usage, it has also been necessary to build such a secured platform in our country so that everyone can use it without any restriction. Users for their personal use tend to share a lot of personal information through the social network and it has been known that the company that offers the social networking services use those personal data to sell to the advertisers without the acknowledgement from the end users. And in many cases, users from Bangladesh have faced similar situations and could not take action against the company since it is based in foreign country. Same goes for the businesses that primarily run on the social media platform can also be vulnerable to the security data breach and the social networking platform can control the data they own. So it is needless to say that a platform which is built and maintained locally and offers similar but more secured services would be more viable. The customized services can also be provided to the local users in the context of Bangladesh and according to the needs of the businesses. Many different countries have already embraced the idea to develop their own social media platform which is heavily connected among the large number of users. For example, China has regulated and heavily controlled foreign intervention among the local digital market and developed its own platform. To name a few, “WeChat” which has around 1.2 billion active users in China alone, “Kakao talk” in Korea and “Line” in Japan. So embracing the similar concept in Bangladesh, developing a secured social media platform would be beneficial not only to the end users from all over the country, but also it will play a vital role to enhance the local business and help booming the digital services in Bangladesh.

In this report, the end to end development cycle has been discussed thoroughly. This social media app is primarily built for the smartphone and tablet and uses Flutter by Google as the main UI development platform. Flutter is used to develop a cross-platform app and to provide a native level user experience. The Firebase console has been used to manage the user authentication, and Firebase Firestore has been used exclusively for the database connection.

1.2 Objectives

There are several aspects of this project. Among them the main objective is to develop a fast and secured social networking app exclusively for the users from Bangladesh. The other objectives include:

- A cross platform app which can be run on both android & ios
- Fast and secured data protection on the personal information shared via network
- A light-weight easy to use user interface
- Custom news feed based on the followed users on the app
- Media selection (Camera/gallery) on the unlimited post length
- Likes and commenting on the post
- Dynamic search for the user profile
- Activity feed for the recent changes

1.3 Scopes

The app is intended to reach out to the mass users from Bangladesh for their day to day social networking. Especially among the young users who are actively sharing posts and photos, and at the same time expect a higher standard for data security. The app also would work as a bridging between the different backgrounds of people who are newly experiencing the advantage of having a secured and locally built social networking app. For the business owner, this app can also serve as a best tool to reach out to their prospective customer and engage through a highly adaptive networking platform.

Chapter 2

2. Literature Review

2.1 Relationship with Undergraduate Studies

It has been a great experience to work on a professional project and it is really a valuable lesson to be able to apply my acquired knowledge gathered throughout the undergraduate studies. Needless to say that the core fundamentals of the programming skills that I learned from the very beginning of my studies, gave me a head start and I stacked up my knowledge completing the more advanced topics covering the best software development practices made my current learning from the app development a lot easier. The most helpful courses that I undertook during my course studies are CSE 203- Data Structure, CSE 211- Algorithm, CSE 317 – System Analysis, CSE 303 – Database Management, CSE 213- Object Oriented Programming, Mobile Application Development. The core concepts of these courses are directly related to my current project and without those lessons it would have been impossible to work on a production level code base where very advanced skills are required.

2.2 Related Works

Due to the recent heavy usage among the young generation and broad access to the internet, the need for the social networking app in our local market is getting real attention. Up until now, we are only focused on some specific domain of apps, but the trends are soon to be changed in the near future. By analyzing the most downloaded apps from the google play store, the social media apps ranked far higher and almost half of the top ten apps in Bangladesh are from the social networking category. So addressing this opportunity to reach out to the local users, many software development companies, big investors are gradually taking initiative to launch an app considering the large number of users from Bangladesh. A recent initiative from the government has also caught everyone's eye. The exclusive app which will be called "Jogajog" [1] is expected to be used as an alternative to the mostly used current social media platforms like Facebook and Instagram. So to compete in the market, it is also expected that other organisations will also participate to develop much more reliable and user friendly social networking apps for the community. The "Connect" app is no different from the concept that has been put forward by the other organization to develop a locally available app, but it has a prior interest to develop a more secure and reliable app and to roll out to the mass users as early as possible.

2.3 Market Analysis

There are a notable number of social networking apps currently available globally. Since the large number of users has increased, the demand for the platform independent social networking app has also increased. In this section, I have introduced some of the leading global and local apps that fall into the social media category and their overall market share and cumulative comparison to the current situation. Although the country sepec apps are popular only to that specific country, on a global scale there are few apps to be mentioned for the better understanding.

2.3.1 Global Market

The most widely used social networking apps have already taken a global market share among the wide range of users. But it indicates that the demand is higher in this category, so is the risk to the user on the security grounds.

Facebook

Facebook is by far the most widely used social networking app around the world. Facebook is considered one of the Big Five companies in the U.S and has more than 2.8 billion monthly active users [2]. The whole idea of social media platforms has been transformed and got into the next level by the rise of this app and it is also considered as the most valuable companies in the world. The active users are not only using this platform for personal communication but the various companies are also using it as a tool for their services. A wide range of services are provided by Facebook which sometimes make it hard to shift from one platform to the other. TAccording to the survey conducted by oberlo.com, almost 59.0 percent of social media users use Facebook and 78.3 percent of Facebook users access the social media platform via mobile phones [3].



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Phone number or email address

Password

Log In

[Forgotten
password?](#)

OR

Create New Facebook Account

Instagram

Instagram is one of the most popular apps among the millennials. The trend of using it on multiple platforms is getting higher and higher. The ease of use and sharing multimedia has never been so popular. By the time Facebook has acquired this giant social media platform, it is already experiencing the peak number of users on a daily basis.

English (US) ▾

Instagram

Enter your mobile number, username or email

Enter your password

Log In

Forgot your login details? [Get help logging in.](#)

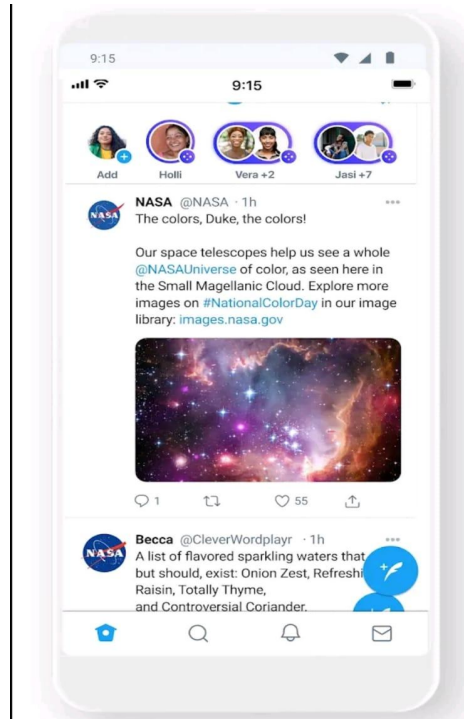
 [Log in With Facebook](#)

OR

Don't have an account? [Sign up.](#)

Twitter

Twitter is also a world wide phenomenon of using instant social media platforms. It is based in the USA and is currently seeing a large number of users day by day. The main service on which users post and interact with messages known as "tweets" is one of the widely used terms used all over the world. According to bandwatch.com, there are approximately 330m monthly active users and 145 million daily users on twitter. It is expected to grow even bigger since the political figures, models, and government agencies are also heavily relying on this social networking app.



2.3.2 Local Market

Kotha

Kotha is the first Bangladeshi social media and lifestyle app currently available in the digital market. Owned and maintained by Kotha Apps & Technologies Ltd., it is claimed to have almost 0.1 million users and growing. It offers chat, post, feeds, free calls, stickers, and lifestyle contents freely available to the users. This app is also sponsored by the popular ecommerce based app called Daraz and chaldal.com.

