Simulated education system using IOT

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Abstract — *Almost all of the data testing systems are applied as paper-based. There have been numerous studies to apply exams online and perform the measure and analysis processes through laptops since technological means that like computer and net are wide employed in academic activities. In these exams, students take tests either on a written document and place their answers on a sheet; or they answer them on a computer display screen. Besides, in these sorts of exams, all candidates are required to answer the same questions in exams. M-Learning has increased the e-learning by making the learning methods learner-centered. However, enforcing exam security in open environments where each student has his/her device connected to a Wi-Fi network through which it is further connected to the internet can be one of the much difficult and challangening work. In such environments, candidates can easily exchange information over the network at time of exam in the exam hall. This project aims to identify 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 assure exam security. It additionally aims to integrate the resulting secure exam management system with an existing, open source and wide accepted Learning Management System (LMS) and its service extension to the m-learning environment, particularly "the Moodbile Project".*

Keywords- *Access control, e-learning, exam engine, Learning Management System (LMS), m-learning.*

I. INTRODUCTION

E-learning is the new technique of learning and it depends on the Internet in its execution. Internet has become the venue for a new set of illegal activities and E-learning environment is exposed to the threats. E-learning has experienced such an extraordinary growth over the last years that its global industry market is estimated to be worth USD 91 billion. Learning Management Systems (LMSs), due to being essential tools of e-learning, have been adopted by many organizations to establish and provide access to online learning services. Nowadays, the success of LMSs is so great: 74% of the US corporations and educational institutions currently offering e-learning employ LMSs in their training programs. Thus, LMSs should amendment to adapt to `new user necessities and technologies. As an example, interaction with external applications, such as social networks and mobile applications must be incorporated in LMSs to facilitate personal learning demands that happen anywhere and at any time. M-learning puts the control of the learning process in hands of the learner itself and enhances collaboration and adaptability.

Learning Management Systems (LMSs), due to being essential tools of e-learning, have been adopted by many organizations to establish and provide access to online learning services. From student's point of view, m-learning could personalize their learning process as well as enable them to collaborate with other students or teachers. From teacher's point of view, they could continue to use LMSs as their working platform, leaving mobile devices for students. The problem, however, is that the integration between m learning applications and LMS is not an easy task. Indeed, LMSs do not generally contain interoperability standards to communicate with external applications; they are usually designed as monolithic or layered systems. Enforcing exam security in open environments wherever every student has device connected to a Wi-Fi network through which it is further connected to the Internet can be one of the most challenging tasks. The Quiz Engine embedded in Moodle isn't built based on Service Oriented Architecture. It is designed as a bulk of PHP code that has to be accessed through standard internet web browsers that are a unit slow on mobile devices and can't address the exam security issues that exist in m-learning environment. Moodbile services extension to Moodle does not touch the Moodle's Quiz Engine. Thus, we need to design and implement a new Quiz Engine that can be deployed as a service oriented application, so that its services can be consumed by a mobile application designed to cater to m-learning specific security requirements. As well, it should be integratable with Moodle/ Moodbile in order to have a complete LMS which suites the m-learning environment and addresses all of its security issues. In a Wi-Fi based network, we cannot guarantee that each student is going to attend an exam from a dedicated classroom. A student can simply sit in a nearby room and log in to the exam system through the Wi-Fi network. He/she can subsequently open his/her course notes and use it to answer the questions illegally. To encounter this issue, we propose the system which is based on QR code strategy, by which student will able to attempt the exam only when he/ she is allowed by the authorized admin or examiner.

II. LITERATURE SURVEY

1. Designing a Secure Exam Management System (SEMS) for M-Learning Environments
Authors: Mustafa Kaiiali, Armagan Ozkaya, Halis Altun, Hatem Haddad, Marc Alier.
Description:

The SEMS integration with Moodle framework and its service extension Moodbile. Moodle is an open source and widely accepted LMS. Integrating SEMS with Moodle helps to make use of its ready-made and welltested services in other aspects of e-learning that are not related to exam security such as administration, documentation, tracking, reporting and delivery of electronic educational technology. Moodle is designed following the classic three-tier architecture. Presentation Tier is meant for the interaction between a user and Moodle through a web browser. The majority of business logic is located at Domain Tier. Data Management Tier provides database related functionality such as storing or retrieving information.

