

AN ANDROID BASED ONLINE SUPPORT FORUM

¹U.S Haruna and ²Ahmad Umar D.

^{1,2}Department of Computer Science,
Yusuf Maitama Sule University, Kano,
Nigeria.

¹shafsonharun@gmail.com

+2348032206648

²optimisticahmerd@gmail.com

+2348033303295

Abstract

Traditional mode of learning provides ineffective means of student-to-student and lecturer-to-student communications involving: cancellation of lectures due to some out of the blue circumstances; important notices concerning assignments and tests; sharing of past question papers for examination purposes; and most outstandingly, getting answers of perplexing questions from students or lecturers. This clearly signaled the necessity of transiting from this mode of learning to a more better and effective modernized one. It is unanimously agreed that, smartphones and Information and Communication Technologies (ICTs) have significantly eased, modernized and enhanced human activities related to learning through Electronic Learning (eLearning), Mobile learning (mLearning) etc. This paper presents an Online Support Forum on android smartphones with the sole aim of taking students away from using smartphones and the Internet solely for social networking purposes, to a more important life-reshaping aspect that can enhance their cognitive skills, problem solving capabilities and decision making abilities, developed using Java programming language, Extensible Markup Language (XML), Firebase Database and Android Studio Integrated Development Environment (IDE).

Keywords: ICT, XML, Online Support Forum, Student, Lecturer, Firebase Database

Introduction

In the current traditional mode of learning, there are number of problems faced by students in the process of deepening their understanding of a particular topic or an entire course as a whole. Furthermore, this mode of learning provides ineffective means of student-to-student and lecturer-to-student communications involving: cancellation of lectures due to some out of the blue circumstances; important notices concerning assignments and tests; sharing of past question papers for examination purposes; and most outstandingly, getting answers of perplexing questions from students or lecturers. Automated means of handling these important and hard-to-manage activities will apparently reduce to bare bones the entire learning process.

In recent time, the growth of smartphones and tablets has remarkably increased due to their suitability, intuitiveness, expedient usage and wide acceptance by youths of nowadays. The majority of applications running on smartphones and tablets are based on Google's Android operating system and Apple's iOS due to their wide acceptance[1]. Considering the aforesaid actualities, an android web-based support forum will surely solve the problems of traditional mode of learning detailed earlier. An online support or discussion forum is an interactive modern approach of learning that operates over the internet, which pave ways for students to enhance and augment their understanding of subjects related to their respective fields of studies through posting perplexing questions or messages to discussion threads and await responses from their fellow colleagues or lecturers. Online Support Forum on android phones will undoubtedly take students away from using smartphones and the internet solely for social networking purposes, to a more important life-reshaping aspect that can enhance their cognitive skills, problem solving capabilities and decision making abilities.

Online support or discussion forums are "considered an extension of traditional learning that promotes dialogue, reflection, knowledge construction and self-assessment"[2]. The integrity and stability of an Online Support Forum when developed in any technological platform, such as android, are achieved by targeting latest available Application Programming Interface (API). The android application developed needs to be checked and rechecked to ensure its soundness performance-wise and to also testify that it is in tandem with the trending pace of development in the android community.

In this paper, we use Java programming language, Extensible Markup Language (XML), Firebase Database and Android Studio Integrated Development Environment (IDE) to develop an online support forum with the aim of liberating lecturers and students from some of the itching activities associated with learning process.

Related Tools

There are many tools that are related to online support forum. An Android Application for Smart College[3] automates the manual processes of managing the overwhelming activities involved in

the institutions of higher learning by providing a faster means of disseminating information to the parties involved. It can be used in communicating academic related information such as lecture notes, notices, timetable and other related details. Further to this, the application has a discussion forum in which students can interact with head of department and subject teacher, but they can only access documents uploaded by an admin, with no functionality that let them upload the ones they have in their possessions, such as past question papers and previous lecture notes. Android Based College Notification System[4] aims to replace the traditional notice board with E-notice board. The application supports sharing of information, exchange of notes and other college related news, but lacked the features of online support and exchange of files among students.

Further to the above, [5]came up with Android Based Student Learning System equipped with many tools that support and ease learning processes, it is further equipped with modules timely notification, activities due dates, exam alert and discussion notification functionalities. But it doesn't allow exchange of files among its users. [6]implemented and launched a web-based application named Technical Discussion Forum for convenient discussions of technical topics tailored to the respective fields of studies of registered users. Topics to be discussed can be posted by a registered user to a relevant category or subcategory and may require admin's approval for it to be visible and discussable. The tool is not mobile friendly, and also lacks file exchange feature.

Table 1 depicted the summary of the reviewed tools.