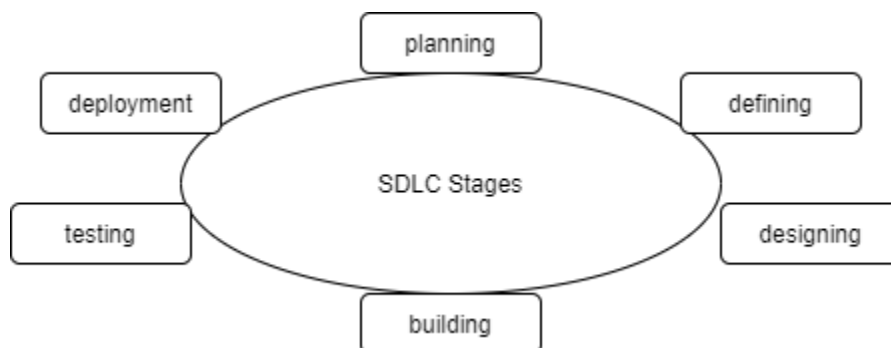


Chapter 3

3. Methodology

As a standard practice, it is very essential to go through the design, development and testing phases to deliver a high end product to the user. Software Development Life Cycle (SDLC) [4] aims to fill that gap to offer the expected deliverable within the required time frame and requirements. So the SDLC process plays a vital role for the detailed plan to execute the requirements and thus by following this process will significantly increase the quality of the development life cycle.

Typical SDLC process is shown below

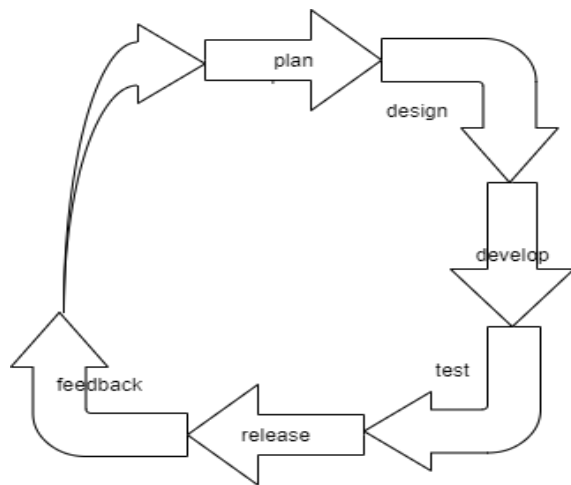


There are few SDLC methodologies that the current software industry uses as a guide to the whole life cycle. The methodologies are-

- Waterfall Model
- V-Shaped Model
- Iterative Model
- Spiral Model
- Big Bang Model
- Agile Model

3.1 Agile Methodology

Agile literally means "quick". Agile development is one of the project development methods in system and software development, and we proceed with development by repeating implementation and testing in small units without dividing the system into large units. It is called agile because it takes less time to develop than traditional development methods. [5]



3.2 Agile development flow & why agile Methodology for this project?

Release plan

In agile development, there are no strict specifications at the software planning stage, but only on the general specifications and requirements. This is because it is natural that there are changes in specifications and design during development. With only a rough plan, problems are likely to occur in the subsequent implementation phase, but if the specifications are not decided, even if there are changes in the middle, we can respond flexibly, so we can meet the needs of our customers as much as possible. [4]

Iteration

Once it is decided on the general specifications and requirements, now it is easier to proceed with development by repeating a cycle called iteration. Iteration means the release of functions is repeated while the development divided into small units is performed in the order of "planning"-> "design"-> "develop"-> "testing"-> "release"-> "feedback"

Since the iterations are typically every one to two weeks, with features released every iteration, our current project on social media app development perfectly suits this category. There are a lot of changes incoming and there are no set requirement guidelines on how to release the feature on a specific time frame. It will gradually adjust with the current need and future trend in the usage from users, so the agile methodology will best serve the purpose of our development lifecycle.

Chapter 4

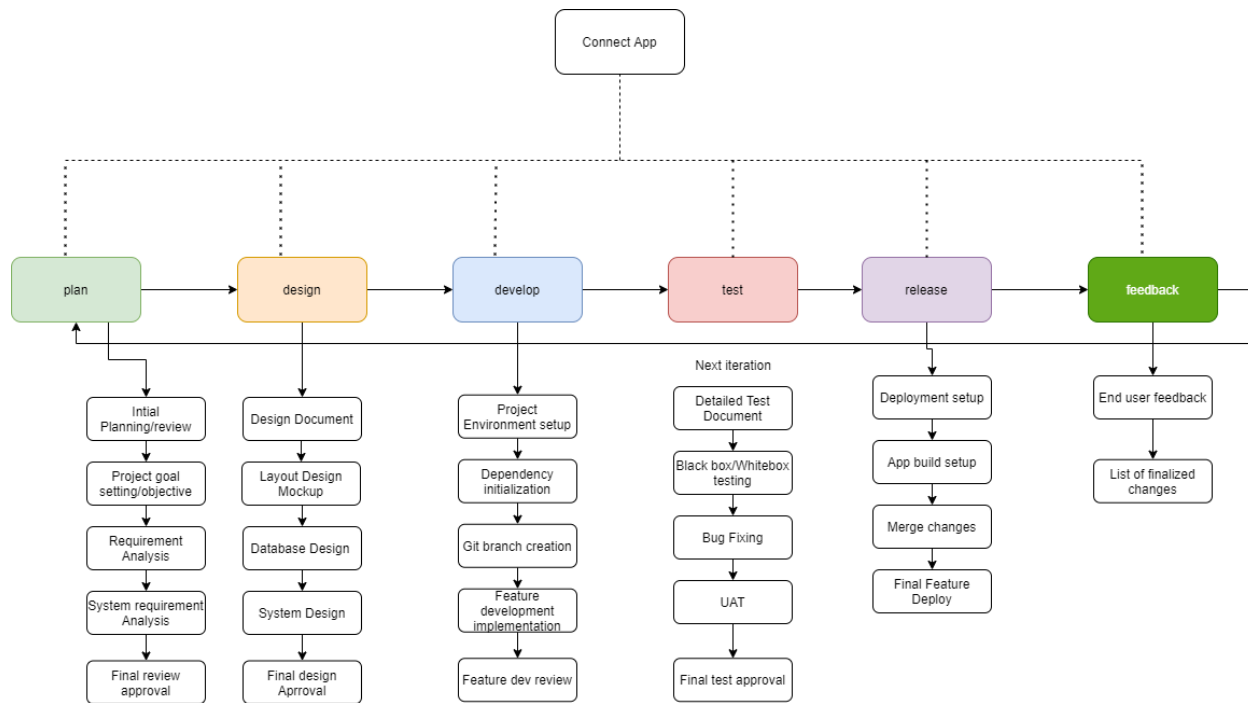
4. Project Management & Financing

4.1 Work Breakdown Structure (WBS)

WBS is a type of planning method used in project management, and is a method that divides the work in a project into small units and manages them in a hierarchical structure.[6]

At WBS, the necessary work is first identified, subdivided as much as possible, and the necessary cost and personnel allocation for each work are determined. As a result, it is possible to grasp the entire work and the systematic connection of each work, and it is possible to improve the accuracy of progress management and plan adjustment.

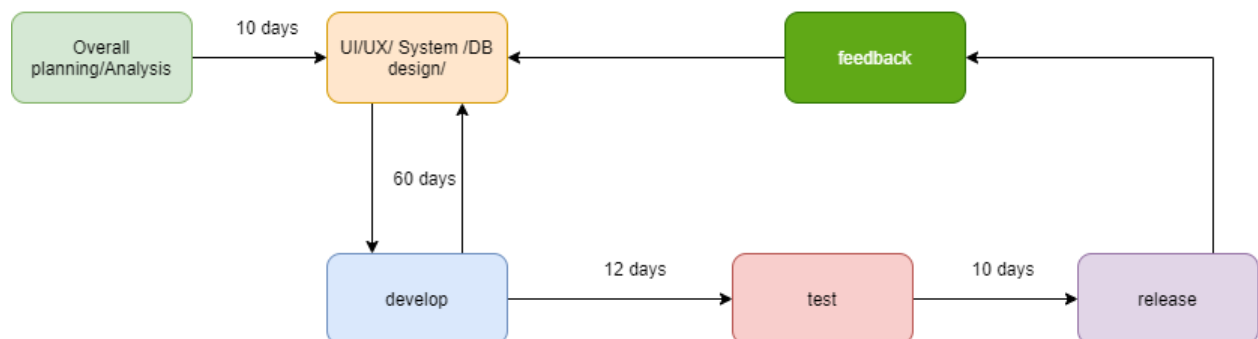
In this project, the following subunits of tasks have been implemented in order to develop in a structured and dynamic way to keep up with the continuously changing environment.



