Android-based College Fees Payment Application

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Abstract- **The primary focus of this research paper is to propose a mobile solution for college fee's payment system. Students of the colleges have been paying all their fees such as tuition fees, hostel fees, mess fees and other college-relevant fees manually while waiting in the long queues which waste not only student's precious time but also the college management's time. Due to this, colleges have to maintain all the information regarding the fees manually into their databases. This paper proposes to build an android application that will give the students a freedom to pay their fees from anywhere, anytime, 24x7. Although college can provide a particular time constraint for that. This android application serves as a more reliable and effective means of paying college fees and removing all forms of delay and stress that is involved in the manual system of college fees processing.**

Index Terms: - Android application, Android Studio, Android SDK, Firebase, JSON.

I. INTRODUCTION

Nowadays, the use of mobile phones has become a necessity. Anything and everything is either digitalized or is on its way to be digitalized. People can do a lot of their activities such as listening to music, writing an email, play games or even watch a movie, directly on their mobile phones. A large number of smartphones use Android OS, which supports third-party software development, hence there has been a rapid increase in the number of Android application developers. Android is an OS which was designed and developed by Android Inc. in early 2000 for smartphones, tablets and other kinds of personal devices. Later it was acquired by Google in 2005 in order to support its further development as an efficient operating system and an amazing user-friendly platform for mobile devices. Android is a Linux-based operating system which is currently available on various types of smartphones and tablets. It includes a touchscreen as a user interface with various other features that converts a normally functioning cell phone into a smartphone. Android provides a platform that supports various applications, available through the Android Stores. This platform provides a freedom to the end users for developing their own apps, which can be easily installed and used above the Android framework. Android Inc. launched their first version in September 2008 with no name. The various other versions launched since then are Cupcake (v1.5), Doughnut (v1.6), Eclair (v2.0), Froyo (v2.2), Gingerbread (v2.3), Honeycomb (v3.0), Ice Cream Sandwich (v4.0), Jelly Bean (v4.1), KitKat (v4.4), Lollipop (v5.0), Marshmallow (v6.0), Nougat (v7.0), and the latest one was Oreo (v8.0) launched in August 2017.
This paper proposes an application that is built above the Android framework. This application is compatible with all the versions of Android OS above Lollipop(v5.0). It focuses on the problems that are faced with the payments of fees offline and overcomes them by providing an easy and simple to use an application to do the same.

II. LITERATURE SURVEY

Students from every college have been paying all their fees such as tuition fees, hostel fees, mess fees and other college-relevant fees manually while waiting in the long queues which waste not only student's precious time but also the college management's time. Due to this, colleges have to maintain all the information regarding the fees manually into their databases. This paper proposes to build an android application that will give the students a freedom to pay their fees from anywhere, anytime, 24x7. There are various web-based applications that allow the students to pay their fees online without having to stand in long tiring queues and waste their time. The web-based solution to this problem solves their problem to an extent.

III. PROPOSED & EXISTING SYSTEM

To overcome the problems of manual fees payment system we propose an android based application that is, even more, easier than the web-based solution. The web-based system needs to have a computer system or even if used via mobile it's not that user-friendly, whereas, with the Android application it's easy to treat users with more personalized experience. The application provides more user-friendly experience than the web-based system of fees payment. The web-based system allows the students to pay only their college fees but the proposed application provides the students with an option to pay any kinds of college-relevant fees whether its mess fees, hostel fees or even stationary

related fees. The application provides the user to have a personalized experience.

IV. SYSTEM ARCHITECTURE

An IDE called Android studio is used to develop the application, which is the official IDE for Google's Android OS. Android Studio was developed by Google and JetBrains. This operating system is built on JetBrains' IntelliJ IDEA software and designed specifically for Android development. It is compatible with all kinds of operating systems currently available in the market such as Microsoft Windows (7/8/10 with 32bit/64bit), Mac OS X (10.10-Yosemite or higher up to 10.13-Sierra) or Genome/KDE desktop Linux. It requires minimum 3 GB RAM, plus 1 GB for the Android Emulator which allows the developer to emulate the built application virtually on the system. The most mandatory requirement for the Android studio is JDK (Java Development Kit v8). These requirements may change based on the version of Android studio being used. The latest stable version of the Android studio is 3.1 which was recently launched in March 2018.