Table 1 Summary of Reviewed Tools

S/N	Authors	Title	Strength	Weakness
1	Mrs. M.S. Malkar (2018) et al	An Android Application for Smart College	The proposed study disseminate notes, notices, time table and enables online discussion	Students only have the privilege of accessing (read) data, that is, they can't upload files for others
2	JadhavKomal (2016) et al	Android Based College Notification System	The proposed study is able to provide instant notification to some issues that may arises	The study prioritized notifications without considering online discussion and sharing of documents among students
3	Vineet Singh (2015)	Android Based Student Learning System	The proposed system addresses timely notifications for different module and online discussion	The study prioritized on notifications and online discussion without considering sharing and downloading of documents
4	Baiju Kumar Jha (2016) et al	Technical Discussion Forum	The proposed system addresses online discussion	The tool does not address the sharing of documents and is not suitable for mobile devices

After inspecting and analyzing previous tools related to online support, the authors design and implement a suitable web-based android application that solved most of the identified issues. This application is called "CsC Online Support Forum". The application helps students and lecturers to support each other in overcoming academic difficulties and the tedious activities involved. The following section depicted the features of this application.

CsC Online Support Forum Features

Launching Activity

The launching interface is the welcome interface of the application that allows users to either create a new account or login to the system's operations as depicted in figure 1 below.

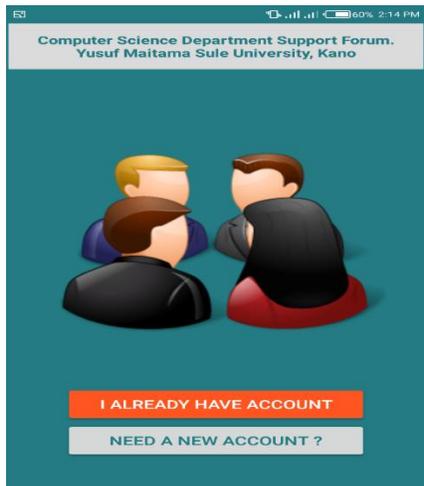


Figure 1. Launch Activity Interface

User Registration and Login

This is an activity that allows a new user to create a free account by providing his/her Display Name, Email and Password as shown in figure 2 below.

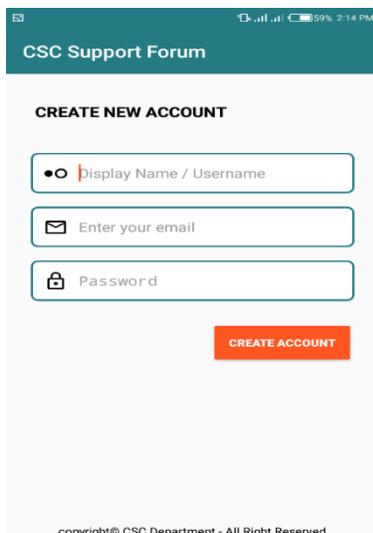


Figure 2. User Registration Interface

After a successful registration, a user can then be able to login into the system to access its functionalities. The user login activity is a security mechanism provided by the system in order to authenticate registered users before having access to it by providing their email and password as depicted in figure 3 below.

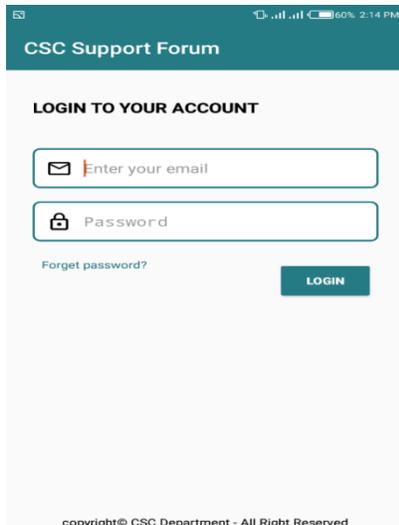


Figure 3. Login Interface

Forgot Password

It is apparent that, people do forget their passwords perhaps due to several accounts they have in different online platforms. This tool provides feature that allows a user reset his/her password by providing his registered email address. It is presented in figure 4 below

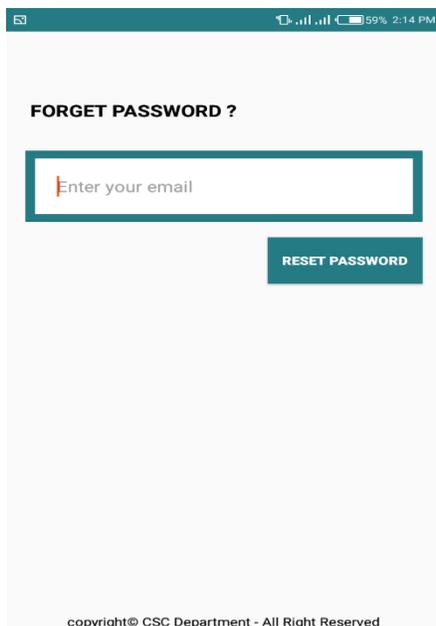


Figure 4. Forgot Password Interface

Profile Setup Activity

After successful registration and login, users can be able to complete their registration by providing their full names, genders, phone numbers, program of studies and specifying their status (Lecturers or Students) as depicted in figure 5 below.