4.2 Process/Activity wise Time Distribution

The project requirement and the initial planning has been started from the earlier, but since the agile methodology is being applied, the feature development and rest of the cycle will be continued until the final product is released on both the Android and iOS platform. It is also an advantage that one feature is independent from the other feature's current progress, so the project timeline would not hamper. So when the feature of login was being implemented, at the same time the user activity feed feature's requirement was also ongoing. The following is the approximate timeline for the completed and upcoming sprints of the project.

Iteration wise process timeline for Sprint 1-5 [User authentication to home/profile/activityfeed]



4.3 Gantt Chart

A Gantt chart [7] is a table used for all management processes such as project management and production control. Some organizations call it a schedule table or management table. It summarizes the "setup" for proceeding with some work by item. I think the advantage of the Gantt chart is that it visualizes the overall plan and gives a general overview at a glance.

The Gantt chart is represented by a tree structure and it has a part on the left side. Items such as "task name to be managed", "date data such as completion date", and "person in charge" are listed.

In this project, a gantt chart is also maintained to visualize the agile workflow, and some of the details of the sprints are given as follows.

AT RISK	TASK NAME	FEATURE TYPE	RESPONSIBLE	STORY POINTS	START	FINISH	DURATION in days	STATUS	COMMENT
	SPRINT1				07/04	07/07	3	Complete	
	Flutter ENV 1	ENV Setup	App dev		07/04	07/05	1	Complete	
	Dart ENV 2	ENV Setup	App dev		07/04	07/05	1	Complete	
	IDE/System ENV 3	ENV Setup	App dev		07/05	07/07	2	Complete	
	SPRINT 2				07/10	07/17	7	Complete	
	Login widget 4	Login	App dev		07/10	07/13	3	Complete	
	Login Backend 5	Login	App dev		07/13	07/16	3	Complete	
	Google authentication 6	Login	App dev		07/16	07/17	1	Complete	
	SPRINT 3				07/20	08/21	32	In Progress	

4.4 Process/Activity wise Resource Allocation

For managing the project effectively and to develop the Connect social media app, it is very important to allocate the resource carefully. Since the project can be very difficult to manage, simply because of the sheer volume of tasks and a lot of processing is involved. And to use the cutting edge technologies, it is also very critical to wisely manage the resources available to get the best out of it.

1. Plan: Since it is the very beginning of the agile process for the project to plan and analyze the requirements, the design and development team is involved to sort out the plan effectively. Throughout the multiple iterations and sprints, the analyzed work would come into light, so the resource allocation for this stage is very critical. Without any clear understanding of the requirements of the desired product, it would be difficult to develop the product.
2. Design: This is one the fundamental stages of product development. Specially for this mobile app, the UI/UX design is absolutely important to attract the users. And at the same time, the design should be incorporated with the backend services. Although the design documents should clearly specify the definition of the tasks, it is very likely to upgrade or attach a new feature on the next sprint. So the design team for the database, and system environments should also be prepared for any incoming changes. Two teams for the Connect app have worked to implement the whole design successfully.

3. Develop: Although the development of the tasks is ongoing for the multiple sprints, it is very critical to develop the best product and incorporate the services across the platform. The development team for this app have faced a numerous challenge due the upgrade issue of the Flutter platform, but the development was aligned with the exact requirement.
4. Test: For the testing team of this app, it is very challenging to first complete the white box and then the black box testing. All the manual testing has been automated and clear documentation has also been prepared. After finding the issue for a specific feature, it has been retested to ensure the quality of the app.
5. Release: In this stage a small feature of the app is released for a preview, and from the client's end it is confirmed to move forward to the next feature development. The devops of the project and the implementation took a significant amount of the time.

4.5 Estimated Costing

Overall estimated budget for the project is determined, but since the nature of the project is dependent on multiple factors, it is also possible to increase the budget as well. Here is given a simple breakdown to the overall financial estimates.

Financial factors	Estimated amount in BDT
Development Resources allocation	80000
Infrastructure services	30000
Functional services for the app	50000
IT support services	40000
Administrative services	30000

Chapter 5

5. Body of the Project

5.1 Work Description

I have been involved on the Mobile app development team throughout my internship. The main roles and responsibilities include but are not limited to developing apps using Flutter and dart programming. I have parrellaly contributed to the frontend widget building using flutter as well backend services using firebase console. The database and cloud infrastructure used was firebase, I have also been involved in user authentication via google. The reporting format is standard among all the team members, and to keep track of all the deliverables, Azure devops platform has been used. I had to participate in the daily team meetings and discuss the deliverables, current tasks, related issues and upcoming sprints.

5.2 Requirement Analysis

The tasks began with the requirement analysis which is part of the project scenario and starting point of the sprint. It is very crucial to analyze the scenario of the proposed requirement. To incorporate with the system and with the system environment, it is absolutely vital to pinpoint the issues that could be arised upon designing and developing stages. As for the current social media app, the requirement is constantly evolving, so the existing requirements might be substituted on the next sprint, and to be able to successfully integrate these changes, we had to make alternative ways to handle those requests.

To make the app environment safe and secure, it is really essential to begin with a good system design. So in the analyzing phase, the system design documentation was carefully checked and made subsequent analysis for that design.

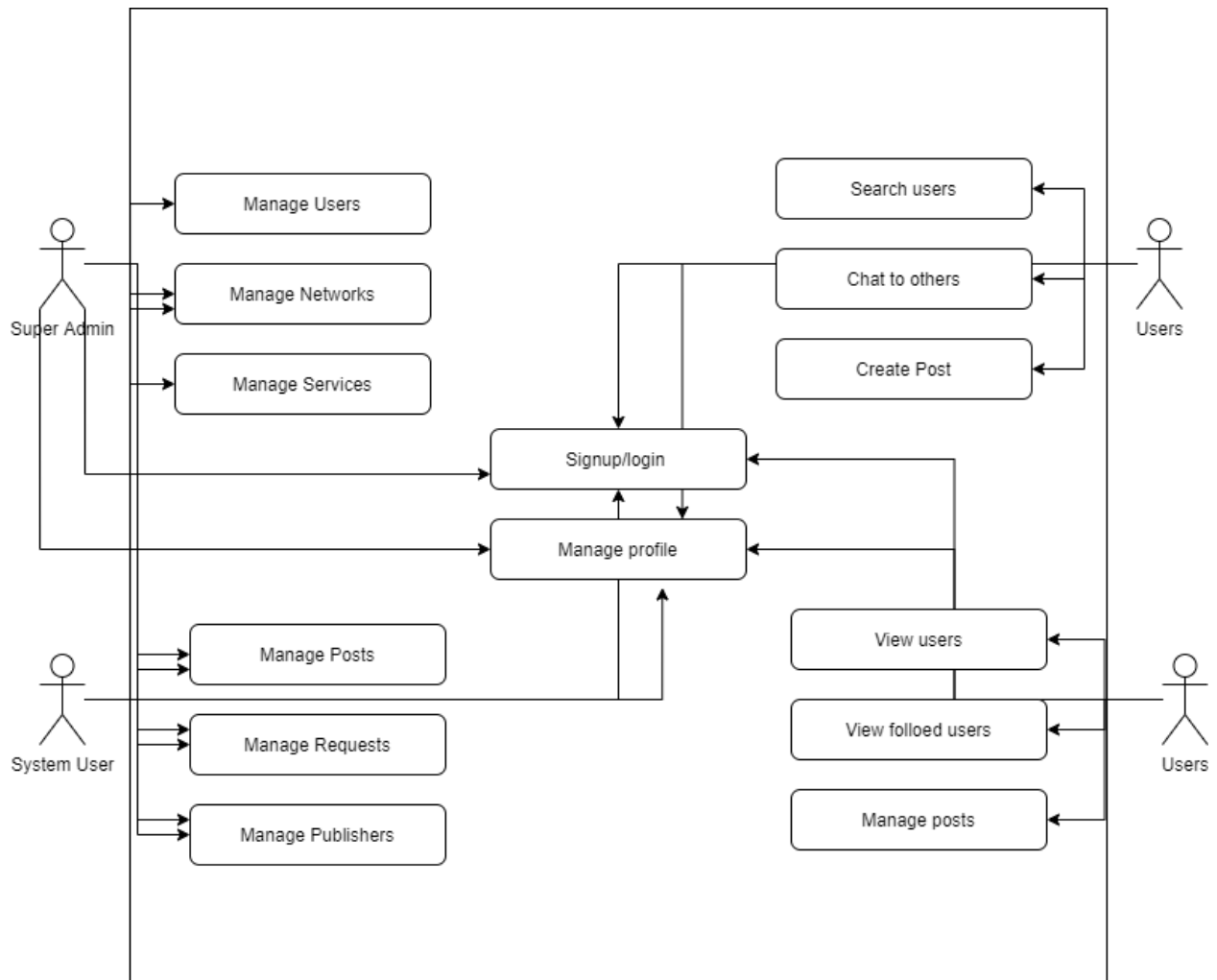
Aspart of the requirement analysis, I conducted various research on the proposed system and on the current market situation. The following are the few which have been covered as part of the analysis:

