A Project Report

on

MOBILE APP FOR MUJ DEPARTMENT INFORMATION

carried out as part of the Minor Project (CC3270) Submitted by

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VIth Semester Bachelor of Technology Computer and Communication Engineering

in partial fulfilment for the award of the degree

of

BACHELOR OF TECHNOLOGY

In

Computer & Communication Engineering

MANIPAL UNIVERSITY
JAIPUR

Department of Computer & Communication Engineering,
School of Computing and IT,
Manipal University Jaipur,

May, 2022

CERTIFICATE

This is to certify that the project entitled "***Mobile App for MUJ Department Information***" is a bonafide work carried out as part of the course ***Minor Project (CC3270)*** , under my guidance by ***Ayush Gupta and Kriti Vaid***, student of ***Bachelor of Technology Computer and Communications Engineering*** at the Department of Computer & Communication Engineering , Manipal University Jaipur, during the academic ***semester VIth***, in partial fulfilment of the requirements for the award of the degree of Bachelor of Technology in Computer & Communication Engineering, at MUJ, Jaipur.

Place: Jaipur

Date: 20 May 2022 Signature of the Instructor (s)

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Place: Jaipur

Date: 20 May 2022 Signature of the Instructor (s)

DECLARATION

I, ***Ayush Gupta*** hereby declare that the project entitled **"*Mobile App for MUJ Department Information***" submitted as part of the partial course requirements for the course ***Minor Project (CC3270)***, for the award of the degree of Bachelor of Technology in Computer & Communication Engineering at Manipal University Jaipur during the ***VIth, May 2022*** semester, has been carried out by me. I declare that the project has not formed the basis for the award of any degree, associate ship, fellowship or any other similar titles elsewhere.

Further, I declare that I will not share, re-submit or publish the code, idea, framework and/or any publication that may arise out of this work for academic or profit purposes without obtaining the prior written consent of the Course Faculty Mentor and Course Instructor.

Signature of the Student:

Place: Jaipur

Date: 20 July 2022

DECLARATION

I, ***Kriti Vaid*** hereby declare that the project entitled **"*Mobile App for MUJ Department Information***" submitted as part of the partial course requirements for the course ***Minor Project (CC3270)***, for the award of the degree of Bachelor of Technology in Computer & Communication Engineering at Manipal University Jaipur during the ***VIth, May 2022*** semester, has been carried out by me. I declare that the project has not formed the basis for the award of any degree, associate ship, fellowship or any other similar titles elsewhere.

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Abstract

Department Management System is software that is helpful for students as well as the college authorities. In the current system, all the activities are done manually. Its time saving and scalable. Our Department Management System deals with the various activities related to the Department. In the Department management system, we can view as a user and the user has two types of students and administrator.
The administrator has the power to add a new user and can edit the details entered. An admin can add faculty details department-wise. All students can search their basic details and attendance status with their respective roll numbers.
It can be used by educational institutes or colleges to maintain the records of department easily and helps them by automating regular administrative tasks. The creation and management of accurate, up-to-date information regarding a faculty's academic career is critically important in the university as well as college. This App also features the placement data as well.

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1. Introduction

The "MUJ Department Management System" has been developed to override the problems prevailing in the practicing manual system. This software is supported to eliminate and, in some cases, reduce the hardships faced by this existing system. Moreover, this system is designed for the need of the university to carry out operations in a smooth and effective manner. The application is reduced as much as possible to avoid errors while entering the data. It also provides error message while entering invalid data. No formal knowledge is needed for the user to use this system. Thus, by this all it proves it is user-friendly. Department Management System, as described above, can lead to error free, secure, reliable, and fast management system. It can assist the user to concentrate on their other activities rather to concentrate on the record keeping. Thus, it will help organization in better utilization of resources.

Every organization, whether big or small, has challenges to overcome and managing the information of Course, College, Faculty, Exam, Students. Every department Management System has different College needs; therefore, we design exclusive student management systems that are adapted to your managerial requirements. This is designed to assist in strategic planning and will help us ensure that our organization is equipped with the right level of information and details for your future goals. These systems will ultimately allow you to better manage resources.

1.1. Scope of the Work

A major challenge faced by an academic department is the effective management of large amounts and various types of data that are encountered in its day-to-day operation, ranging from personal data to varied types of documents. The data have various access privileges and restrictions and will be input by a variety of sources, ranging from individuals themselves (e.g., a current student or applicant submits a resume), to a member of the faculty to a member of the departmental administration (e.g., an advisor provides notes about a meeting, or a faculty member provides a review of a faculty candidate), to automatic uploading of transcripts or test scores for an applicant. Automatically generated statistics regarding this information will be used by many different constituents, both inside and outside the department. Traditional paper-based operation is not only costly but also ineffective.

The main contribution of this thesis work is the design and implementation of a de-part mental information management system that significantly improved the efficiency of the department’s daily operation.

All the process done manually at the centres and all the records are maintained on the papers. So, the maintenance of the record is very difficult in the departments as well as it is very difficult for the staff to check the record. The existing system is monotonous, time consuming, less flexible and provides a very hectic working schedule. The chance of loss of record is very high and record searching is very difficult. Maintenance of the system is also very difficult and take a lot of time. Result processing is slow due to paperwork and requirement of staff.

1.2. Product Scenarios

- This project has an emphasis on how students and faculty can easily coordinate and improve the experience of users while using their product and release and predict the stability of their product and improve their positioning on the Department Management app. It can be used by developers to understand what kind of issues cause instability hence providing a better development and verification experience for testers.
- Keeping in mind the Future Scope of expanding the project using this project It can help students and faculty to have insights on whether they need to work upon the whole database or a few files which are rich on data. It gives them a certain goal or path that they need to find the required solution.
- This can also help faculty recover the lost physical data. For example, we manually went through 5 documents of Research work and lost it, then they can find it on the app.
- Collaborations in university shall always take place, but by using our app we can predict if the collaboration has been successful in managing the proper data. So, it is focused more towards providing data to its users.

2. Requirement Analysis

2.1. Functional Requirements

This part elaborates on various requirements for developing and running the Application smoothly. While developing the application Android Studio, Emulator, VS code were used to run and keep on testing the application on local host. The final deployment will be done on App store and Play store, which can be accessed by android or iOS devises.

2.1.1. System Requirement for web application

Preferable a Windows or mac Machine (or any other machine is also compatible) with good processor (equivalent to core i5 7th generation or higher).
Stable and fast internet connection. This is essential because if the internet is not fast stable the program will take a lot of time to update the status of user related data from Admin end or request of service from user end.
System memory (upwards of 4 GB). For when the database needs to store the all

the user related transactional and account data. As big bank will have a lot of user data thus a lot of related data will also be there and will need a lot of space on the device. Therefore, a cloud-based system with expandable memory usage is recommended.

