



Enhanced Secure Authentication Based SEMS with Improved Security Model

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ABSTRACT: Mobile Based Exam Management Systems (MEMS) is an effective process carried out in educational systems. This paper proposed mobile based online examination that processes the automatic grading of the students. It facilitates the exam processing, collecting the answers, submitting the answers, generating the reports etc. It supports both offline and online examination systems. Behavior based biometric authentication is used for validating the authorized users. In order to prevent the user's impersonation, the behavior based authentication process is carried for validating the authorized students in m-learning environments. This system could help lecturers, instructors, teachers and others who are willing to create new exams or edit existing ones as well as students participating in the exams. Experimental results have shown the effectiveness of the proposed systems.

KEYWORDS: m-learning environment; behavior biometrics, online model; offline model and educational systems.

I. INTRODUCTION

Generally, the social users are easily pliable to the new technologies in which wireless technologies plays a vital role in day-to-day life. The advent of wireless technologies has been introduced to the educational systems [1]. The exploration of the mobile learning system is different from the traditional learning systems. The gaining of knowledge via mobile communication is known as distance education systems. The traditional classroom environment should possess network services so as to access the data from anywhere. In fact, there exists a difference between normal learning and mobile learning. This type of wireless environment achieved great success towards the educational systems. It is also more precise than the conventional class system. With the mobiles, the students can access the required data in any form with the desired results [2].

It is also reported that m-learning is not only descendant of e-learning with different philosophy and science. The model used for desktop and laptop machines are not utilized for the mobile devices. Right from the information presentation, instructional design, graphic and user design etc are entirely different for e-learning and m-learning environment. Though, m-learning has reached its popularity, there are still pitfalls in this environment [3]. The misuse of the mobile technology affects the performance of individual learners. The threats like data stealing, m-learning and their services.

Therefore, the issues of security and privacy in the m-learning realm are expected to be quite different from those confronted in legacy e-learning systems. For example, when focusing on privacy, the involved parties may be especially worried about the use of sensitive personal data collected indirectly (e.g., without the implicit user's consent) such as mobile phone number, IP address, location data, International Mobile Equipment Identity (IMEI) [4], unique phone ID, and so forth. Similar concerns, but for security, apply to usual learning activities like those of e-examination which may be totally uncontrollable under the m-learning setting. Responding to the aforementioned needs, so far, several researchers have identified security and privacy issues especially for the m-learning ecosystem [5].

The rest of the paper is organized as follows: Section II depicts the related work; Section III presents the proposed work; Section IV gives the experimental analysis and concludes in Section V.



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II. RELATED WORK

This section presents the prior works carried out by other researchers. The author in [6] depicted a design oriented flexible online exam management systems. The design will automatically set questions for each student and measure the ability of certain area of their student. By doing so, they could efficiently found the performance of the student and their loss of motivation. The answering of difficult questions over their ability is dismissed from the design. The questions are selected for the student gains and to view their competencies in more effective way. Though, it provided better and flexible environment, it fails to support distant learning model. The author in [7] depicted an online educational system model that makes use of two approaches, blog mining and traditional literature search. They also deliberated the next generation of an online education system: a safer personal learning environment which needs a one-stop solution for authentication, assures the security of online assessments, and balances security and usability. The author in [8] discussed about the information security in e-learning environment. The paper helped to discover the information threats in the e-learning environment. They also discussed the pitfalls of the existing techniques. The author in [9] discussed about the e-learning in web 2.0 technologies. The students developed MashUps for each lesson and they intuitively studied their lessons. Information security management was contributed to make secured e-learning environment.

The author in [10] discussed about security in collaborative e-learning environment which discussed the identity and social aspects of the security. Fully editable websites are easily accessible, require no software and allow its contributors to feel logic of responsibility and ownership. The difference between two wiki studies whereby one group employed user login and the other maintained anonymity throughout the course of the study. The results considered the independent participation and evolution of the work requirements over time, which in fact determines the non- validity of identification. The author in [11] focused to predict the secure communication between teachers and students with the security countermeasures. They also discussed the limited the no. of submitting the answers. Monitoring the offline exams is the biggest issues that have to be 6667analysed between teacher and student [12]. This will effect has direct impact on online exams when students may have little contact with their teachers.