- What are the current trends among users using social media apps
- Current user ratio on various matrices like age, gender, occupation
- UI/UX research and analysis
- Addressing the security issue on the social media platform
- Using cloud infrastructure for the development
- Making available to the maximum number of users

5.3 Overview of the System

In this app multiple layered systems have been implemented. From the cloud architecture of google forbase to native code base in dart and flutter, it is one of main goals to provide an optimal and best solution among the social media user base. In the following UML use case diagram, the multiple participant's action has been provided for an overall big picture.

Use Case Diagram



5.4 System Analysis

5.4.1 Six Element Analysis

Process	Human	Non-Hard ware	Hardware	Software	Database	Network
Login/Signup	User input of email and password	NA	Smartphone/tab	Mobile Application	Stores and validates login data using firebase/firestore	Internet
User profile	Input the user details	NA	Smartphone/tab	Mobile Application	CRUD of the user profile	Internet
Post	Create a post	NA	Smartphone/tab	Mobile Application	CRUD of the user post	Internet
Feed	View the newsfeed	NA	Smartphone/tab	Mobile Application	Retrieves the followed user's post and shows it on the feed	Internet
Find users	Search	NA	Smartphone/tab	Mobile Application	Search DB and show the retrieved data	Internet
Send message	User input	NA	Smartphone/tab	Mobile Application	Retrieves the chat	Internet
Follow users	View the count	NA	Smartphone/tab	Mobile Application	Retrieves the followed user	Internet

5.4.2 Feasibility Analysis

It's no wonder that every executive wants to review a feasibility study before granting permission to run a project that costs a lot of money. The first thing in a feasibility study is to determine the chances of a successful project. A feasibility study is usually one of the most important factors in deciding whether or not to proceed with a project, which is carried out before every step (including planning) in the project progress. Or it may be the most important factor. This study identifies the target market for the project, clarifies the main goals of the project based on market research, illustrates potential obstacles, provides alternative solutions, and provides duration and budget. It is also very important to determine if the project is not only feasible, but also beneficial to the company, taking into account legal and personnel requirements, etc.

To this “Connect” app project, few feasibility studies have been carried out to ensure the success of this project. The studies are given below-

- **Technical feasibility:** Technical feasibility study is one of the main studies to determine whether this project can be run on the planned resources. It mainly relies on the hardware, software and networking resources which will be used for this project. The study has detailed the requirements for whether the existing tools and resources are sufficient or any more upgrade is required before starting the project. Aligning with the development team and their technical ability, it must cover the resource to the limit where the members are really comfortable and could carry on the project smoothly. In this app development project, the technical feasibility study showed that the skills and the resources that are required are aligned with the requirement to develop this app optimally.
- **Operational feasibility:** The “Connect” app is mainly designed for the secured and easy to use social media platform. So its user interface must be aligned with the current guideline provided by the app community. To incorporate those best practices, the study found out that a user-friendly UI and secured platform can be provided using the current resources.
- **Economic feasibility:** The economic aspects of this project is also one of the important factors to be considered. Whether the resources including the tools, software, premises, and manpower will be covered is the project cost that has been determined. The various economic aspects have been studied and it has been concluded that the project could be run under the company’s own service provision and economically feasible.

5.4.3 Problem Solution Analysis

The problem solving analysis has been carried out to ensure that the specific problem which needs to be addressed and the possible solution to the problem which will be required to progress. This analysis is important for the project because it will give a clear understanding of the challenges and the solution. Without identifying these main issues it will have a negative impact on the project.

Problem 1: Incorporate the best technology for a faster and secure development environment

Definition: There are a lot of choices for the app development environment, but since the main purpose of this project is to build a fast and secured platform it must be decided whether to for a native app development for android and ios separately, or go for a cross-platform technology like flutter and react native.

Solution: By analyzing the problem, it has been finally decided that a hybrid approach using cross-platform environment flutter will be used. It gives the native code performance without compromising the security and robustness.

Problem 2 : Backend cloud infrastructure environment

Definition: There are a wide range of cloud service providers for any larger project development. Google Cloud Platform and Amazon Web Services being the main contenders. It is crucial to integrate the best service for uninterrupted connection.

Solution: Google Cloud Platform, Firebase and Firestore seem to be the most secure platforms for cross platform app development. It's cloud and database services are the required features which have been integrated.

5.4.4 Effects and Constraints Analysis

Constraints define the limitations for the app development cycle which needs to be considered in any project. It can be wide ranging and can affect the whole development process. Without considering the constraints, it will be harder to judge the outcome of the project. Sometimes the officials or the management team can set some predefined contrast to the development process relating to the human resource, tools, software etc. But it not only limited the organizational limitations, but it also extended the various surrounding factors like third party services, limited acquisition, political effect, market limitations etc. There are few constraints that must be taken into account on this project:

Constraint 1: Limited human resource

Effect: Limited human resources means that the project is run on the smaller team and it can put pressure on the related team to meet the deadline of a sprint. The required man hour is not fulfilled and the development, design and test team would have to work an extra hour to meet the requirements.

Constraint 2: Deadline

Effect: The deadline for each sprint is predefined and the project goal is set by the managers beforehand. But to implement in that manner is sometimes not possible since there can be a lot of modifications on the review meeting on each sprint. So it is quite hard to meet the app launch deadline after successfully passing the QA.

5.5 System Design

System design is one of the major steps towards a successful project. It basically paves the way for designing and developing a product which will be maintainable, comprehensive and illustrates the scenario. The very crucial stages involve the design and development; it gives the workflow of the project in a structured format.

5.5.1 Rich Picture

Rich picture provides the overall big picture and related user's interaction in a graphical representation. Various symbols are used to visualize the scenario and action that takes place during the usage of the app.

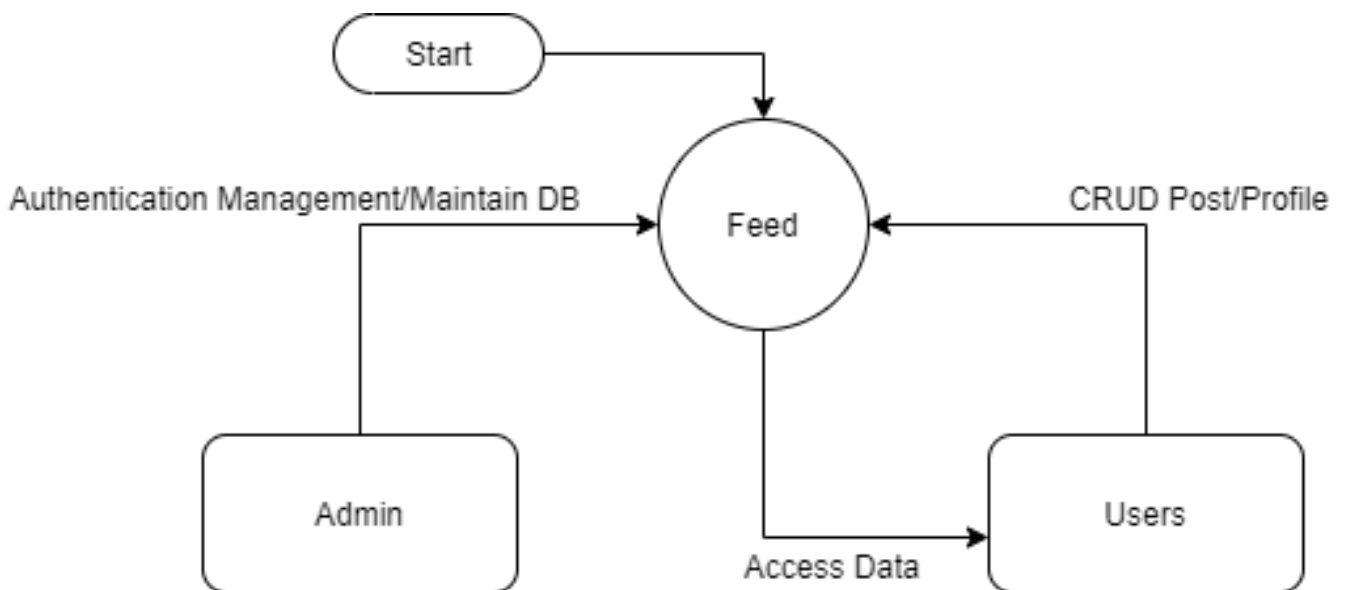
5.5.2 UML Diagrams

It is called UML or "Unified Modeling Language" and by graphically expressing complex system development and unifying the description method, it helps to improve the readability of design documents and the efficiency of communication.

