

Online Virtual Subjective Examination System Based Under Ubiquitous Cloud

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Abstract: *With the advancement in the field of information and communication technology, must change in the traditional examination system. Today, the online examination conducted is for an objective phase, but no provision is there for subjective phase that is a sort of liability in the current examination system scenario. The proposed methodology deals with this that and introduces virtual subjective exam system. In this paper, the proposed architecture for online subjective virtual examination system based on ubiquitous cloud is developed.*

Keywords: Online Exam, Virtual Answer sheets, Tablet, Cloud Computing, subjective.

1. Introduction

The traditional examination system is facing the problem of delay in evaluation system as per the prescribed deadline. With reference to Savitribai Phule University of Pune (SPUOP) examination system, students are used to writing the answers on paper answer sheet and fulfill the formalities as per the details ask on its first page. The supervisor has to use additional stationaries such as a holograph sticker, barcode sticker, supervisor's report. This makes overhead of additional usage of paper. All the answer sheets then submitted to SPUOP are packed in bundles that are expensive and vulnerable to loss or theft. Papers are then forwarded from SPUOP to respective (CAP) centers. At the time of evaluation of papers, evaluators have to evaluate the allocated paper at individual CAP centers till all answer sheets get checked. Evaluators associated with the SPUOP may or may not be residing to the nearby CAP centers. They are spending more time in travelling to reach the respective CAP centers which result in less ample of time for checking answer sheet. This leads to delay of examination results that are lagging behind as per prescribed schedule. With the technology of computer and communication media on the rise, a change in this traditional method of examination to virtual online subjective examination can be brought about. Rajasthan Technical University (RTU) has taken a step in the direction to convert this traditional system to a digital one. In this online system, the answer sheets will be scanned using high-resolution scanners and images will be uploaded in the database connected to the server. A scanned version of the papers will be sent through mail or can be accessed through accounts on the server at regional evaluating center. The system having the provision to check the digitized answer sheet by comparing them with answers listed in the database and evaluated marks can be submitted online. This system requires scan answer sheet that is very tedious job. As per this RTU, nearly 35 lac answer sheet need to be scanned. Thus, the proposed system targeting on the generation of virtual digitized written answer sheet. The proposed system consists of entities like tablet, stylus, router, server and wireless fidelity (WiFi) communication network. In the proposed scenario students are being provided with a tablet and a stylus to write on the virtual answer sheet after necessary authentication. The written virtual answer sheets are being migrated from tablet to the

central repository that is located in eucalyptus private cloud in a secure manner. This is very efficient and effective way to provide input to online evaluation system.

2. Related Work

Cloud computing is emerging the technique that is been find by John McCarthy in year 1960. After a various refinement and modification this technology has been come with various platform like Infrastructure as a service (IAAS), Platform as a service (PAAS), Software as a service (SAAS). Three systems are working under SAAS. Tarkeswar Prasad et al., 2012[2] have published an Architecture on Online Examination System. As per their work their steps have been focused on student registration and monitoring system with digital camera. Their system has sufficient access policy to the students for authorized access. PAAS provides application development and deployment tools for developing the system, business intelligence for student performance and also integration and testing of the system. NAAS provide virtualization by using tolls like VMware. This will make the internal working of the system. IAAS is sensitive layer of cloud. It contains physical data centers where data like logging information, question pool and their answers, multimedia data and score of the candidate are stored. The application developer and cloud service provider have access to all the three layers of cloud architecture. The system is generating examination paper automatically provided that each question paper will have different issues that are fetch the form the question database pool randomly so that no two examinees will get the same set of questions. But the system is available only for objective type examination. The proposed system gives efficient way to conduct online subjective examination.

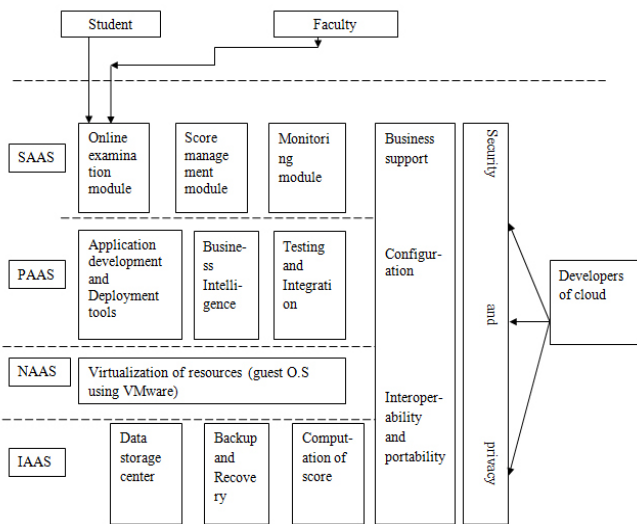


Figure 1: Architecture Diagram

G.Ganesh Sriram, et al., 2013[1] have developed the interface is developed such that it helps students to use various learning based services using cloud based functionalities. The user interface are designed in such a manner that students get the services like videos of various lectures conducted, theory sessions, e-books and the chat room is provided to facilitate communication between many participants at a time. The user interface for teachers includes information related to academic references, correction of homework and services like interaction with staff members also.

Sachin G. Deshpande, et al., 2001[3] has presented a paper on the design and development of a real-time interactive virtual classroom multimedia distance learning system at the University of Washington. Digital data is available freely on the internet, and it's easy for the people to access information on the go for their benefit. A real-time interactive virtual classroom allows users or participants to access live video, and audio feeds present in the different location to people who are at completely different location for delivering seminars or lectures on a particular topic. They have provided extensions that consist of encoding algorithms to handle the handwritten text video. Their method results in decoded video frames which can be read very clearly when encoded at low bit-rate. By synchronizing various previous videos and lectures taken in the class, the tool is designed to properly simulate these and allow people to access it whenever they want to have a look.

ZhangAiHua et al. 2010[4] has proposed U-learning environment that allows study based resources and other educational features to be provided to students and staff members under a ubiquitous cloud. Their system analyses feature provided by the ubiquitous cloud and the u-learning environment which translates into a combined power to support e-learning based methodology.

Alwin Castro et al. 2013[5] have presented a possible way of building a ubiquitous computing infrastructure. Their approach targets computer labs where the students and staff members are provided with services related to the ubiquitous cloud which will keep the focus on the teaching learning process. The system adheres to unobtrusiveness that is an

important part in a ubiquitous cloud. Such a ubiquitous system helps in consuming less power required in the lab and reduce carbon foot-print helping the ecological balance.

Carla A. Romney, et al., 2011[6] have given the services of tablets and touchpads which provides various technological advancements required and necessary in educational fields. Usage of tablets and other computing devices have made an impact on the way the educational work is conducted. They have implemented a way to track and study to understand the impact of this technology on students. The most important finding is that students who used tablet pc's for their academics continued for the entire term whereas the responses gradually increased for the students who were not been using tablets for the educational purposes.

Sungkur et al., 2013[9] proposed a method of cost cutting by avoiding the physical based examination. This system allows a lesser time for the students to view the results of the respective examination they appear for. Authentication of examinees is done for security purpose. This paper showcases a mechanism which allows the student to be identified about his legitimacy. Method of authentication and its strength and weakness are described.

Basar et al., 2014 [10] proposed an architecture which provides host of features like that of scalability, flexibility and security which are used in business object architecture. A computer assisted examination system is used for the examination purpose.

Li, Xiao -Feng et al., 2013[11] proposed a method directed to open universities and autonomous colleges located in China. In traditional online examination system huge amount of data is stored in the database as the number of students who are appearing for the examination are in lacks, so the efficiency of the system is hampered because of slow processes and execution. Thus, the algorithm is used named as APRIORI based on parallel programming model which computes the data in a reliable and efficient manner.

Best, et al., 2013[12] proposed system that allows individual parts of past examination papers to be submitted to a search engine. Animated and online lectures are features for the narration used by search engines in the digital design. This allows the system to recommend students those slides that are important for their examination. How the online lectures take place and what are their benefits are describes in the paper. The search mechanism is based on a conventional term frequency-inverse document frequency scheme. This procedure allows students to view the results and then define the objective on how to evaluate their individual performances.

Wang En Dong, et al., 2013 [13] proposed a method for Monitoring Model of Cloud Computing Resources Availability. There are many applications which help in providing key services for the cloud computation. So the availability of cloud computing services turns to be higher and higher. A monitoring model was established for the resource availability in the cloud domain. Amanatullah, Y. Et al, in 2013 [14] proposed the Method of Cloud computing architecture in which they proposed a guideline to

understand the whole process including actor roles inside a cloud computing environment. There are very fewer architectures related to the cloud that may help in building a solid foundation for cloud computing infrastructure. Many organizations and managements are reverting to the idea of using cloud services to reduce cost and improve the efficiency. Cloud service management is an important aspect which this paper describes.

3. Proposed System

The proposed model is having a tablet, stylus and a secure communication network. The tablet is equipped with the necessary android app with provide an interface to write the answer on virtual answer sheets. There will be a provision of reviewing questions and answer at any point of time during the examination. The system can be operated with three sets of user as Admin, supervisor, student. Admin create question papers. Supervisor distributes the question papers. Student writes on the virtual answer sheet. The experimental setup of proposed system is shown as following the figure.

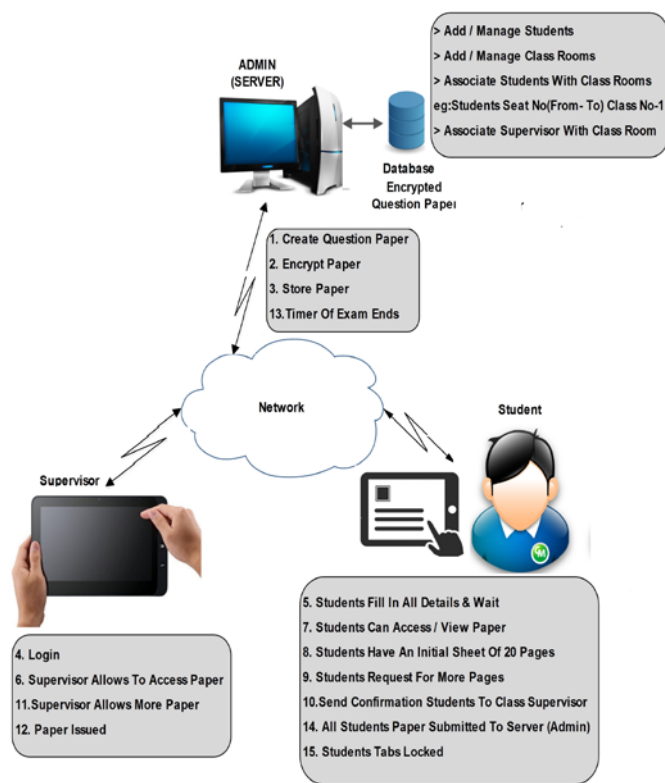


Figure 2: Architecture diagram for online virtual subjective examination system

Question papers are created by the university, and those are first encrypted and then stored in the database. Supervisors are selected for each college by university only. At the time of examination, supervisor will login to his tablet. Once the supervisor logs into the tablet he gets the basic information related to the examination. Then authenticated supervisor will request the university to send the question paper on his individual account. After this process, the university will send the question paper to the valid user. Then supervisor will distribute the question paper among the student in the digital format.

Student will authenticate himself by one-time password authentication and once the authentication is done the student will write the answer of the respective questions in digital format via a tablet and a stylus. Once the examination starts there will a timer that will get automatically initiated and once the time stipulation finishes the tablet will get freeze that is the student would not be able to write the examination further. After attempting all the questions, there is the patch provided to exit from the examination. The PDF of particular answer sheet will get generated and then will be sent to the supervisor's account. Supervisor will collect all PDF's and store it in the private ubiquitous cloud. The files that will be stored in the cloud will be in an encrypted format.

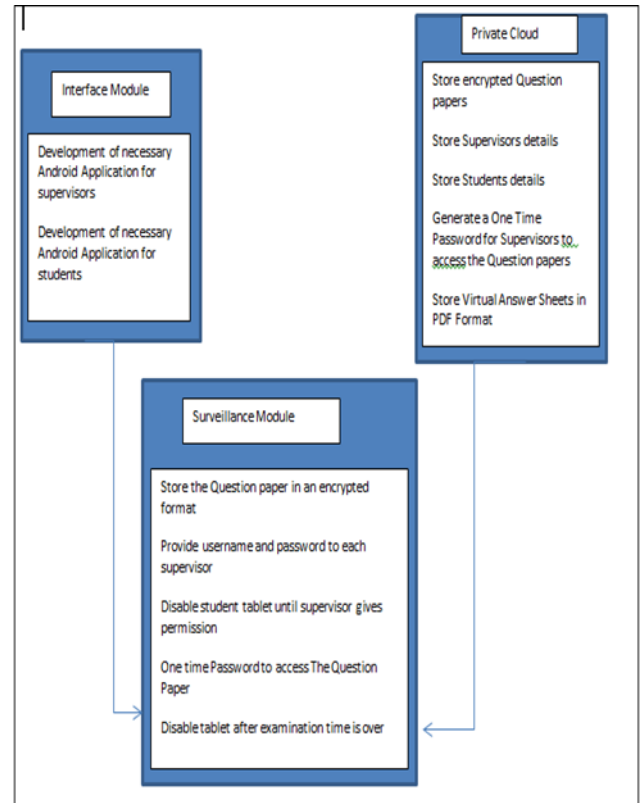


Figure 3: Module diagram for online virtual subjective examination system

4. Security Analysis

Every system cannot be effective until and unless it should be provided with security. The proposed system also being secured with necessary secured communication. The primary analysis for the implementation of security is being presented in the following tabular manner.

Table 1: Security Analysis

Sr No	Security Issues	Consequences	Counter Measures
1.	Authentication	Access will be denied to the valid user	Providing legitimate username and Password
2.	Storage of virtual answer sheet in the cloud	If the answer sheet is not stored in the cloud in an encrypted form, the contents can be accessed	A proper encryption algorithm will be used to avoid any loss of data integrity
3.	Accessing The Question	Students can access the Question papers only	Use One Time Password

	papers	when Supervisor enter this One Time Password which will be given by server	
4.	Data exchange/transfer	Contents of the paper from a particular tablet can be transferred to another tablet during examination calling it as a copy	Blocking the features of the tablet like Bluetooth and Wi-Fi till the examination gets over
5.	Time parameter	Student may write the paper more than the stipulated time being provided for the examination	Timer is set and as soon as the exam time gets over the tablet freezes that is the functionality of the tablet gets disabled

5. Future Enhancement

The proposed work can be extended with the provision of intelligent high-resolution camera, GPS and big data for the higher accuracy and performance of the system.

Camera can be installed and configured in the necessary premises. These cameras can take over the supervisor role. GPS enabled tablets can be incorporated in the proposed project to trace the location of a given student having the tablet. Pune University will have a large amount of information to process so we can provide Big Data concept to store the information in the database.

6. Conclusion

As per the existing survey we have come up with the motivation of the problems faced by offline examination. The proposed system can provide strong and efficient input to the existing online examination system.

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