2. Designing and implementing an adaptive online examination system
Author: Mustafa Yaci, Menderes nal
Description:

The paper present the design and application of adaptive online examination system Adaptive exam systems determine unique and different question sets automatically and interactively for every candidate and measure their competence on a certain area of discipline scrutiny their gains with one another. Through an adaptive examination is an approach, a candidate distraction and motivation loss that is led by the questions with quite lower hardness level than his/her competency is prevented. Additionally, negative effects of questions requiring higher knowledge than his/her competence over a students self confidence and morale are dismissed. Since questions are specialized so that they can allow making clear deductions about student gains, they are able to detect student competencies more effectively. Requiring less total time for measurement and being a lot of versatile within the communicatingmanagement square measure among the benefits provided by the system. Self sufficiency of the system in terms of coming up with, continuation and assessment of the measure method particularly permits itself to be utilized inthe individual education sets. Through this technique, student competencies may be determined a lot of effectively in cases like distant-learning, during which some challenges square measure knowledgeable often.

3. Security Risks and Protection in Online Learning: A Survey
Author: Yong Chen and Wu Hel
Description:

This paper describes a survey of on-line learning that tries to see on-line learning suppliers awareness of potential security risks and therefore the protection measures which will diminish them. The authors use a mixture of 2methods: diary mining and a conventional literature search. The findings indicate that, whereas students have knownnumerous security risks and have planned solutions to mitigate the safety threats in on-line learning, bloggershaven't mentioned security in on-line learning with nice frequency. The variations shown within the survey results generated by the 2 totally different strategies ensure that on-line learning suppliers and practitioners haven'tthought of security as a high priority. The paper conjointly discusses consequent generation of an internet learning system: a safer personal learning surroundings which needs a one-stop resolution for authentication, assures the safety of on-line assessments, and balances security and usefulness.

4. Security in the Online E-learning Environment
Author: Ruth Raitman, Leanne Ngo, Naomi Augar and Wanlei Zhou
**Description:**

This paper addresses the role of security in the collaborative e-learning environment, and in particular, the social aspects of security and the importance of identity. It represents a case study, completed in Nov2004, which was conducted to test the sense of security that students experienced whilst using the wiki platform as a means of online collaboration in the tertiary education environment. Wikis, fully editable websites, are easily accessible, require no software and allow its contributors (in this case students) to feel a sense of responsibility and ownership. A comparison between two wiki studies will be made whereby one group employed user login and the other maintained anonymity throughout the course of the study. The results consider the democratic participation and evolution of the work requirements over time, which in fact ascertains the no validity of administrative identification.

III.PROPOSED SYSTEM

This aims to identify 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 security in exam management system. It also aims to integrate the resulting secure exam system with an existing, open source and widely accepted Learning Management System (LMS) and there service enhanced to the m-learning environment, particularly "the Moodbile Project".

To design a Secure Exam Management System (SEMS) that meets the distinct security requirements of m-learning environments and to integrate it with the current Moodle/Moodbile platform. This will result in a complete LMS that is both equipped with secure exam services and suitable for m-learning. Our intention of integrating SEMS with a well-known LMS such as Moodle is so to get the benefits of Moodle's readymade services in other learning aspects such as course material administration, documentation, etc. which have been experienced and appreciated for the last 15 years. However, the proposed SEMS can also work as a standalone secure exam management system for m-learning environments without integration with Moodle.

IV.SYSTEM ARCHITECTURE
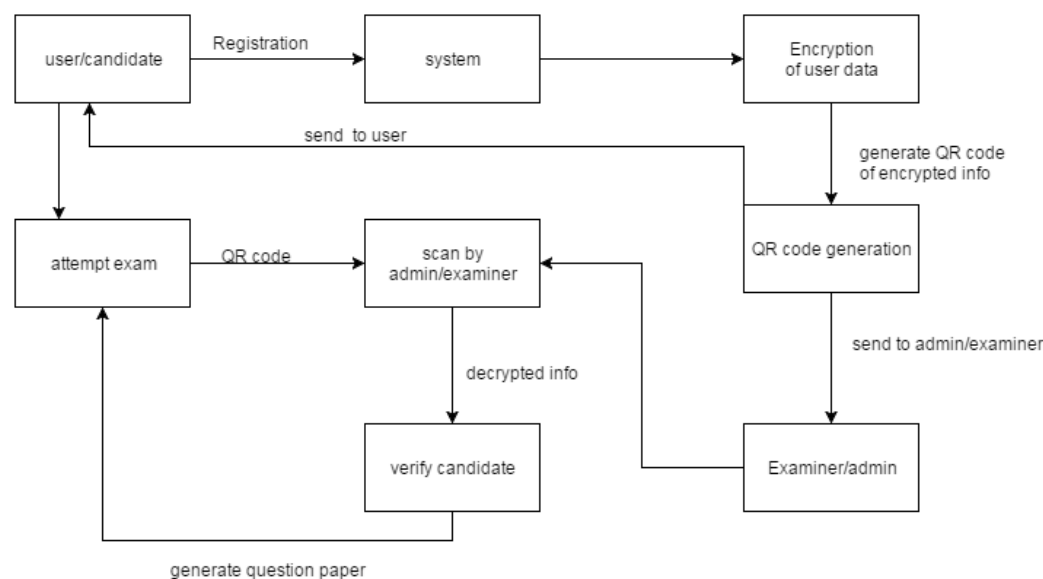
Fig.1 System Architecture