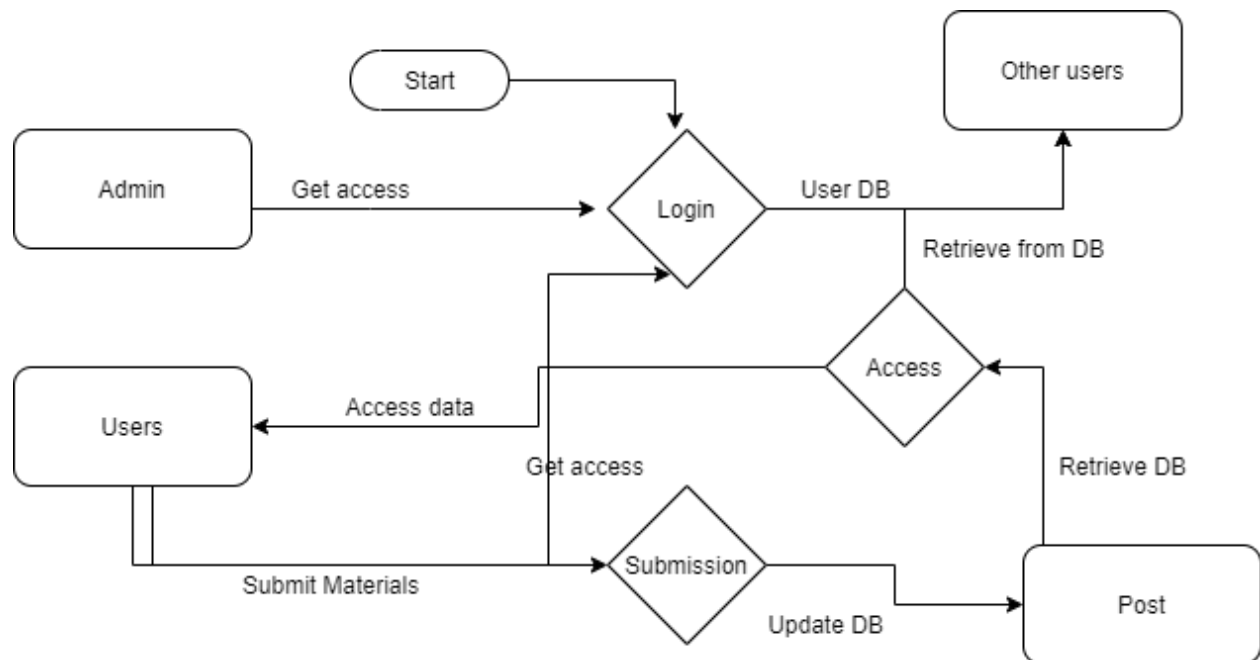
UML diagrams are necessary to simplify the overly complicated development process. It is very useful for defining the models and later developing them through the coding and technical implementations. Various forms of UML diagrams are used for various projects for a clear overview of the system, and there are few which have been given below for the current app development project.