Recently developed web-based commercial courses have been used by the latest educational systems [13] such as WebCT, in-house developed software etc. The existing web-based learning models possess online courses that stratified easy accessibility and simplified exam managements. Webcams [14] are used for preventing the threats during online exams. Thus, the group mediated communications to ensure the secure communications of its different group members. Public key infrastructure [15] has been deployed in inter-communications under variant Diffie-hellman keys. Concurrently, they have also deployed the symmetric key with secure intergroup communications.

III. PROPOSED WORK

This section depicts the workflow of proposed model. The proposed model is explained via four modules:

a) Authentication module:

Authentication module is the first module of our proposed work. This process enables to find the authorized user of the smartphone. Generally, the authentication process includes three actions, namely, knowledge based, possession for object based and biometric based actions. It is a general process that prevails between users and smartdevices. Continuous authentication is the process of biometric based authentication system to verify the authorized user of the systems. At first, the analysed6667 of the user is 6667analysed. The 6667analysed data is further used for building authentication models. The constructed authentication model is applied over the legal users. To obtain successful logins, there is difference between passive authentication and entry-point authentications. Secret gesture is defined by moving a finger over the screen to create a certain pattern. This pattern can be used as authentication to allow the user to enter the device.

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b) Student module

Student module is developed from the client side. In order to precede the exams, the students initially get register with Online Management Systems. Once the registration process is completed, the login credentials will be further used for writing the exams. After the exam completion, the secret key is generated for each user which is unique in nature. By doing so, the student can maintain the exam schedules and the results. This secret key will be further used for viewing their results. To prevent impersonation, we recommend the adoption of a well-known biometric-based authentication technology, such as face recognition, to serve as a supplementary access key.

c) Teacher Module

Teacher module is also developed from client side systems. It views the results of the students. It sorts out the exams process and intimate to the students via Whatsapp. The staff can update the information regarding the student's attendance, internal marks of the students and any information regarding the subjects they handle. They can also view the student details for better understanding the student performance and improving the efficiency of the student. The staff also gets the updates from the college regarding any events occurring in the college. They can also get the notifications from the placement cell and exam section.

d) Admin Module

Admin module is developed from server side using PHP language. The tasks of admin module are the viewing the student credentials, removing the student name after the exam completion, viewing the student's results etc. It also ensures the secure channel between exam servers and student's mobile devices. A shared key is established between two entities in order to make secure communication. The exam server delivers it services only when the student id matches with the registered ID. Master Shared Key (MSK) is generated for activating the student's web page.

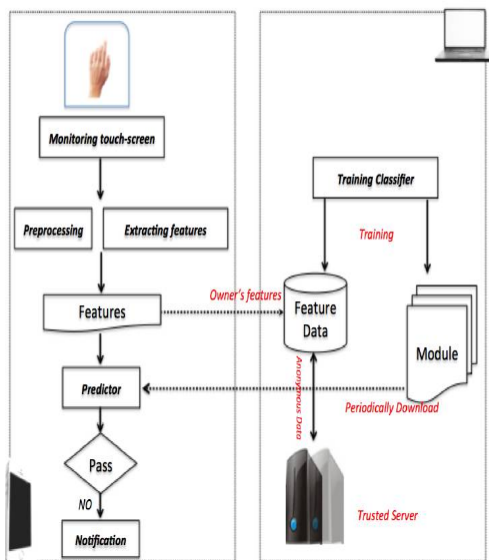


Fig.1. Proposed architecture

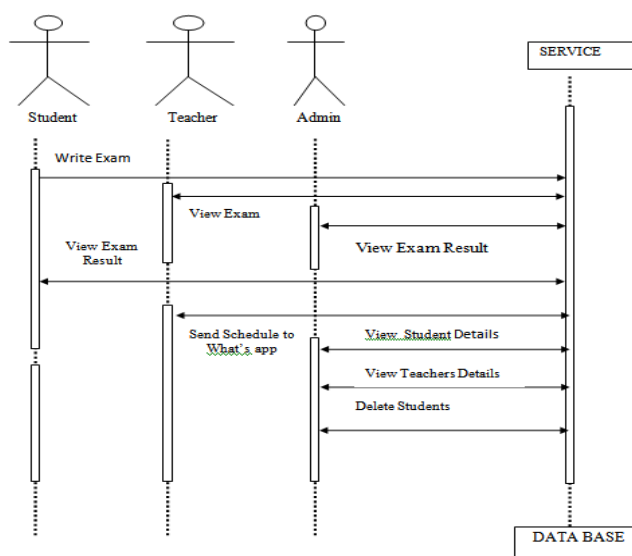


Fig.2. Sequence diagram of each entity in Online Exam management systems

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IV. EXPERIMENTAL RESULTS

This section depicts the experimental analysis of our proposed Online Exam Management Systems. Using Android 2.3, the proposed system is designed with better GUI.

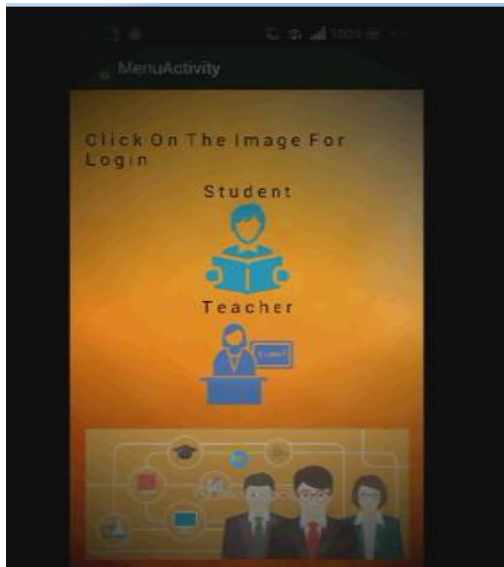


Fig.3. Main activities of proposed management systems

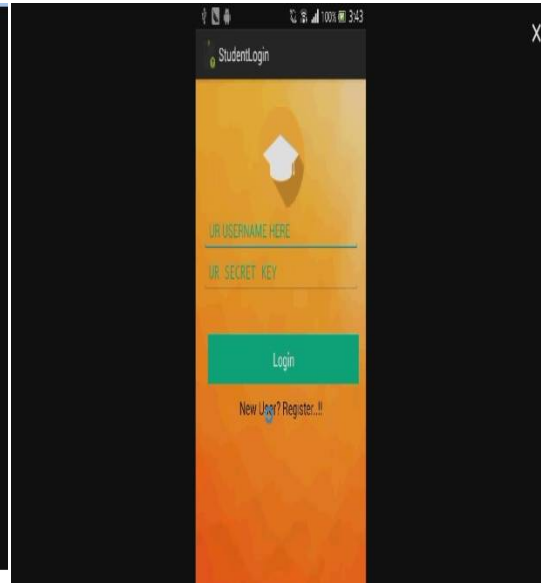


Fig.4. Student's Login using their credentials produced at registration phase.

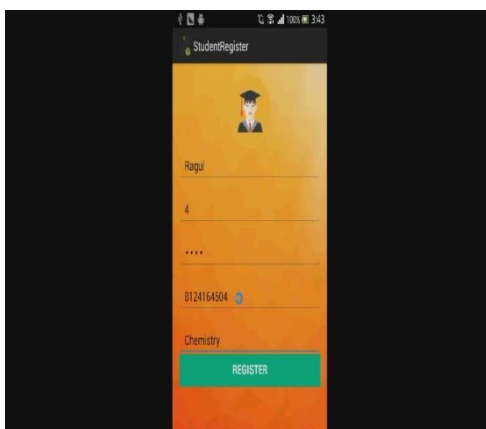


Fig.5. Students registration process

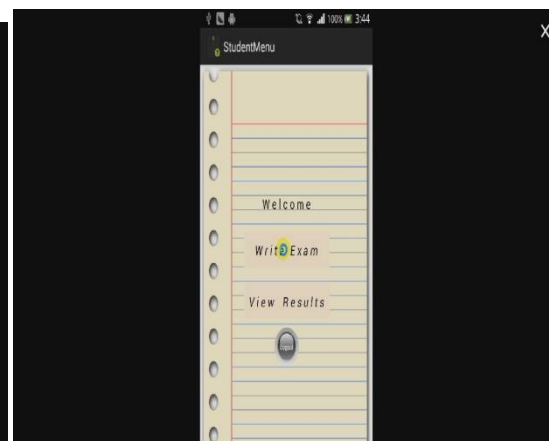


Fig.6. Credentials given for student entity

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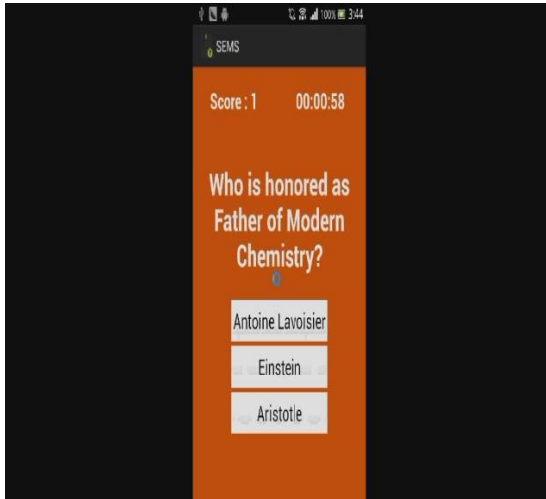


Fig.7. Sample questions for students

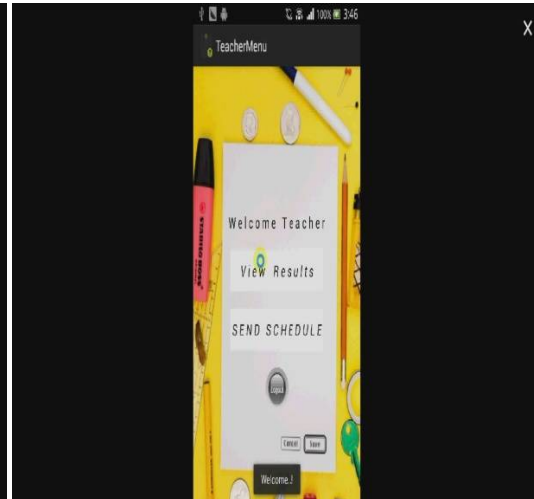


Fig.8. Credentials given for teacher entity

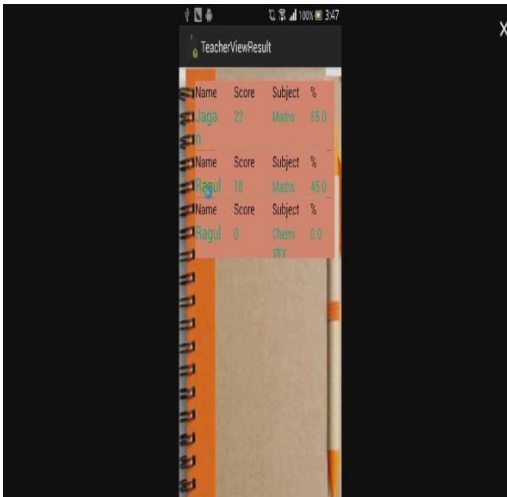


Fig.9. Viewing the results of the students

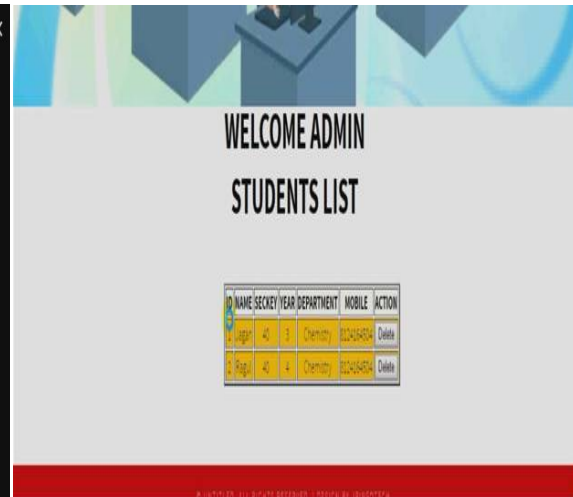


Fig.10. Administrator viewing the student details and removes the secret key once their exam process is completed

V. CONCLUSION

In this paper, mobile-based examination system has been studied. The features involved in conventional EMS are transformed into mobile based e-learning systems. It also concludes that the presented system saves instructors time on grading works. And students have explored themselves and accessed a larger variety of exams than before. Taking advantage of auto-grading system, instructors may not only add new questions in question bank, but also grade students' answers automatically. Behaviour based biometric authentication is used for validating the authorized students. This system could help lecturers, instructors, teachers and others who are willing to create new exams or edit existing ones as well as students participating in the exams. Experimental results have shown the effectiveness of the proposed systems.



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BIOGRAPHY



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