

Android based Secure Exam Management System to Prevent Impersonation

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Abstract – Nowadays the users of android mobile are increasing rapidly, the works done by PCs are being implemented in smart phones. So E-learning is enhanced by M-learning. However, managing the exam and providing the security in open environment where each student has his/her own android device connected to a Wi-Fi network through which it is further connected to the internet can be a most challenging task. In such environments, various vulnerabilities may occur which may violate the exam such as students can exchange information over the network during exam time. Hence this paper aims to identify such vulnerabilities and provide the appropriate security services to ensure exam security.

Keywords: M-learning, Exam Engine, Android, Pinning, Exam Security.

I. INTRODUCTION

In this paper, we describe about an android application for managing the exam and making it secure from various vulnerabilities that may violate exam security in m-learning environments and to design the appropriate security services and countermeasures that can be put in place to ensure exam security.

Here we propose different technologies to provide the security such as proctor based strategy to prevent impersonation, random description of questions and answers options, random capturing of photos of students during exam to prevent form exchanging their mobile phone with each other, pinning and unpinning technology to prevent the student from accessing other application and so on. The main objectives of the proposed work are:

- provide the exam management system through android smart phone.
- prevent from impersonation.
- provide portability in exam management.
- manage the exam securely.

The remaining paper is mapped as follows: In section 2, we briefly explain about the literature survey. Section 3 deals with our proposed model while we designed section 4 to deal with the implementation of the proposed model. Finally, the conclusion followed by the references referred.

II. LITERATURE SURVEY

Sanjay Kumar Singh, Arvind Kumar Tiwari deals with the algorithm of auto generating test paper, and discusses the security of the system [1]. Here the online exam is based on B/S structure in which the server is broken into database server and application server. They used algorithm for Auto Generation of Paper.

Deepankar Vishwas Kotwal, Shubham Rajendra Bhadke, [2] the Online Examination System is efficient, fast and reduces the large amount of material resources. This system used HTML, JAVASCRIPT, JQUERY, AJAX, JSP and MYSQL database which may be deployed on either on Internet or Intranet. Also this system supports random question display at a time, solution to the issue of security and cheating for online exams.

Yushuang Dong, Yingqun Liu, China, [3] reviewed the research on the mobile learning and introduces the development of smart mobile technology. This paper integrated the mobile learning platform into the web-based learning system, making a depth fusion of mobile learning and web-based learning. With the utilization of mobile learning, learners' multiple terminals can log into the mobile learning platform, and learners can freely switch between different terminal devices.

N.Sendhil Kumar, Agarapu Raghavendra [4] proposes a framework that gives security to enhance online Examination by using DMZ Concept in firewall innovation. DMZ is one of the fundamental idea in a Hardware Firewall and their use in upgrading security in online Examination framework. This paper examine the execution of online exam concerning the security given by the firewall innovation.

III. PROPOSED SYSTEM

This section deals with the proposed system. To overcome the disadvantage and problems with web based exam management system, we are proposing the exam management system based on android and providing various securities to prevent from vulnerabilities that may violate exam security in m-learning environments.

Securities mechanisms we use are as follows:

- Proctor Approval Based Strategy

- Providing software token to verified student to prevent the “Unattended Exam” Issue.
- Capturing photo of student randomly to prevent from exchange of mobile during exam.
- Pinning and Unpinning functionality destroy of student activity after app is minimized to prevent from accessing other documents or browsing.

3.1 Proctor Approval Based Strategy:

This strategy best suits the case in which we have a small number of students and the proctor is familiar with them. Once the student logs in to the exam system, before he/she gets enrolled into the exam, his/her name will be populated in a list shown in the proctor’s mobile device through the Exam Enrollment Confirmation Interface. The proctor has to physically check that all students whose names are listed are present in the dedicated class room to approve their enrollment request accordingly.

3.2 Providing software token to verified student to prevent the “Unattended Exam” Issue:

This strategy is applied to provide a token to student which is verified by proctor. After physical authentication of student, proctor verify the student and send token to verified student then only student can start the exam on appropriate subject.

3.3 Random distribution of questions and answers options:

The questions and answers options will be randomly distributed to the student so that students during the exam cannot copy from each other. Hence this approach helps to provide the secure exam management system. Moreover, the multi-choices of each question, in case of objective questions, will be flipped randomly and delivered differently to each student.

3.4 Capturing photo of student randomly during exam:

This strategy captures the photo of student during the exam to prevent from exchange of mobile. That means during the exam, the students who are sitting together or near they can exchange their mobile with each other and can give others exam. So to prevent from this type of activity we are implementing Capturing photo of student randomly during exam.

3.5 Pinning and Unpinning strategy:

Another problem in exam management system in m-learning environment is that during the exam the student can minimize the exam application and can chat, open any document or browser to cheat in exam. So to prevent from accessing such type of information we use the Pinning technology. In Pinning technology the screen of the exam system will be pinned up. So student cannot come out from application simply. If the student comes out then he/she need to be approved from proctor again.

IV. IMPLEMENTATION

The Architectural diagram of the proposed system is shown in the figure below:

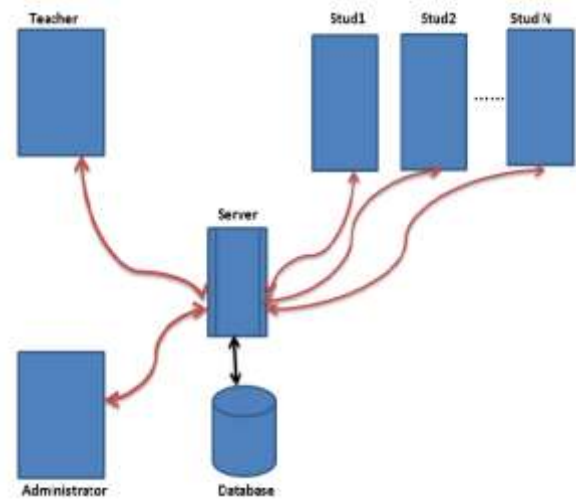


Fig. 1 Architecture Diagram

As shown the figure Fig. 1, we have various components grouped together comprising various modules of the system. Here, we discuss about working of those various modules and their interaction.

4.1 Administrator:

This module describes about the functionalities of the administrator in our application. Administrator has the functionalities such as adding proctor, adding students, adding subjects, adding the set of questions and answers options and maintaining all these information in database. So this module is very important and plays important role to operate the application.

4.2 Proctor/Teacher:

Proctor module describes the functionalities of proctor or teacher in our application. Proctor is a person who will be present in the exam hall and will monitor all the students who are giving exam. Proctor first authenticate the student physically and verify the student which send software token to the appropriate student by clicking it, student can start the exam. In between the exam, Proctor can see the photos of student that are taken randomly during the exam to ensure that student are not exchanging their mobile during exam.

4.3 Student:

Student module is about the steps to be taken by the student to attend the exam. First the student needs to be registered. Then student logs in to the system, books the exam. Then proctor verifies the student then only the student can start the exam.

After exam is finished, student can see the result and then he/she can logs out.

4.4 Server:

Server is another important module. This module maintains the database. Database is used to store all the information of users i.e. administrator, proctor, students and all required data such as set of questions, answer options, set of subjects etc. So server accepts different requests from the client application and responds them.

The Activity diagram is as shown in fig 2 which shows the complete flow of operations in our proposed system..

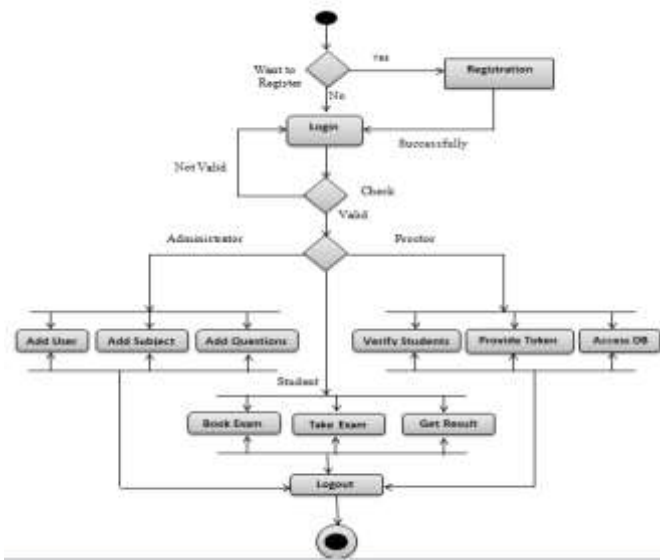


Fig. 2 Activity diagram

V. OUTPUT SCREENS

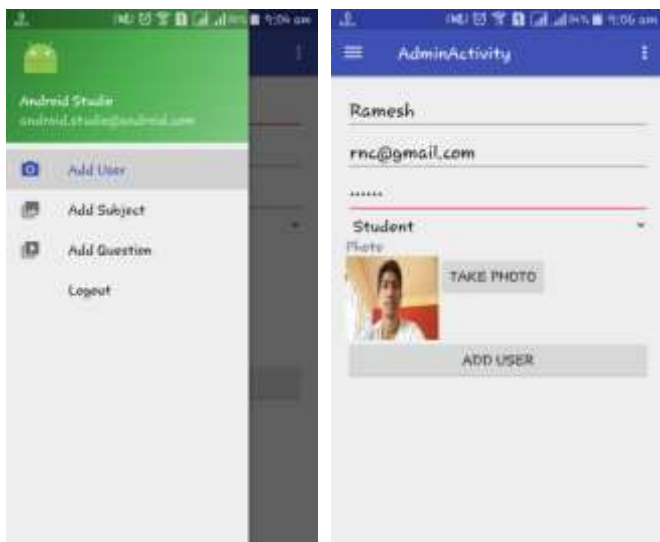


Fig 3 Screens of Administrator Activity

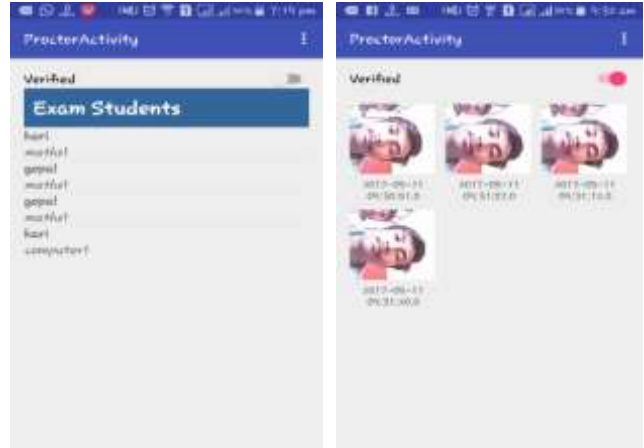


Fig 4 Screens of Proctor Activity

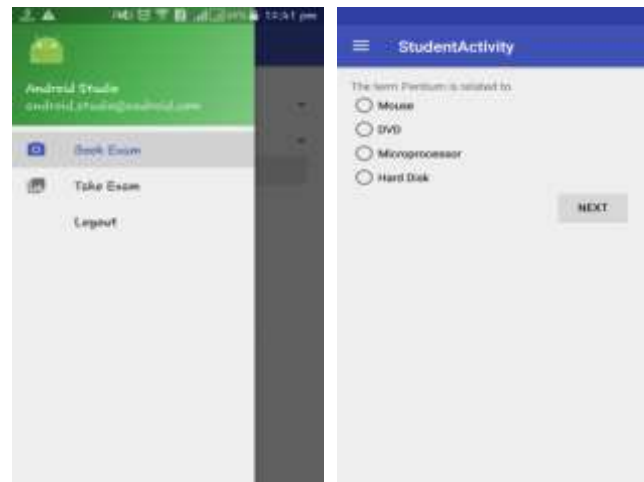


Fig 5: Screens of Student Activity

VI. PERFORMANCE GRAPH

Fig 6 shows the performance evaluation graph. In X-axis we have plot number of students and performance percentage in Y-axis as shown in figure below. We have tested our application over 20 students and we came to know that when the number of student increases the performance of system is degraded due to of network overload. Since we have used tomcat as server which has less capacity, so we cannot deal with more number of users.

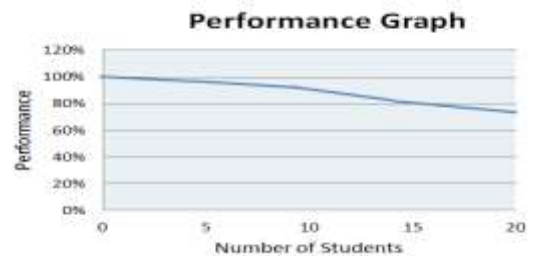


Fig 6 Performance Evaluation Graph

VII. CONCLUSION

We propose the design of a Secure Exam Management System to mitigate the exam security threats that may exist in m-learning environments. We have successfully provided the services for security. Secure and Random distribution of questions and answers was implemented successfully. Also random capturing of photos is provided which prevented exchanging the devices between the students. The pinning and unpinning function which restricted the students from browsing other services during the exam are also implemented. And the main function is that student cannot simply write the exam he/she should be verified by the teacher/proctor by long press on the student who had booked the exam.

VIII. FUTURE ENHANCEMENT

Future work is expected to be done biometric security for conducting more secure exam. We will also add the automatic time counter function for time limit in exam. Also in future we will make the design part more attractive. We will further add the NFC card for each student to enter examination center.

The signature of respective student is stored in the NFC card. In future we propose to provide security on the networks.

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