5.5.3 Activity Diagram

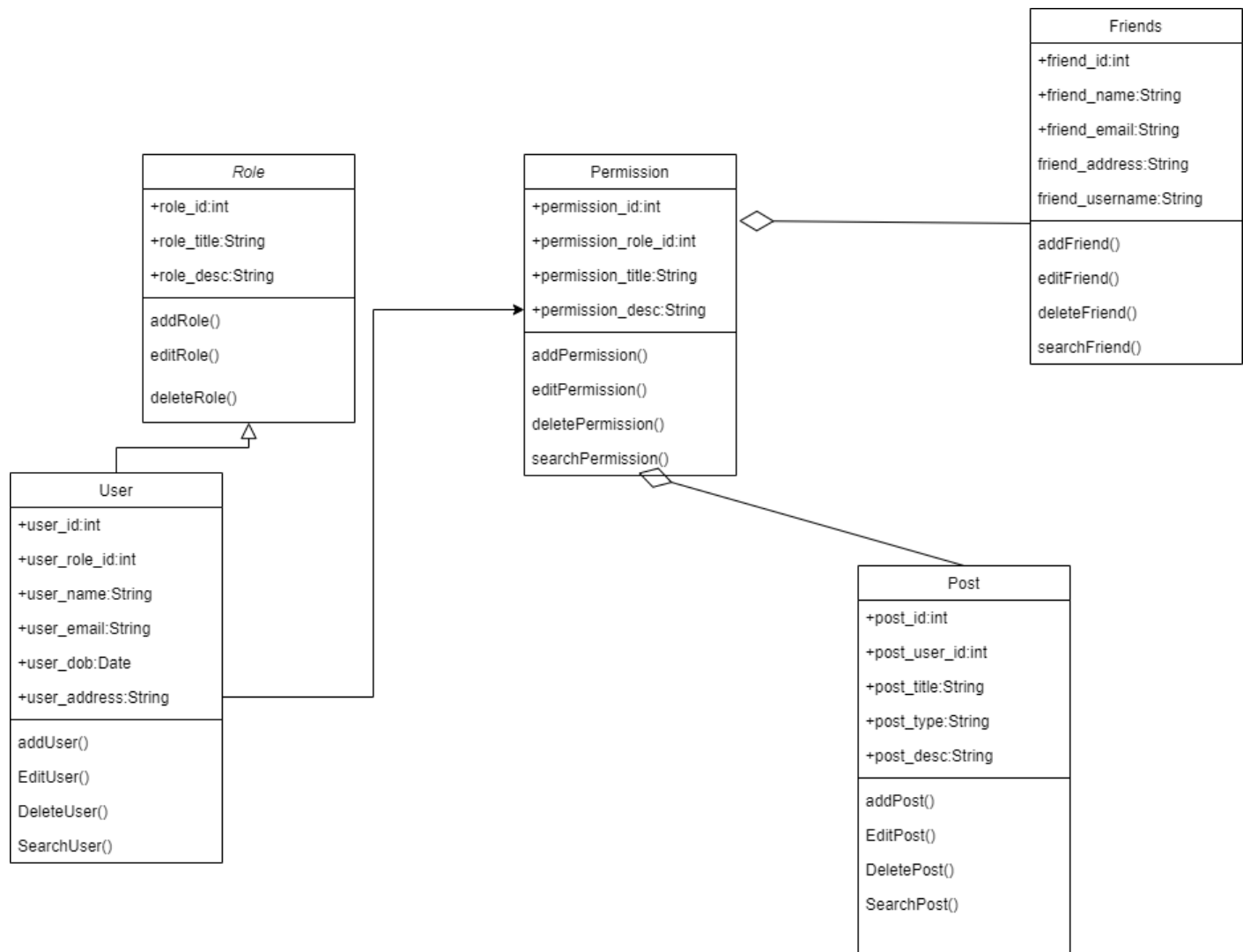
Context Level



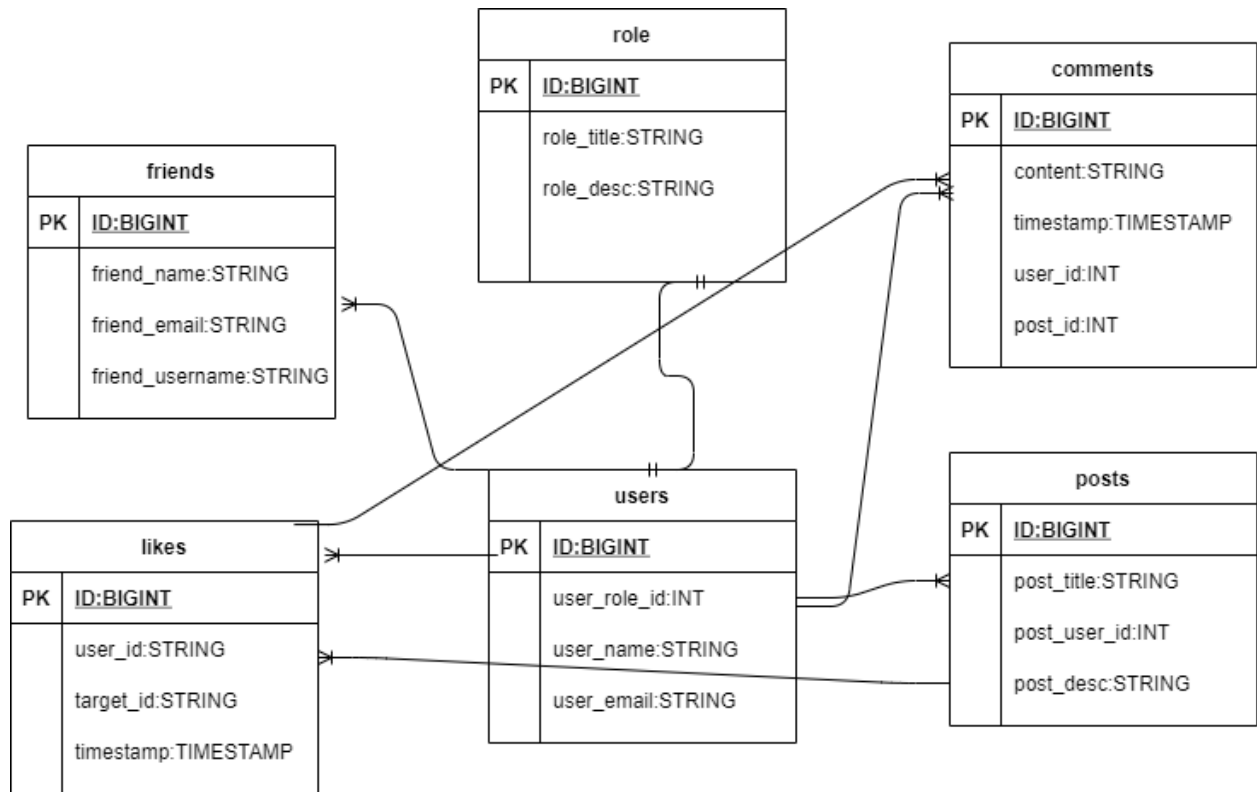
Level 1



5.5.4 Class Diagram



5.5.5 ERD (Entity Relationship Diagram)



5.5.6 Functional and Non-Functional Requirements

Functional requirement defines the main features of the project which must be implemented. The requirements related to implemented functions in the requirement definition are called functional requirements. For example, the function that actually requires the client, such as the function to search for the specific user on the social media app, is classified as a functional requirement. Depending on the specific fulfillment of the requirements, the functional requirements define the overview of the specific behavior of the app.

Requirements related to other than implemented functions such as system performance are called non-functional requirements. For example, requests other than the main purpose, such as the function to search for specific users on the social media app, and how much time is required to complete the search is classified as non-functional requirements.

Functional Requirements:

- When the user registers to the app the information is stored and similarly when tries to login to the app the login is authenticated. A successful login will redirect the user to the main feed page.
- The user profile should contain multiple fields including phone number. A user can also update or delete the information they provided.
- Admin of the app can manage app settings and can delete users or publishers if necessary.
- The main newsfeed should show the posts sorted by descending order. The post's contents can be commented on or liked.
- Users should be able to search other users and follow them.
- Users can chat to the other users anytime.
- A push notification functionality should be implemented

Non-Functional Requirements:

- The app should be secured and reliable
- User's CRUD operation should be done within a fraction of seconds and response should be 200.
- The app UI should be top notch
- The app should accommodate the visibility on all screen sizes.
- The color and the theme should represent the brand value to the market

5.6 Product Features

- Login/Signup : User login/signup is one of the important features of this app to make a secured platform. Since this is a role based app, the specific users will be authenticated against their credentials.
- User profile: Users can update or delete the profile information at any time. The user profile is included with a profile picture and personal information.
- Feed: The homepage or the feed is the place where users can view all the posts by the following users. The posts can be commented by multiple users and can also be liked by tapping the button.
- Create post: Users can create any post with multimedia selection, so a post can also include images or videos. The post can also be modified and deleted.
- Sponsored content: On this app, business users can share their sponsored contents. Admin has full access to all the contents and can control which should be visible or not.
- Search: Users can search for other users and view their profile.

- Chat: User can chat with other users and can view who is online
- Notifications: Push notification is shown for related updates on the post or any profile visitors' information.

5.7 Data Dictionary

5.7.1 User's Details

Field Name	Data Type	Field Size	Description	Example
User ID	String	21	Unique id to each user	kkrt56hkkf78
Username	String	3(min)- 21(max)	Unique username to each user	shoptorshi
Display name	String	21	Name of the user	shoptorshi
Email	String	auto	Email of the user	shoptorshi@iub.edu.bd
Notification Token	String	auto	Unique id to communicate with the DB	H4kj5isahkkj4qib b_sajhb_iu74b 4kjb844&_sajhbb 8875dshhk
Bio	String	100	User's bio	Hello there!
Followers	Map	auto	List of followers	[{jh6hjsa7488gm mnjgyu},{....}.{....}]
Following	Map	auto	List of users following	[{jfiue7jgc5b4uih dsuhhiuhj976},{...}.{....}]

5.7.2 Post Details

Field Name	Data Type	Field Size	Description	Example
Post ID	String	20	Unique id to each post	lmbbu765jhb
Username	String	3(min)- 21(max)	Unique username	shoptorshi

			to each user	
Owner ID	String	20	Postowner;s ID	kkrt56hkkf78
Email	String	auto	Email of the user	shoptorshi@iub.edu.bd
Location	String	50	User's location	Dhaka, Bangladesh
Likes	Map	auto	Post Likes	[{kkyhfsa0908gm mnjgyu},{..},{..}]
Comments	Map	auto	Post Comments	[{jhmma4658gm mbbyu},{..},{..}]
TimeStamp	TimeStamp	auto	Upload Timestamp	August 29, 2021 at 00:00:00 AM UTC +6

5.7.3 Architecture

In this cross platform mobile application, selection of the platform architecture is very crucial since this app is expected to grow over time and reach a handful of users in Bangladesh and abroad. Although it's target market is Bangladesh, it is not limited to the local market only. So to incorporate those masterplans, a clean built platform architecture is important for the development and ultimate growth of this app. In the mobile application domain, there are various options just like the web architecture, but the resources are limited. Sometimes many big projects like this one must continue with the current technologies available even if those technologies may not serve the better performance as expected. There are native app development approaches in both android and ios. For the android app development it is preferred to use JAVA/Kotlin as the main programing language, whereas C#/Swift is used for iOS app development. Both should be developed independently and maintained separately. Sometimes these native developments could hinder faster development. So the recent trend of app development using cross platform technologies like Flutter by Google and Reach Native by Facebook. Both of these technologies are very popular among the developers community because of its high availability and easy development cycle. Following are the development technologies that have been used to develop the "Connect" app.

Front End: Main building blocks and frontend have been developed using Google's Flutter framework for cross platform app development. Various widgets have been used to build the app. Packages like redux, firebase integration, and google authentication have been used.

Back End: Dart has been used as the backend programming language. The dart is also developed by Google and it gives the best stability. The main feature of this language is NULL safety. For the virtual

device, GenyMotion and Oracle VirtualBox have been used to visualize the output. For the code editing tools Visual Studio Code and android studio have been used.