The screenshot displays a mobile application interface for completing registration. At the top, the status bar shows 0.9K/s, signal strength, 64% battery, and 12:51 AM. The main heading is "Complete Your Registration". Below this is an illustration of a person working at a computer. The form consists of several input fields: a name field containing "D Ahmad Umar", a phone number field containing "08033303295", a gender dropdown menu currently set to "Male", a status dropdown menu currently set to "Student", and a program of studies field containing "UG14ICT11".

Figure 5. Profile Setup Interface

Conversation Activity

This is the main activity that allows interaction and communication between registered users. Users can post perplexing questions and messages and await students or lecturers' responses to that. The responses can be in form of texts, images or likes. Students and other users can also use this feature to make important announcement to the registered users of the forum. Further to this, past question papers and other important documents can be shared among the registered users of the forum. The interface for this outstanding feature is depicted in figure 6 below.

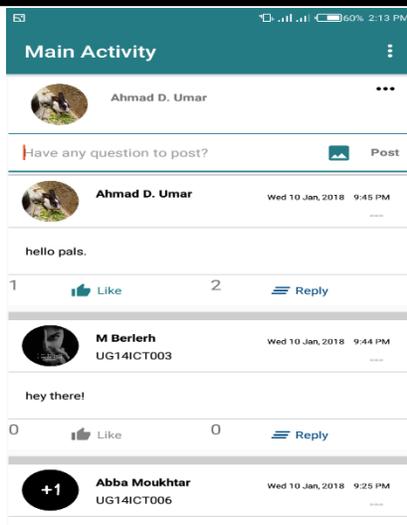


Figure 6. Conversation Interface

Design and Architecture of the Tool

I. Use case and Activity Diagrams

Use case and activity diagrams of Unified Modelling Language (UML) have been used in coming up with the graphical representation of the tool. Use case diagram provides a high level description of the system and how it interacts with its users. It gives a full identification and clarification of the system's requirements through depicting the main components and how they interact with users. The online forum has two users as depicted in figure 7 below. The users can interact with the tool registration, login, profile setup, posting messages, replying posts, etc.

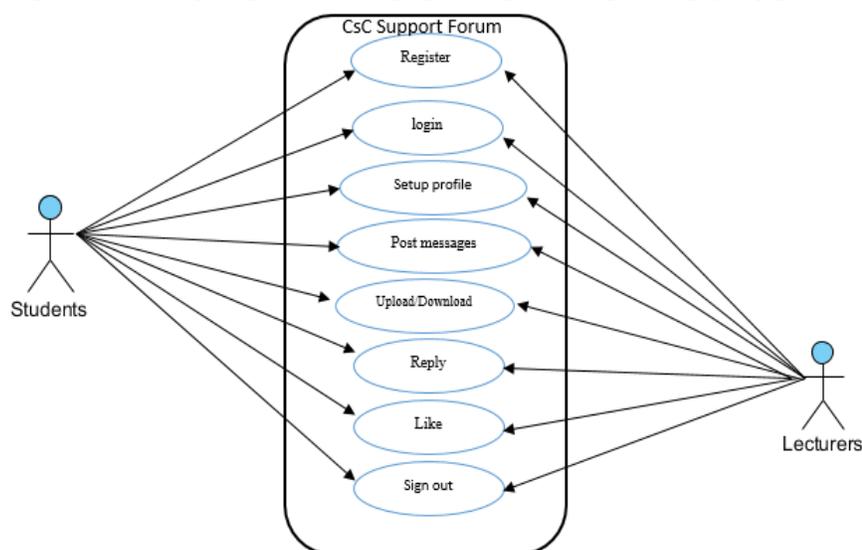


Figure 7. Use case Diagram

Activity diagram is used in depicting the dynamic aspects of the system, in other words, it is used to visually present the flow of activities involved in the system. Figure 8 below describes the flow of activities of this tool.

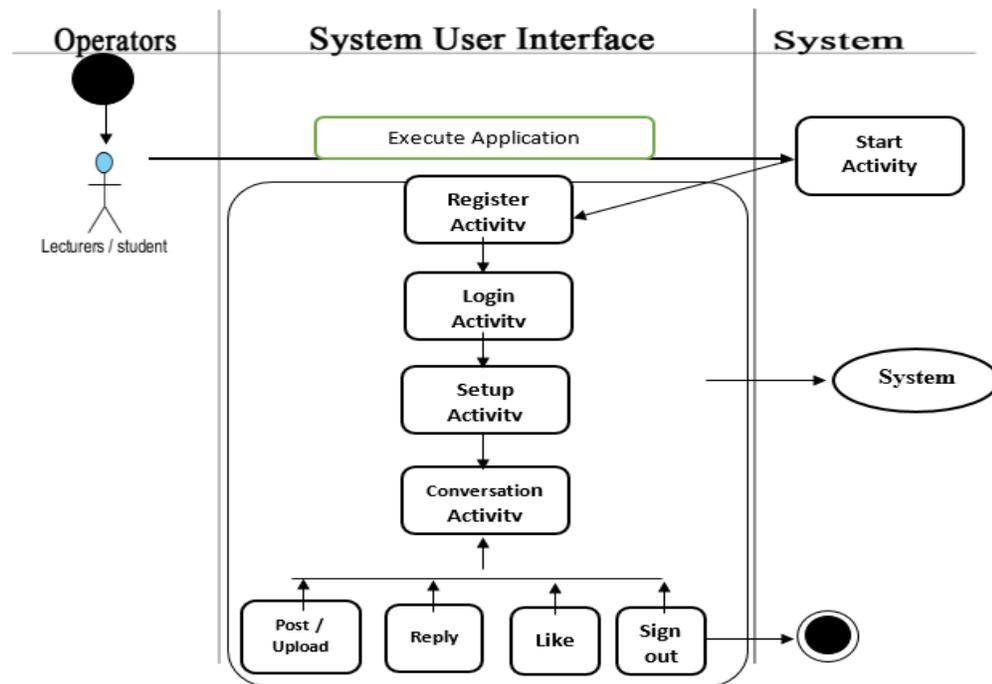


Figure 8. Acitivity Diagram

II. Database

In this tool, Firebase database is used for storing information. Firebase is a real time cloud-hosted database provided by Google offering a number of different features [7]. [7] further states that, with Firebase, there is real time synchronization of data across all clients and it remains irrespective of being online or offline. With this database, users can be able to post messages while offline, the moment they get connected to the internet, the local messages are synchronized with the remotes updates resolving all conflicts automatically.

Firebase database is a NoSQL database that provide a real time way of storing information as JavaScript Object Notation (JSON) objects in form of key-value pairs and retrieving it in a fashion contrary to the tabular relations (tables or records) of conventional relational databases [7, 8]. JSON is a language independent textual data exchange format that can be effectively generated and processed by machines, and intuitively read and write by humans [9]. Figure 9 below depicted JSON tree holding the data of this tool.



Figure 9. Sample JSON Tree

Discussion and Future Work

As already pointed out, traditional mode of learning is marred with so many problems that lead to ineffectiveness concerning student-to-student and lecturer-to-student communications involving: cancellation of lectures due to some out of the blue circumstances; important notices concerning assignments and tests; sharing of past question papers for examination purposes; and most outstandingly, getting answers of perplexing questions from students or lecturers. This clearly signaled the need of modernizing learning activities to agree with current technological trends. Automated means of handling these important and hard-to-manage activities will apparently reduce to bare bones the entire learning process as proven by the results presented in this paper.

In the future, we anticipate integrating Level Coordination as part of the functionalities of the tool. In addition we also envisage implementing one-to-one and one-to-many form of communications in the subsequent version of the tool.

References

- [1] Shackles, "Introduction to Android," *British Computer Journal*, vol. 1, no. 9, pp. 1-28, 2016.
- [2] M. A. Gerosa and D. filippo, "" is the unfolding of group discussion a pattern ? Improving coordination support in educational forums using mobile devices," *Computers and Education*, vol. 54, no. 2, pp. 528 -554, 2010.
- [3] Mrs. M.S. Malkar, "An Android Application for Smart College," *International Research Journal of Engineering and Technology (IRJET)*, vol. 5, no. 02, pp. Page 2199 -2201, 2018 et al.
- [4] Jadhav Komal , "Android Based College Notification System," *International Research Journal of Engineering and Technology (IRJET)*, pp. Page 1768 - 1770, 2016 et al.
- [5] Vineet Singh , "Android Based Student Learning System," 2015.
- [6] Baiju Kumar Jha, "Technical Discussion Forum," *International Research Journal of Engineering and Technology (IRJET)*, pp. Page 655 - 658, 2016 et al.
- [7] Firebase, "Firebase Realtime Database," Google, 13 April 2018. [Online]. Available: https://firebase.google.com/docs/database/#looking_to_store_other_types_of_data. [Accessed 18 April 2018].
- [8] R. T. Mason, "NoSQL Databases and Data Modeling Techniques for a Document-oriented NoSQL Database," in *Proceedings of Information Science & IT Education Conference (InSITE) 2015*, Florida, 2015.
- [9] Tutorials Point (I) Pvt. Ltd., JSON: Javascript Object Notation, India: Tutorials Point (I) Pvt. Ltd., 2017.