In order to store the data of the application, we make use of a real-time database which is provided by the Firebase. It was developed by Firebase Inc. in 2011, then was later acquired by Google in 2014. It is an open source platform for mobile and web application development. The services provided by the Firebase offers an API for the application developers which allows the data of the application to be synchronized across the end users and gets automatically stored on Firebase's cloud. It also provides various client libraries that enable integration with Android, iOS, JavaScript, Java, Objective-C, swift and Node.js applications. Developers making use of the real-time database can secure their data by using the Firebase's server-side-enforced security rules. Firebase data is stored in a NoSQL database and only available as a cloud service. The advantage of using a NoSQL database is that the schema and the structure of the database are dynamic so there is no need of pre-defining it. NoSQL databases typically use clusters of economically efficient servers in order to manage the huge amount of data and transaction volumes. The cost per gigabyte or transaction/second for a NoSQL database can be many times less than the cost of a SQL based database. This allows us to store and process even more data at a much lower price rate. Firebase is a normal JSON (JavaScript Object Notation) tree database which is almost similar to other NoSQL databases such as MongoDB, Redis, or Casandra. The application consists of two modules; the end-user module and the admin module.
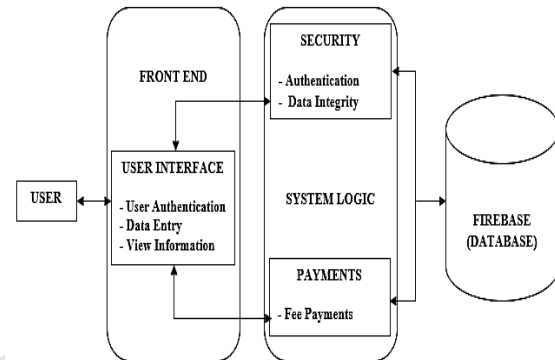
Figure 1: Online Fee Payment System Architecture

The application makes use of 3-tier architecture i.e.; the user interface, the system logic and the backend data storage. The overall data security is provided by the Firebase's server-side-enforced security guidelines. The admin registers the user's login details such as their name, USN, email, etc. Admin controls this information from his database account which is available to be accessed only by the admin himself.

The end users can download this application from the Google's play store free of cost. They can then enter their respective details to register for the application. This registration data is then transferred automatically to the firebase account of the admin where he can take control of it. After logging in the application, the user can check his profile, check their fees details or even change their password. When the user needs to pay their respective fees, they can choose between the options provided in the application. The available options are college fees, hostel rent, mess fees or other college-relevant fees.

Inside the College fees option, there is an option to choose their respective year of study. Inside Hostel fees option they can choose between Girls hostel and Boys Hostel. Common to all these options is the payment option which finally results in the payment of any kind of fees. This is done by making use of any kind of payment gateway available in the market. A payment gateway is a merchant service which is provided by an e-commerce application service provider. It authorizes various kinds of credit cards or direct payments processing for any sort of e-businesses which is the college fees payment in our case. The payment gateway is internally linked to our application which facilitates a payment transaction. This is possible only if the required information is transferred between the payment portal available on the application and the respective banks' front-end processor.

V. CONCLUSION

In the end, we finally conclude that there was a need for a system that eases the life of students in case of fees payment. This application eliminates all those unnecessary steps that were required before such as standing in long queues of the banks for DD, standing in long queues in college to submit the DD. This approach provides an efficient solution to all those problems. Of course, the application can later be extended for different purposes related to the college administration and various other activities but currently, it's limited to just paying the fees.

VI. RESULT

Following are few of the snapshots of the application which shows few of the internal working of the application.
• As shown in the Figure 2, it is the first page of our application. The user has to enter the email id and the password in order to log in. If the user is new then they have to enter their full details in order to register.


Figure 2: Login page

• After logging in the application, the user can now check his profile, pay various fees, check fees details, and change password.
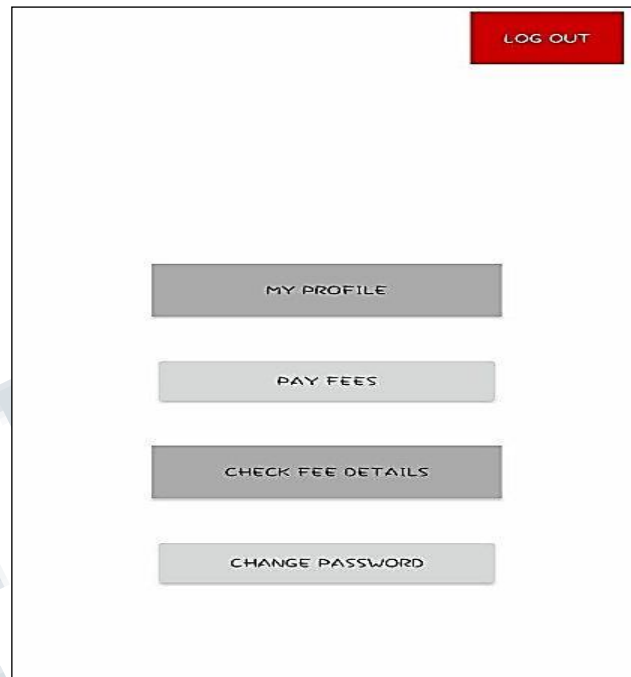

Figure 3: Choice of options

• When the user choses the payment option they will get the order ID and the page will get directly transferred to the payment gateway. As shown in figure 4, on the payment gateway page, they can choose the mode of payment and even change the language according to their comfort.
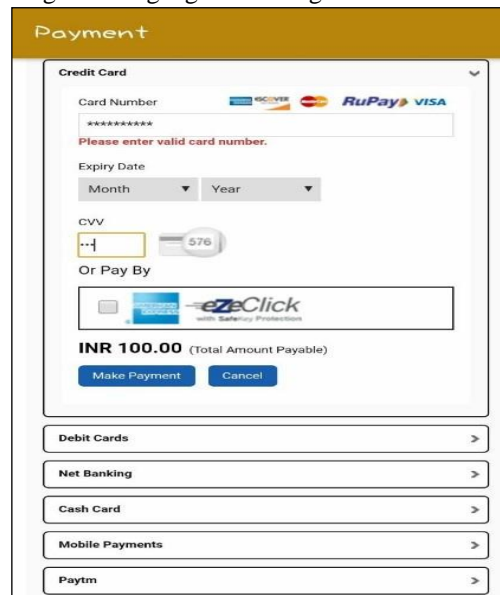
Figure 4: Payment Gateway Portal

• As shown in the figure 5, this is the firebase database account. Through this the admin can have control over the user's data. All the registered user's data will be stored here.
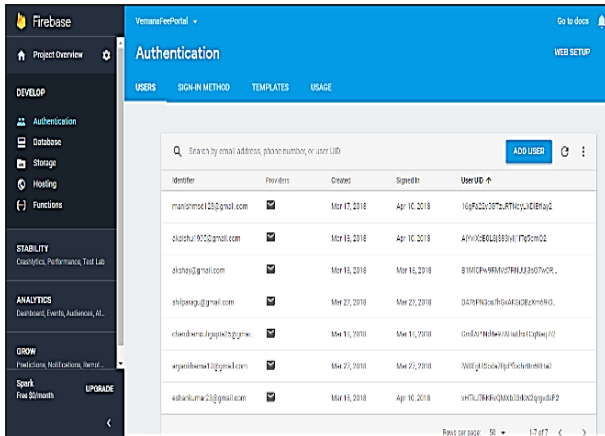
Figure 5: Admin Database page

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