Cloud Infrastructure: Google Firebase, Firestore database, Google Cloud Platform have been used as the main backbone of the backend cloud infrastructure.

Chapter 6

6.Results & Analysis

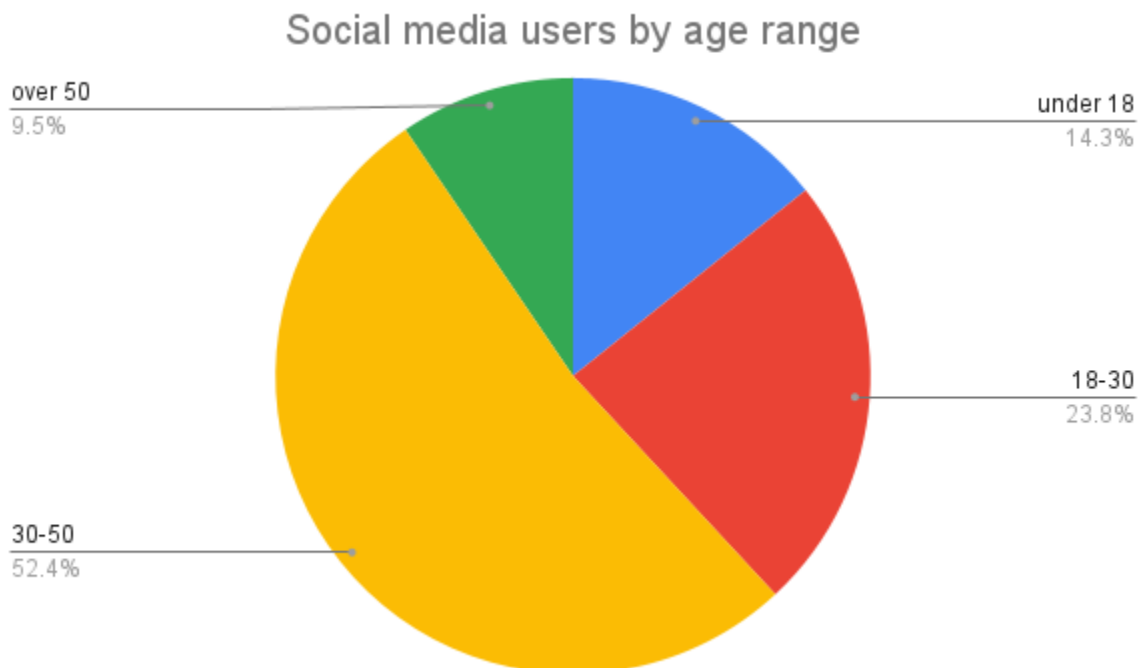
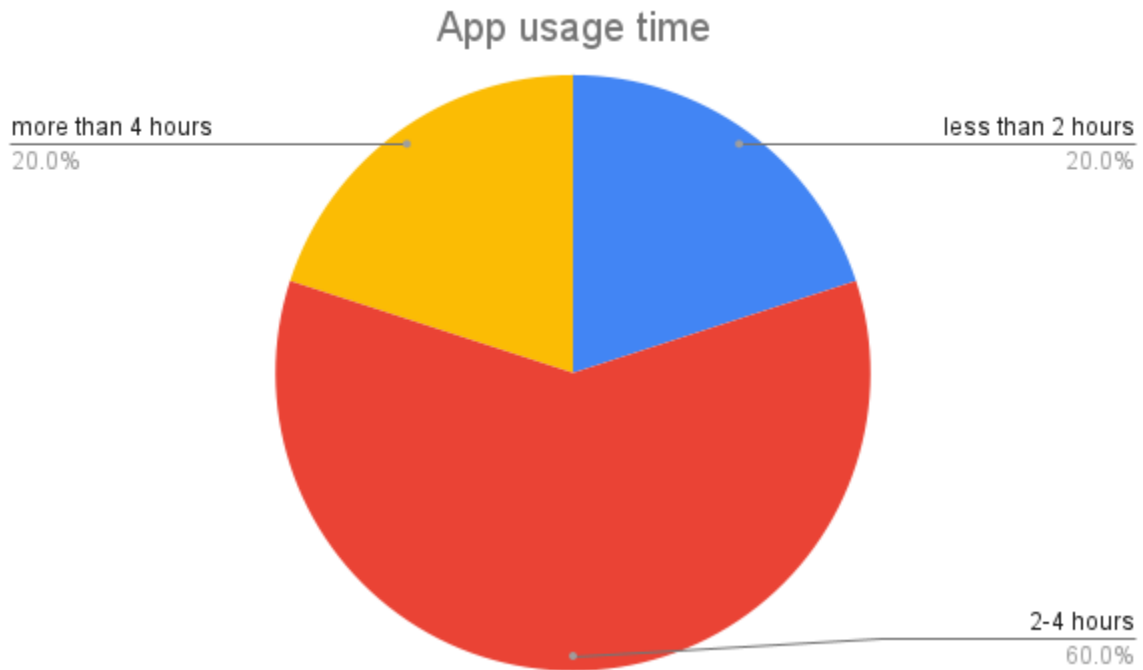
6.1 Overview

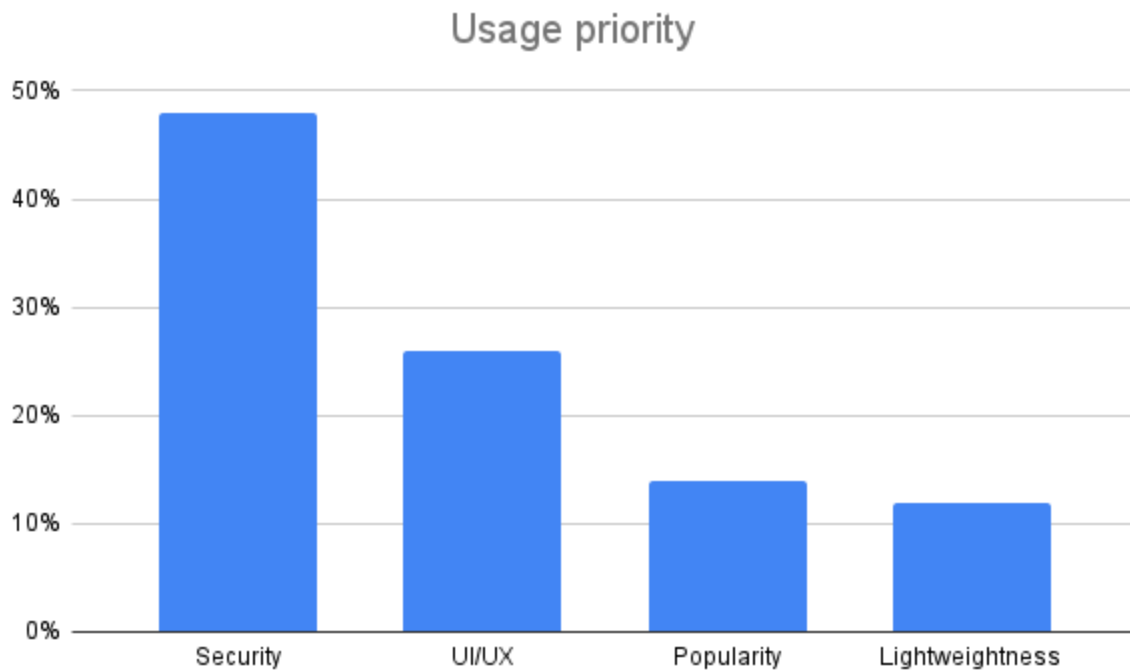
The social media app specifically for the local market in Bangladesh is highly demanding yet a very complex project to deliver. Considering there are a lot of international social media app platforms that are present for a quite a long time, it is very challenging to distribute to the target users. Starting from the very beginning of this project, few pragmatic steps were taken to ensure the quality and a meaningful delivery to make a positive change across the digital platform. Since the agile methodology was in place, there are various discussions and review meetings are still going on for the product development. The first step from the requirement gathering and analysis was the crucial steps of all to correctly identify the user's behaviour and pattern as well as to gather the necessary data for a full-fledged social networking platform. From the project manager, team leaders, team members, lead developers, designers, testers were involved in almost all the main steps, the final product would not have been possible to deliver without everyone's involvement. Specially pointing out to the frontend development where I was specially assigned throughout this time, the team members were very enthusiastic and made their best effort to finally ship a great user interface. And to make the decision for a great UI and UX , comprehensive research and survey has been conducted among the various range of users in Bangladesh.