Step1: In this registration phase every candidate or user has to register themselves in order to give an exam.

Step2: After registration the will get an QR code image which is encrypted information of user information. The same information will be stored at the server side for admin/ examiner record.The secret key K is send to admin record, which is used for decryption purpose.

Step3: user will bring that QR code image while coming for exam then, admin. Examiner will scan that QR code image to check whether authenticated candidate has come for exam or not, the verification process done by that user information stored on server or examiner record, upon verified the admin will send the question paper Q to user account.

Step 4: user will login to system, to attempt an exam.

System Features:

    1. **Web Application:**
            In the part the student or candidate will register themselves to the exam system, upon registration they will be provided by a username and password with QR code which is generated by the given information at the time of registration. This QR code will generated by the encrypted information of user details.

The candidate will login to system, to give exam upon allowed by examiner.

2. **QR Code Base Strategy:**

The system will generate the QR code for every student who is attempting to the exam. This QR code will be considered as hall ticket for attempting exam, the QR code contains the information of student/ candidate which has been submitted at the time of registration to the system.

3. **Scanner (Android Application):**

The scanner will be placed at the examiner. The examiner will have standard login details just like admin; apart from this authorized person no can use this application. After examiner or admin login he will scan the QR code of candidate, after scanning the encrypted information will be shown on application. There will a decrypt and verify option, after clicking that button the encrypted information will be decrypted and verified with the database record whether the student/ candidate has been valid registered or not. If yes then admin allow the candidate to attempt the exam.

4. **Random Generation of Question Paper:**

The system will generate the random question paper for each student who is attempting the exam. This system is different from traditional question paper system where the particular number of set of question papers is generated. In this system the student will get the exam paper only when the student is verified and allowed by examiner no matter what time he came for exam.

V. IMPLEMENTATION DETAILS

- *General structure of the system*

The system is composed of three-layered structures:
1. A database for data storage,
2. A server for application and Android application
3. Clients

As database, MYSQL is used since; MySQL database management system is open-coded software and it has enhanced specifications, It uses application server layer which is used to generate the question paper when the admin verifies user by scanning the QR image it should, On the client layer side, it is required to employ a web browser (Internet Explorer, Mozilla, Opera etc.).

To develop Online Exam system, a server based and fast JSP servket programming language is preferred. For the developed software, Apache is used as a web server which is a strong, knowledge and the flexible HTTP (Hyper Text Transfer Protocol) server and the open-coded programming language. The web server is a software sending the pages stored under the web address you are connected to. In the adaptive web-based exam system, JavaScript language is used to allow dynamic user access; to let it probed in the same page; and to perform tasks such as presenting resting time for the exam.

To develop a scanner i.e. android based application. An android studio version 1.5 onwards IDE (Integrated Development Environment) is used with SDK (Software development kit) which contains android plugins, theme plugins etc. which are used to implement the application.

- *Database design*

The database infrastructure is carefully emphasized in terms of circulation and recording processes i.e. insert operations of data through the web-based exam system. The database is designed to compile the largest amount of data by using minimum amount of system source while it is keeping all data safe.

Main tables in the system are Courses, Questions, Students, Examiner, Administrators, Semesters, and Results. Additionally, there are auxiliary tables of Student_Course, Semester_Courses, Exam_Questions, Student_Answers etc.

VI. CONCLUSION AND SUMMERY

Introduced the design and implementation of a Secure Exam Management System (SEMS) to mitigate the unique exam security threats that exist in m-learning environments. SEMS offers many exam services such as: secure and random generation of exam question papers with options to those questions respectively, turbo-mode assessment, prevention of the unattended exam issue, biometric-based authentication service for ant impersonation, preventing candidates from exchanging their answers during an examination is running, conducting exam securely through online or offline

strategies, and auditing. We are using the QR based strategy to authenticate the student who is attempting the exam in the exam hall by the examiner who has the unique android based application which can scan the QR code to validate and allowed the student for exam.

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