2.1.2. Android Studio

Android Studio is the official integrated development environment (IDE) for Google's Android operating system, built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is available for download on Windows, macOS and Linux based operating systems or as a subscription-based service in 2020. It is a replacement for the Eclipse Android Development Tools (E-ADT) as the primary IDE for native Android application development. Android Studio was announced on May 16, 2013, at the Google I/O conference. It was in early access preview stage starting from version 0.1 in May 2013, then entered beta stage starting from version 0.8 which was released in June 2014. The first stable build was released in December 2014, starting from version 1.0. On May 7, 2019, Kotlin replaced Java as Google's preferred language for Android app development. Java is still supported, as is C++.

2.1.2. Emulator

In computing, an emulator is hardware or software that enables one computer system (called the host) to behave like another computer system (called the guest). An emulator typically enables the host system to run software or use peripheral devices designed for the guest system. Emulation refers to the ability of a computer program in an electronic device to emulate (or imitate) another program or device.
An Android emulator is an Android Virtual Device (AVD) that represents a specific Android device. You can use an Android emulator as a target platform to run and test your Android applications on your PC. Using Android emulators is important for testing.

2.1.3 Visual Studio

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs, as well as websites, web apps, web services and mobile apps. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code.
Visual Studio includes a code editor supporting IntelliSense (the code completion component) as well as code refactoring. The integrated debugger works both as a source-level debugger and a machine-level debugger. Other built-in tools include

a code profiler, designer for building GUI applications, web designer, class designer, and database schema designer. It accepts plug-ins that expand the functionality at almost every level—including adding support for source control systems (like Subversion and Git) and adding new toolsets like editors and visual designers for domain-specific languages or toolsets for other aspects of the software development lifecycle (like the Azure DevOps client: Team Explorer).
Visual Studio supports 36 different programming languages and allows the code editor and debugger to support (to varying degrees) nearly any programming language, provided a language-specific service exists. For this project we will be focusing on dart.

2.2. Non-functional Requirements

The app, i.e., frontend and backend are pure flutter development as mentioned in the requirements, The technologies used were very new. The project had been delivered within three spirits and the app should have been responsive and should sending data dynamically. Backend logic using firebase and frontend development using flutter dart.

2.2.1 Usability:

This segment consists of all of these necessities that impact usability. We get the response inside seconds The software program ought to have a simple, user-friendly interface in order that the clients and admin-groups can save time and confusion This application may be used on any type of platform which supports Android or iOS.

2.2.2 Why Flutter?

Flutter is one of the best solutions to develop apps for Android and iOS, without having to write in a different codebase for each platform. The smartphone versions of these apps function as true, native apps on Apple and Android devices and are compiled for the respective platform before publication. They do not need a runtime module or a browser. Using the same codebase, it is also possible to create web apps for browsers as well as native programs for Windows, Linux and macOS.
Flutter is the only framework with a mobile SDK that provides a responsive style without using a JavaScript bridge, thereby reaching a level of performance that rivals its cousin and direct competitor React Native. It easily integrates with the different platforms such as Android, IOS and Linux, MAC, Windows, and Google Fuchsia applications.

2.2.3. Implementation

The system is implemented in compiler/interpreter environment. Android studio or any other emulator can be used to as the service platform and Windows 10 Professional is used as the platform.

2.2.4. Reliable

Data Extractor should be reliable and stable and not crash in the middle of extraction if all system requirements are met

2.2.5. Efficiency

Data Extractor will take a lot of time to scrape the data and will use a lot of CPU Overload therefore it is suggested to kill any other existing processes running on the device.

2.2.5. Scalability

The number of commits and commit related data is easily scalable without disturbing the current situation

2.2.6. Simplicity

The app should be simple and user friendly

2.2.7. Accuracy

The accuracy of data should be their as incorrect information may lead to issues.

2.2.8. Computational efficiency

The app should be smooth and run efficiently in all devices.

2.3. Use Case Scenarios

- An user may use our app to check department information, faculty details, placement data etc.

- Faculty can use our app to update/modify of their profile.

- Admin can add/remove/modify details of department, placement, and faculty.

- Developers who need to plan the next update

- Developers who need to know in what direction they should take their software development to.

- If the software stability is improved, it ultimately benefits both the developer as well as the user.

- Our software might be used to find whether the release would be bug prone or will be tending toward beings' bug free.

- Our software might be used to compare between two similar projects based on stability and being bug prone. We can also rate different software's which have similar functionality based on this project and its present findings. We will need to check the latest releases of the software's that we need to compare, and based on the theory mentioned previously, we can determine which newer software is more stable and at the present stage which one would be least prone to bugs and create lesser problems to the user while using. It will also promote a healthy competition between companies producing similar software's to produce more stable applications in the future.

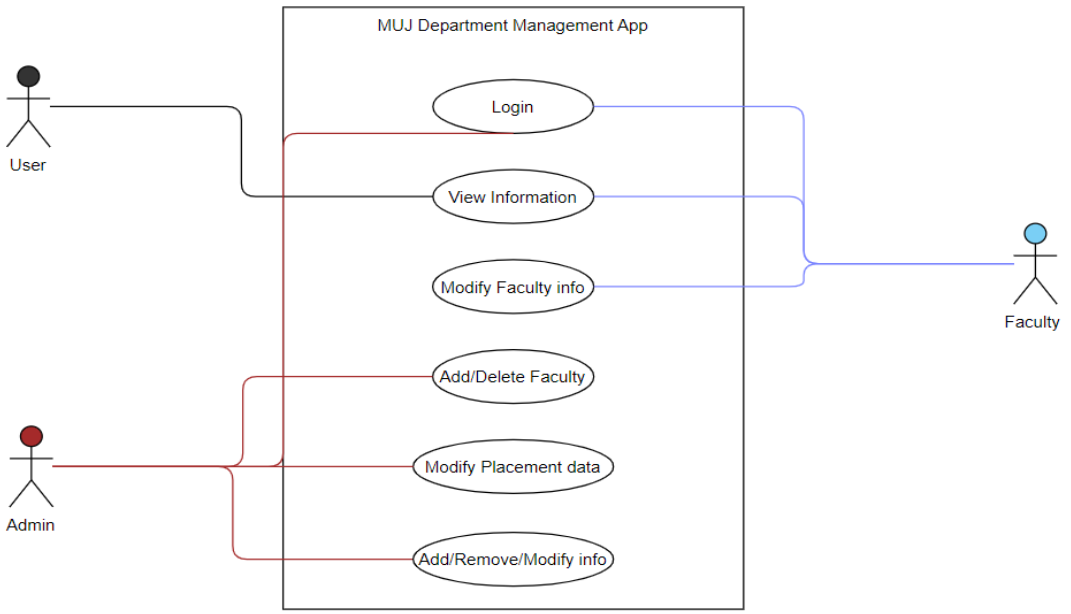

Fig.1. User case Diagram

2.4. Software Engineering Methodologies

The area of code engineering is stated to the development software program in systematic way now no longer like trustworthy applications which is probably advanced in isolation and there may not be any systematic method being followed. As there may be big difference among programming and software program engineering as it delivers fashions that purpose the meeting of properly documented software program in a completely way it is predictable. For a mature process, it should be achievable to workout in advance what share time and electricity are going to be had to deliver the remaining product. To expand rich software program, we without a doubt ought to comply with a few fashions, that act as guidelines.

The model we have used is Agile Model that's an exercise that promotes non-stop generation of improvement and trying out during the software program development lifecycle of the software being designed. In the Agile model, each development and testing activities are simultaneous. Thus, functions of git branch and merge became in extraordinarily accessible during the processes of developing, testing debugging and redeveloping each new feature.

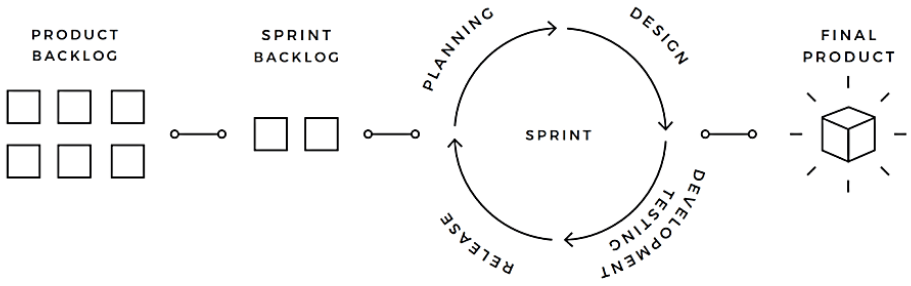

Fig.2: Agile Development Cycle

3. System Design

This project is based on the functional design approach, which helps in understanding the design of the project in a simpler way by explaining its flow, use cases, and implementation more like a modular approach. For example, there are different modules in this project which have separate functionality and, other sub functionalities/modules. All the modules are designed, implemented, and integrated together to make a flawless working application.

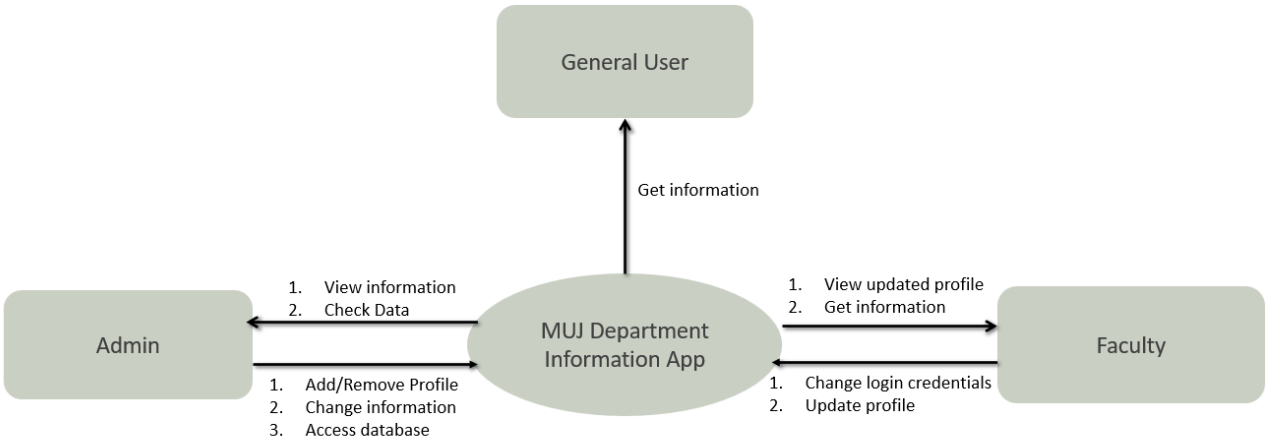

Fig.3. Data flow diagram

3.1. Design Goals

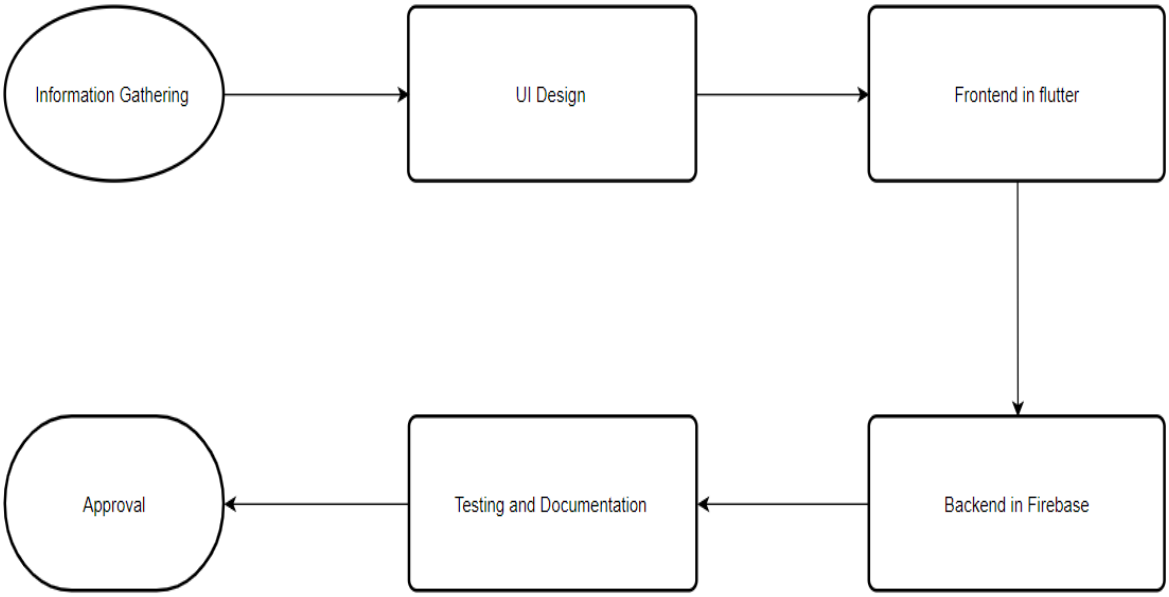

Fig.4. Process

3.2. System Architecture

This section basically talks about how the application functions and the various important system.

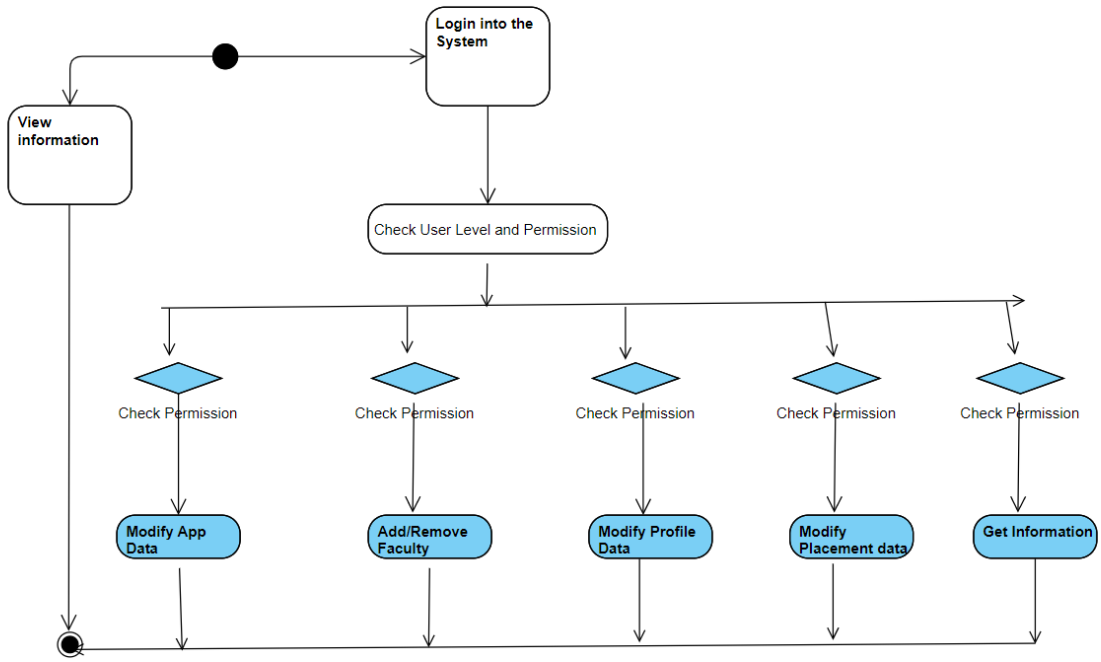

Fig.5. Activity diagram for app

3.3. Detailed Design Methodologies

In this section we will discuss about the implementation of all processes while building this app.

3.3.1 Phase 1

Data Gathering

We enquired the administration and gathered all the required information which is necessary for the app. The data we collected includes department information, faculty information, placement data etc.

UI Design

After deciding the data, we moved in designing phase where we designed the User Interface of the app in figma so that it can give us the overview of the app going to look and help us in designing and approval of app.

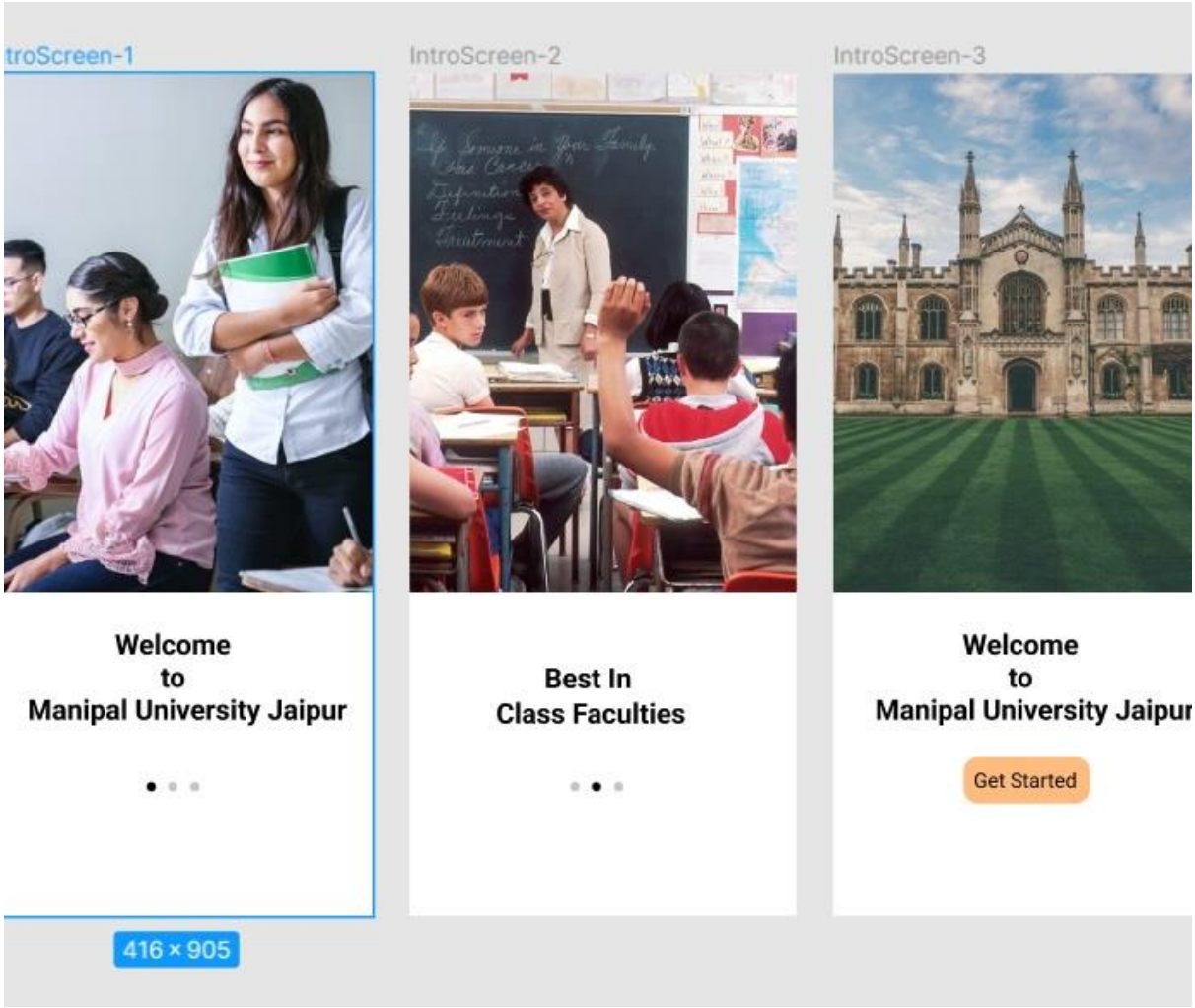

Fig.6. UI design app landing page

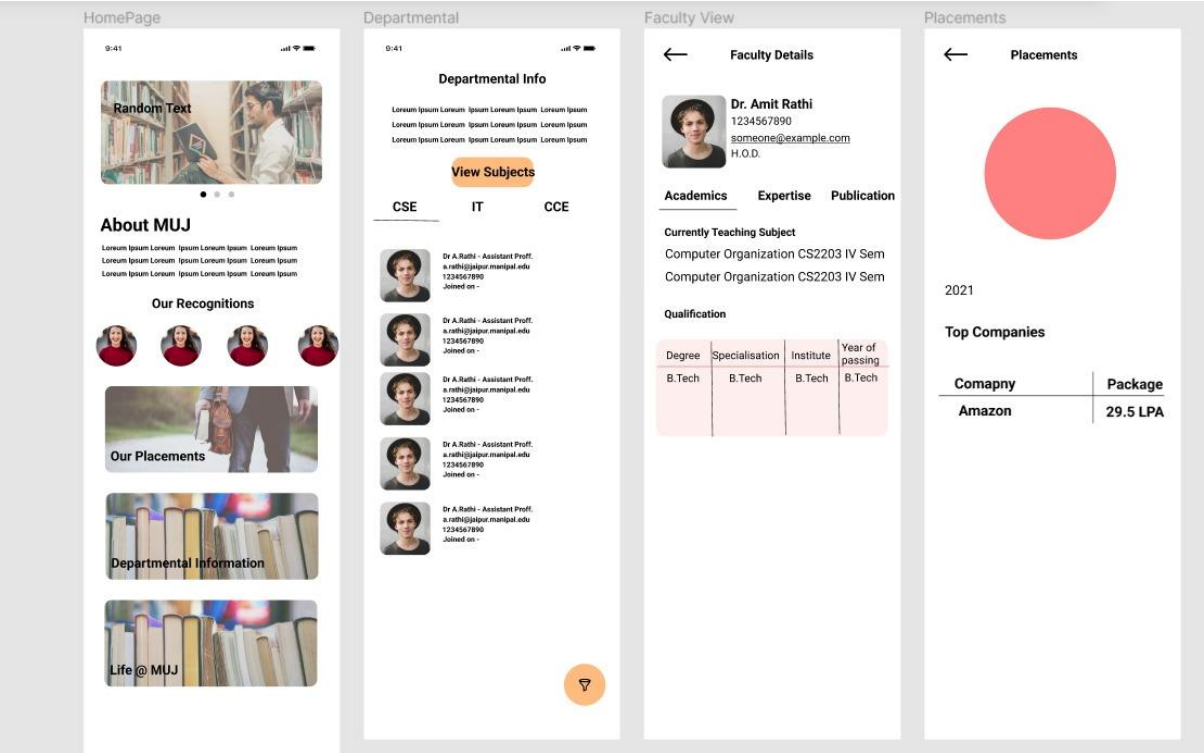

Fig.7. UI design of modules

3.3.2 Phase 2:

In phase 2 we particularly focused on frontend and backed of the app. The frontend was designed in Flutter Dart as it is one of the best languages to code because it makes cross-platform mobile application development simpler and faster. Perhaps most obviously, the ability to rely on a single codebase and UI engine for cross-platform development reduces the effort needed to produce versions of an application for both Android and iOS.

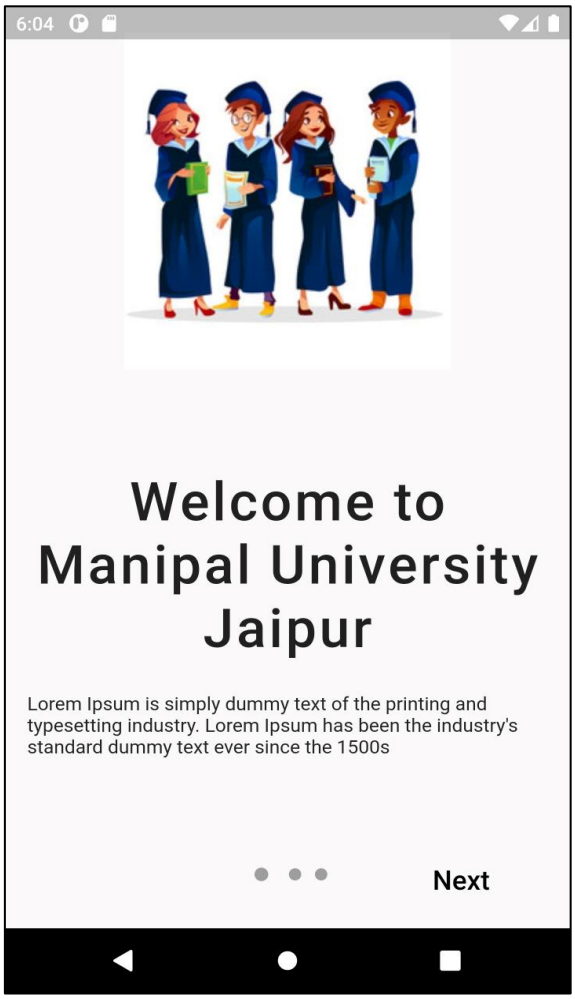

Fig.8. Introduction screen (i)

Fig.9. Introduction Screen (ii)

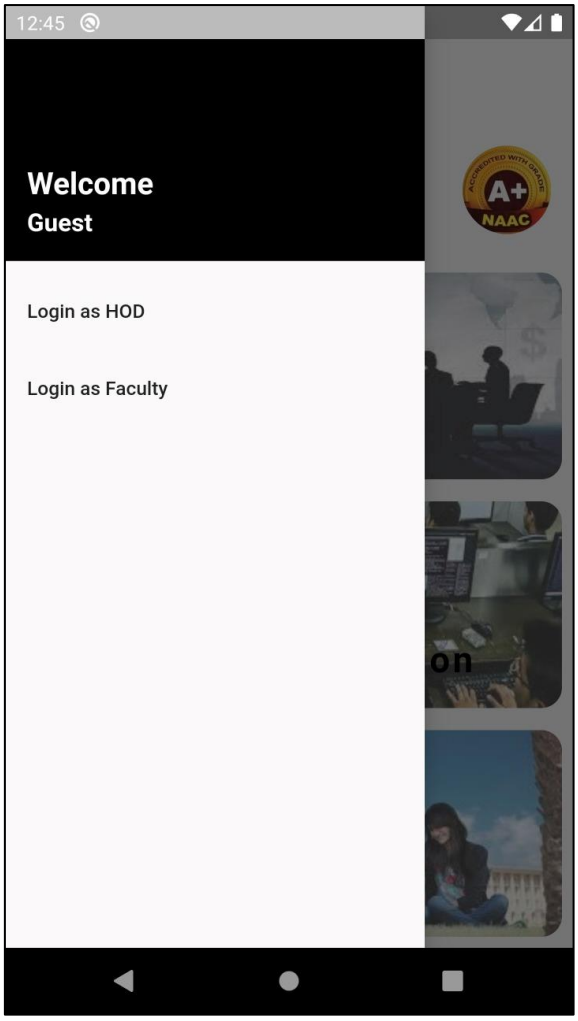

Fig.10. Login page

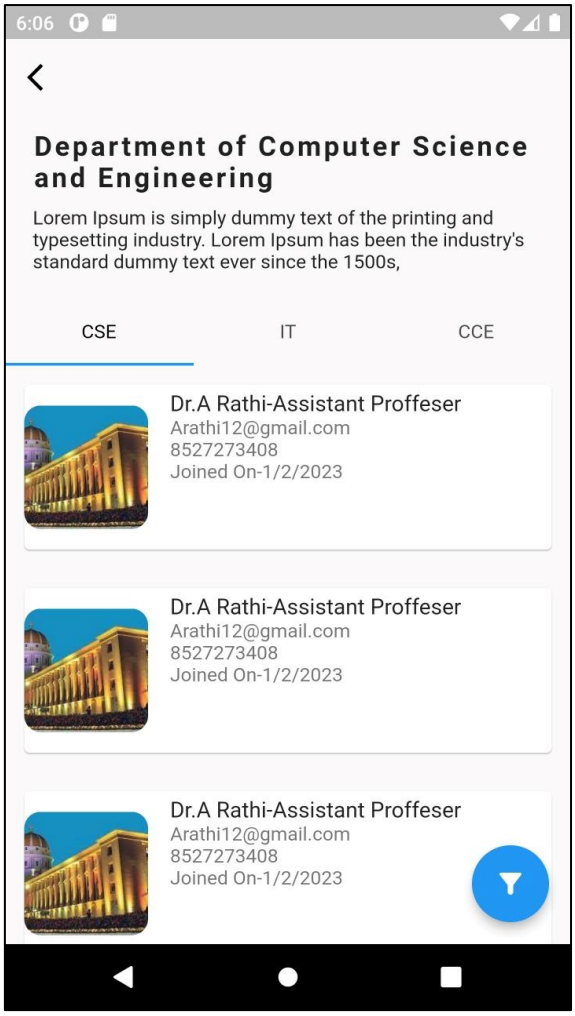

Fig.10. Department Info (i)

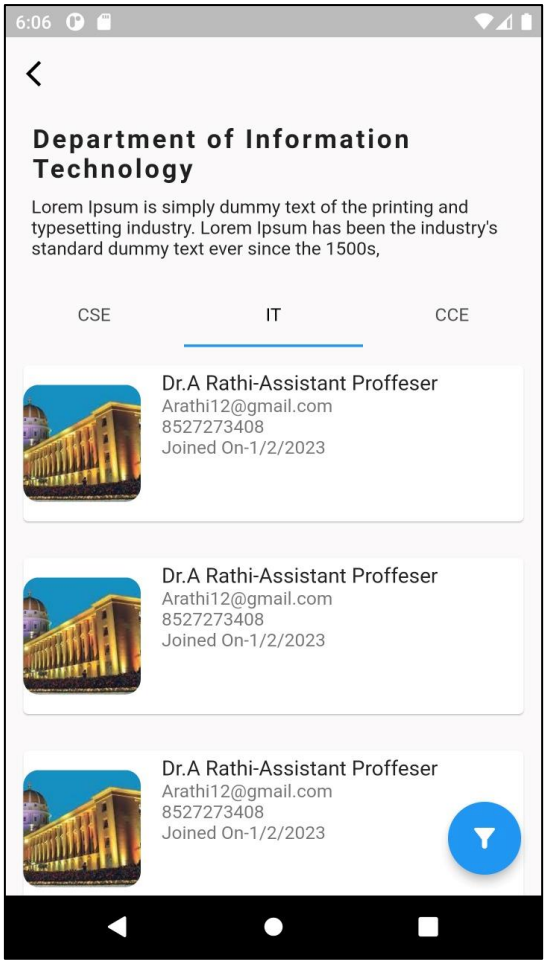

Fig.11. Department info (ii)

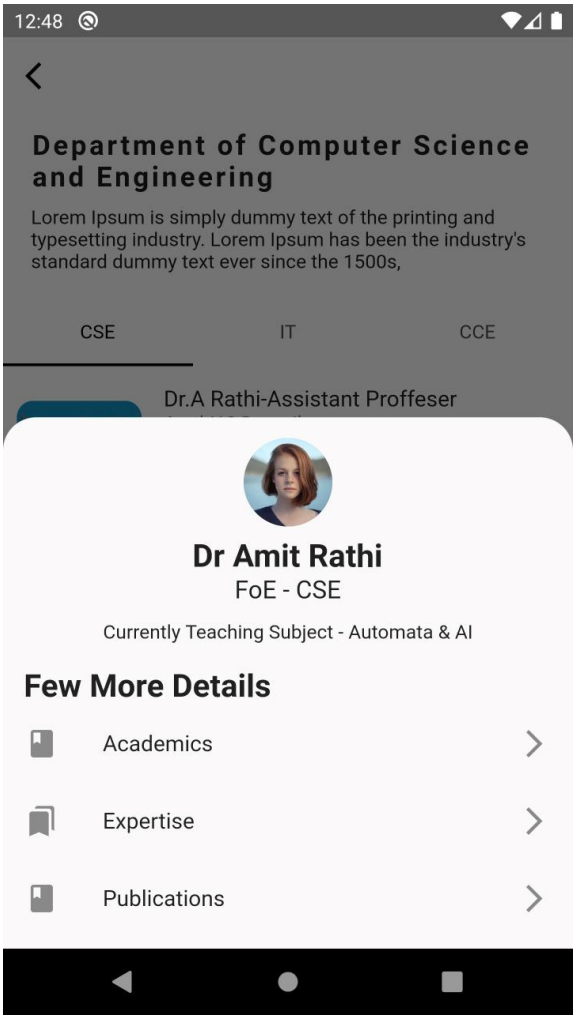

Fig.12. Faculty information (i)

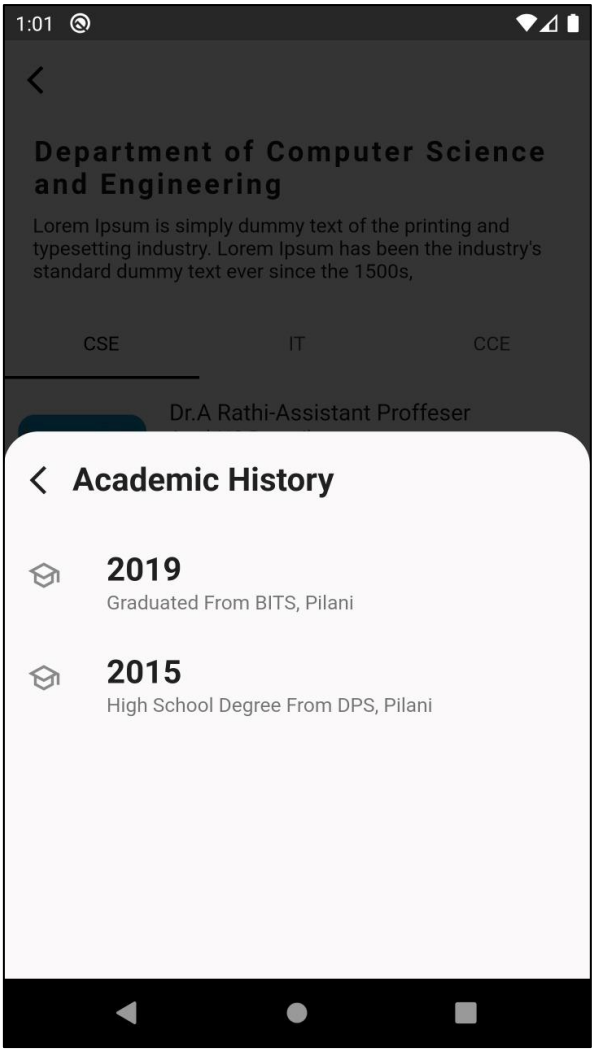

Fig.13. Faculty information (ii)

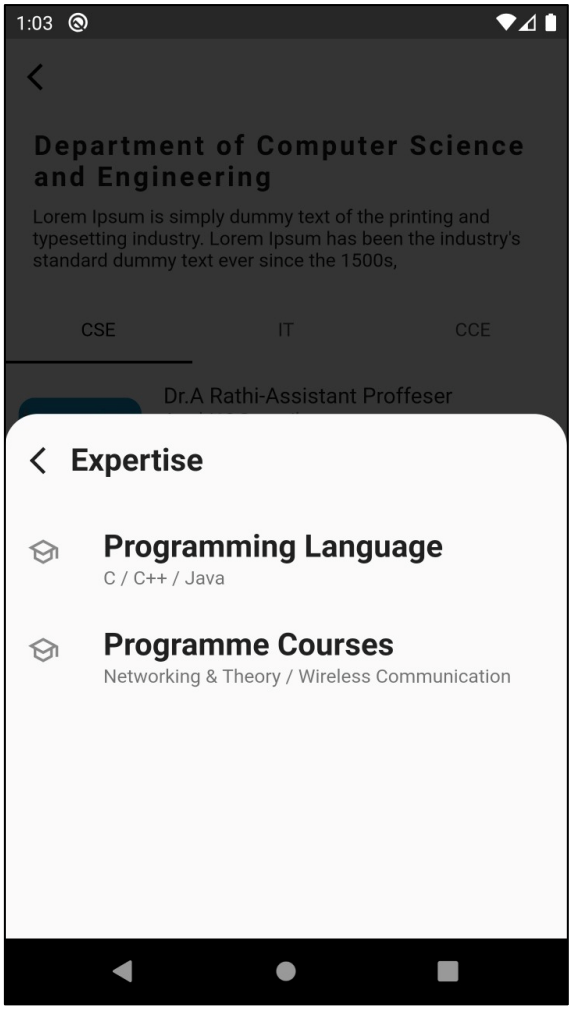

Fig.14. Faculty info (iii)

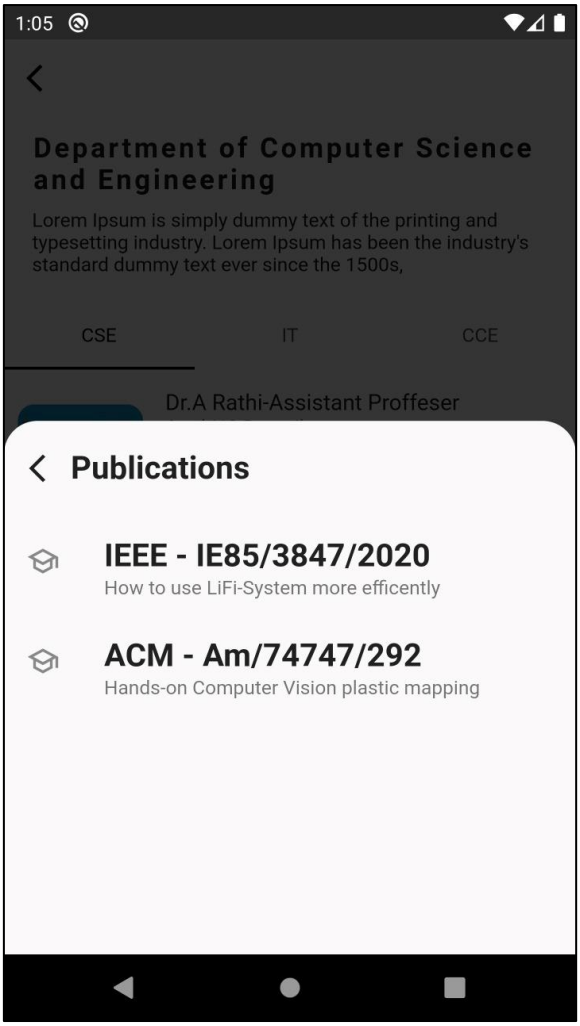

Fig.15. Faculty information (iv)

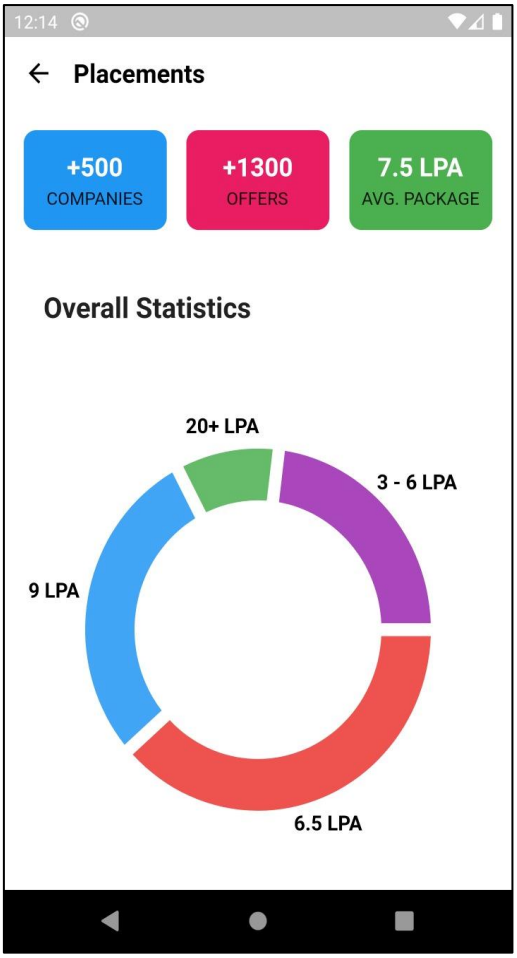

Fig.16. Placement data

3.3.3. Phase 3

In Phase 3, which is also our final phase, we completed all the necessity documentation and performed testing of application. For testing we first tried the working app on Android emulator and after that we tried the apk in the mobile phones. We also asked our friends to test the app and took their feedback, some of which can be performed in our future expansion of this app.

4. Work Done

4.1. Development Environment.

Figma

Figma is used to create design and user interface of the project. It is a cloud-based vector graphics tool used for a range of design tasks. It works directly in a browser.

Android Studio

Android Studio is used to create frontend of the application. It is powered by gradle and allows to customize the build to generate multiple build variants for different devices from a single project. It is a cross-platform integrated development environment (IDE) for developing on the android platform.

- Used Flutter, which is a toolkit for crafting beautiful, natively compiled applications for mobile, web, and desktop from a single codebase.

- Used dart, which is a client-optimized language for developing fast apps on any platform. Its goal is to offer the most productive programming language for multi-platform development, paired with a flexible execution runtime platform for app frameworks.

- Android Emulator is used to simulate the application on computer to test the application on a variety of devises and Android API levels without needing to have each physical device.

Firebase

Used Firebase to develop the backend for the app. It offers many features that pitch it as the go-to backend development tool for web and mobile apps. It reduces development workload and time. And it's a perfect prototyping tool. Firebase is simple, lightweight, friendly, and industrially recognized. The benefit of Firebase Hosting allows you to set-up a single-page, a mobile landing page, web page or progressive web page with ease. It also helps to deliver the content rapidly anywhere. The developers can deploy the web apps as well as static content at CDN (Content Delivery Network).

4.2. Results and Discussion

The following results and observations were made on successful testing and debugging done as much as possible according to knowledge and technology constraints. The system necessities are terribly low. System resources and the system can work in most configurations.

4.2.1. Security

The visiting users are unable to access database, visiting users are unable to access admin services which makes the app secure from fraud from hackers. However, due to limited resources and knowledge, the data is not encrypted and the user data also

maybe prone to theft as proper network security measures have not been implemented.

4.2.2. User Interface and Useability

The User Interface and Useability is user friendly in all possible ways, however it is constrained to mobile devises only as the app design isn't responsive. The services would work smoothly in a desktop as well, but the user interface would not be as appealing or in place as in a mobile phone/tablet.

4.2.3. Admin Services

The admin services to provide authentication to faculty and work well both on user and admin end and changes initiated from admin end reflect onto the user's end. For example, if, a faculty is blocked by admin, if the faculty logs in, he gets redirected to login page with a message that faculty account is blocked or if a new faculty is added or require modification in data, it must go smoothly.

4.3. Individual Contribution of project members

Both Ayush Gupta and Kriti Vaid have contributed equally to the project and report compilation and have learnt from each other. However we would prefer to mention the contribution on the level of our expertise on various subjects of the project.

Ayush Gupta: Planning and data gathering for app, Designing of UI in figma, Backend in Firebase, Documentation of whole project.
Kriti Vaid: Development of frontend in Flutter, Testing of app in Android Studio Emulator and mobile devices.

5. Conclusion and Future

In this report, MUJ department application has been presented. It was emphasized on the basic steps, consequently taken during the project's development course as a particular attention was turned to the basic operative functions performed upon the data into the database. The report's content comprises the whole task solution, starting from the designing tools have been selected, going through the IDE, the applications analyse and construction, and finishing with the code-implementation and test-samples. As a future work, some additional stuff could be implemented and integrated into the application code making it much more reliable and informative; especially what concerns the placement module, for instance. Apparently, the role of such systems is basic and essential within each University or college that wants to keep a good control and record concerning its personnel data, functionality, and performance on all levels in its structure. Every

organization, in nowadays, has the necessity of managing its faculty on a really good level as the faculty has the greatest merit of building up a university as such as it is. The well managed faculty means giving the appropriate award-ness and all kind of benefits as such as they have been deserved. That's why the development of such systems is not just a programming business – a lot of people are ordinarily involved in such projects and one of the basic requirements is the reliability of the system, especially what concerns the storage of data and all the operations that will be performed upon it.

6. Future Plans

The expansion of this app is possible, and it will make it more informative. Below are the aspects that could be improved upon or features that can be added:

1. The next step will be to identify bugs after launching of application and test it again so that bugs can be removed.

2. We will integrate a notice bar in the app in which all the latest achievements of the department will be shown.

3. We will add a chat option in the app so that a user can directly contact the faculty.

4. An information bulletin module will be added to provide users with all the information related to department at one place.

5. An examination module will be added in which all the previous year papers and all other exam related information/quarries will be present.

6. The app will be expanded to other departments and schools of the University.

7. A module will be added where timetable and schedule of a department can be found.