6.2 Results from surveys and interviews

There were a number of interviews and surveys conducted among the various stakeholders of the project. Starting from the project management officials to the mass users community, the survey result indicated a positive and constructive feedback to help develop a user-friendly app. Since the app is free to download, one of the review sources could come from the various advertisers who might be interested in this project. So interviews also have been conducted for the advertisers and to identify their needs. And of course the main target users among the age range of 20-40, the survey indicated the actual requirement the users really want. From these basic surveys and interviews, the data that was gathered was really insightful and having addressed those requirements, this social media app could be one of the top rated apps with the continuous development and improvement in future.

Results by graphical representation:





6.3 Testing

The important thing in releasing software is to create a Bug-free product. Many defects and many unusable functions mean poor quality products. For this reason, software testing is performed to find and improve defects.

In software testing, the aim is to develop useful software for users by creating test cases according to the characteristics of the test target and repeating various tests to find bugs. Software testing is one of the important processes in developing high-quality software, because it is impossible to eliminate bugs in the development process as long as it is made by humans.

6.3.1 Testing Strategy

Initial test

Since it is impossible to develop software with zero defects, it is important to find bugs as soon as possible. Initial testing is especially important because if you discover a defect in the early stages of development over time, the scope of its impact will increase.

Uneven distribution of bug

Software glitches are generally more concentrated in specific areas than scattered around. Therefore, in the test plan, we will narrow down the test cases by predicting the places where defects may occur by referring to the past data and the latest test results.

6.4 Testing Result

Since the complex nature of the app, the development cycle is still going on for the backend. The agile methodology allows the team members to review and retract various features, so sometimes the exact order of the development is not followed strictly. To incorporate the changes that have been requested after the review meeting, the multiple teams swiftly gather and take necessary steps to implement and release the feature as soon as possible. From the testing table, we have seen that all the developed features up until now have passed the QA, but since the other new features are coming almost every few weeks, the testing is also carried out rigorously to make the product bug free. Although there were some limitations on the resources, every team is working to pass their assigned tasks within the limited time slot. It is expected to make the developer's manual for any future developers who might get involved in this project, and also to make the users' manual after the complete development of the current requirements.

6.4.1 Testing Analysis

6.4.1.1 Testing Synopsis

The following functionalities of the app have been tested for a bug free release.

- Signup
- Login
- Users can view self profile
- Users can update profile
- Users can view other user's profile
- Users can create post
- Users can update post
- Users can delete post
- Users can like post
- Users can comment on post
- Users can view news feed
- Users can chat
- Users can search other users

6.4.1.2 Test Table

Sr No	Test Case	Purpose	Precondition	Expected Results	Actual Result	Status
1	Signup	To check if users can sign up	1. Having internet connectivity 2. Users enter the credential details	1.Users can successfully sign up on the app. 2. Unsuccessful Signup will prompt an error message	Signup successful	PASS
2	Login	To check if users can login	1. Having internet connectivity 2. Users enter the credential details	1.Users can successfully log in the app. 2. Unsuccessful login will prompt an error message	Login successful	PASS
3	Profile CRUD	To check if user profile can be created, read, updated and deleted	1. Having internet connectivity 2. User enter profile details	Users can perform the CRUD operation without any error	Profile CRUD successful	PASS

4	Search	Users can search other users and view their profile	1. Having internet connectivity 2. Users enter search details on the search box and press the search button	Show the Exact or partially matched users list	Search successful	PASS
5	Post CRUD	Users can create, read, update, delete a post	1. Having internet connectivity 2. Users enter post details on the box and press the create button	Successfully created post will be visible on the newsfeed without showing any error	Post CRUD successful	Pass
6	Like	Users can like any posts other than own post	Tap the like icon	Like count will be increased	Post like successful	PASS
7	Comment	Users can comment on post/update or delete a comment	Tap on the comment icon	Comments will be added	Post comment successful	PASS
8	Follow	Users can follow any other users	Tap on the follow icon on user profile	User is now followed and the post of that user is visible	Following a user is successful	PASS

Chapter 7

7.Lesson Learned

7.1 Technical knowledge

One of my primary goals from this internship was to gain as much knowledge on cutting edge technologies as possible. Although it is a very insufficient time to learn any technical stack to be a developer, the basics that I got from this project has a huge impact. The coursework from IUB was my basic headstart on programming and software development, but from this internship I could involve myself on the professional and industry level projects which will undoubtedly give me confidence for my next career opportunity. Getting to know the modern app development process using flutter and dart programming, I believe I can now indulge myself on any other app development project without having any initial trouble. The crucial part on the backend development, firerabase handling and cloud services initialization will still take time to get grasp on, but the exposure to these technologies have given me a great head start.

7.2 Challenges

It was very challenging to continue smoothly considering the fact that COVID 19 situation has gone worse during this time, and to fully cope with the situation took time. Various team meetings and sprint reviews were fully done virtually, so sometimes the communication was not very clear and precise. Some of the features were backtracked, whereas some of the features have been developed earlier than anticipated. The major problem that I faced during my internship was related to the development environment. Since my personal device's specification doesn't meet the minimum requirement, I had to run the program considering the large waiting time to build the project and lagging on the graphical sides. But I did my best to overcome those issues with the help of my team members and continued to contribute to the development of this app.

Chapter 8

8.Future Work & Conclusion

8.1 Future Work

In this social media app, a large number of functionalities have been incorporated according to the user need and market demand. But without any doubt, we can say that the technological industry is ever changing and it is very important to keep up with the latest changes and updates. In that perspective, there is already a list of features for this app which have been listed for the future release. One of them is the video calling option from the chat, which has now become a must have feature in a modern day application. The video calling option will not be limited to only one user, rather it will be the combination of conferencing and meeting among multiple users. The web version of the app is also in the pipeline and to be started developing by the end of this year. One of the main features which is expected to be rolled

out is AI integration to identify the user behaviour and recommend user specific contents and advertisements. For global user connectivity, the management is also planning to reach the massive users through multiple platforms. An online shopping based on the users activity will also be integrated in future, so that this app can serve as a all in one platform for a high impact. Current cloud infrastructure will also be scaled up based on the user number and it is expected to initiate the upgrade of Google Cloud Platform very soon.

8.2 Conclusion

“Connect” is a cross platform social media app which is a truly user focused, secured and lightweight app soon to be released on a global scale. As a team member of this project, I feel very fortunate to take part on its journey and be a member of this app. Starting from the requirement analysis, it seemed to be the massive amount of work to be done, but gradually it became really the flow of work and got easier by time. The development life cycle was pretty straight forward, a number of steps have been taken to smoothly run this project in this COVID 19 situation. This report illustrates the whole life cycle of this project, and I tried my best to represent the actual scenario in a clear and concise manner. Although there are some points that can not be disclosed due to the company policy, it is also expected that in future the app will be open source. But for now the company is keeping its proprietary rights and rolling out this app gradually. The development and design team members were very considerate and passionate to continue with this app, without it might be impossible to continue. The development of more features and improvement is still underway, but since the app will be released on a limited version, the first few important features will only be featured on the app store. This internship period has given me the professional experience and I had the opportunity to be a part of the team to look after the whole software development life cycle.

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Appendix

(Questionnaire for Survey)

Q1. Please specify your First name & Last name here.....

Q2. Gender: (1) Male (2) Female (3) Other.....

Q3. What is your Age?

Answer:

Q4. What is your profession?

Answer:.....

Q5. How often do you use social networks?

Answer: (a) Too often (b) Not enough © Occasionally

Q6. How many hours do you spend in social media apps

Answer: (a) less than 2 hours (b) 2-4 hours © more than 4 hours

Q7. What is your main priority while using a social networking app?

Answer: (a) App security (b) App UI © App's lightweighthness

Q8. What are the difficulties you face while using a social app?

Answer:.....

Q9. Which feature do you really want but is missing from your current app?

Answer:.....

Q10. Do you want to buy online using the same social media app?

Answer: (a) Yes (b) No

Q11. Please state your opinion on social networking sites and its influence in your life

Answer: