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Application for Voice Based Examination System Using ASR

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Abstract - This research paper focuses on the development process of a Voice Based Examination System Application that utilizes Java as the backend framework with MySQL as the database, and used XAMPP as a server. The main objective of the Project on Voice Based Examination System is to manage the exams of handicapped candidates like the peoples who are blind or the peoples not having legs or arms, they can not go to centres physically to write exams. This Voice Based Examination System allows users access to information on the internet over a voice interface. Prior studies on open and distance learning online examination systems that make use of voice interface do not sufficiently exhibit intelligent form of assessment, which diminishes the rigour of examination. The objective of this project is to improve on the achievements of previous studies by providing a framework that will guide the development of a voice based online examination system for the visually impaired students in open and distance learning.

Voice Based Examination System is a desktop based RDBMS (Relational Database Management System) project that changes the modern scenario for online examination is becoming popular as well as essential for every kind of exams. The project is totally built at administrative end and thus only the administrator is guaranteed the access. The purpose of the project is to build an application program to reduce the manual work for managing the Exam and for the betterment of the handicapped peoples.

***Key Words*:** Online Examination, Voice Based Examination System, Java, XAMPP, Apache, MySQL, Administration, Backend Development, Browser, Jar (Java Archive) Files, File Import, Software.

1.INTRODUCTION

Now-a-days online or e-Examination System is becoming popular as well as essential for every kind of exams. It saves a lot of time, money and other expenses for any examine. In past days, there was a paper-pencil based test known as offline exam. It is generally offered in a single day for all candidates. This is a typical task for examination authorities and candidates to arrange everything. To overcome this traditional problems, we came with some modern implemented concepts with the help of Artificial Intelligence.

In this project, the various Artificial Intelligence algorithms are used to introduce the new features in the online proctoring exam system. Some of them are as: The voice detection of the candidates can be captured by using the Honorlock's Voice Detection Algorithm and the number of participating candidates can be captured by using Gaze (Eye) tracking, Mouth open and close activity. The Fisher-Yates Algorithm Shuffling Algorithm is used for the randomization of the questions so that we can minimize the copy cases. It is designed based on the Java enterprise edition three-tier architecture. It also allows defining and setting up exams according to a flexible tree-based exams structure. Moreover, it integrates a rich text editor for composing exams suitable for different engineering and language disciplines. In addition, it automates the scheduling, grading and reporting processes in order to relieve instructors from such cumbersome tasks. Furthermore, its capabilities and integration with different databases enable it to offer several security schemes that support strong multifactor authentication and authorization, detect impersonation and prevent cheating. Besides, it provides an easy to use and informative wizard that enables students to take exams. Not to mention, the deployment results illustrate that the system has been successfully used to organize online exams in several semesters over the past three academic years. Finally, the conducted user surveys responses assert that the system is also user friendly, cutting edge, capable, reliable, fast and highly available.

Massive open online courses (MOOCs) and other forms of remote education continue to increase in popularity and reach. The ability to efficiently proctor remote online examinations is an important limiting factor to the scalability of this next stage in education. Presently, human proctoring is the most common approach of evaluation, by either requiring the test taker to visit an examination center, or by monitoring them visually and acoustically during exams via a webcam. However, such methods are labor-intensive and costly. In this project, we present a multimedia analytics system that performs automatic online exam proctoring. The system hardware includes one webcam, one wearcam, and a microphone, for the purpose of monitoring the visual and acoustic environment of the testing location. The system includes six basic components that continuously estimate the key behaviour cues: user verification, text detection, voice detection, active window detection, gaze estimation and phone detection. By combining the continuous estimation components, and applying a temporal sliding window, we design higher level features to classify whether the test taker

is cheating at any moment during the exam. To evaluate our proposed system, we will collect multimedia (audio and visual) data from different subjects performing various types of cheating while taking online exams. Extensive experimental results demonstrate the accuracy, robustness, and efficiency of our online exam proctoring system.

2.LITERATURE SURVEY

1. In this paper [1], In recent times only in the Virtual Assistants we can experience the major changes, the way user interacts and the experience of user. We are already using them for many tasks like switching on/off lights, playing music through streaming apps like Wynk Music, Spotify, etc. This is the new method of interacting with the technical devices makes lexical communication as a new ally to this technology. Voice control is a major growing feature that change the way people can live. The voice assistant is commonly being used in SmartPhones and laptops. AI based Voice assistants are the operating systems that can recognize human voice and respond via integrated voices. This voice assistant will gather the audio from the microphone and then convert that into text, later it is sent through GTTS (Google text to speech). GTTS engine will convert text into audio file in English language, then that audio is played using play sound package of python programming Language. AI based Voice assistants can be useful in many fields such as IT Helpdesk, Home automation, HR related tasks, voice based search etc., and the voice based search is going to be the future for next generation people where users are all most dependent on voice assistants for every needs. In this proposal we have built the AI-based voice assistant which can do all of these tasks without inconvenience.

2. In this paper [2], Voice-based systems allow users access to information on the internet over a voice interface. Prio studies on Open and Distance Learning (ODL) examination systems that make use of voice interface do not sufficiently exhibit intelligent form of assessment, which diminishes the rigour of examination. The objective of this paper is to improve on the achievements of previous studies by providing a framework that will guide the development of a voice-based e-examination expert system for the visually impaired students in ODL. The study employs a combination of technologies such as system design, server side scripting, voice-based system development, data management and rule-based reasoning in developing the system. The system was evaluated to determine the level of usability. The results of the usability evaluation showed that the developed application has an ‘average usability’ rating of 3.48 out of 5 scales. The findings show that the voice based e-examination system will not only be of immense benefit to the visually impaired students in ODL in respective of distance, but will also complement the existing web-based method for online examination. The current study reports on the development of a framework for the implementation of intelligent voice-based e-examination system for the blinds in ODL using voice technologies. The application is an online system that embeds expert knowledge-base to provide intelligent component services on the examination system platform. The remaining part of this paper is organized as follows: Section two presents related works. Section three describes the system framework and design with dialogue sequence, and algorithm development. Section four highlights the implementation of the system and usability evaluation. Section five concludes the paper. In this paper, an e-examination voice interface for the visually impaired learners in ODL has been provided. The developed system was realized using a framework, system design with pseudo code dialogue sequence and algorithm. A usability evaluation of the system was also conducted. The voice-based examination system would improve the accessibility of examination in distance learning for learners with visual impairment, as well as other able-bodied learners.

3. In this paper [3], Massive open online courses (MOOCs) and other forms of remote education continue to increase in popularity and reach. The ability to efficiently proctor remote online examinations is an important limiting factor to the scalability of this next stage in education. Presently, human proctoring is the most common approach of evaluation, by either requiring the test taker to visit an examination centre or by monitoring them visually and acoustically during exams via a webcam. However, such methods are labour-intensive and costly. In this paper, we present a multimedia analytics system that performs automatic online exam proctoring. The system hardware includes one webcam, one wearcam, and a microphone, for the purpose of monitoring the visual and acoustic environment of the testing location. The system includes six basic components that continuously estimate the key behaviour cues: user verification, text detection, voice detection, active window detection, gaze estimation and phone detection. By combining the continuous estimation components, and applying a temporal sliding window, we design higher level features to classify whether the test taker is cheating at any moment during the exam. To evaluate our proposed system, we collect multimedia (audio and visual) data from 24 subjects performing various types of cheating while taking online exams. Extensive experimental results demonstrate the accuracy, robustness, and efficiency of our online exam proctoring system. Exams are a critical component of any educational program, and online educational programs are no exception. In any exam, there is a possibility of cheating, and therefore, its detection and prevention are important. Educational credentials must reflect actual learning in order to retain their value to society.

4. In this paper [4], This paper analyzes current status of teachers' speaking test, applies presently mature C/S system structure and offers a network way for teachers' speaking exam. We provide the whole process of design and development in online speaking exam, illustrate several functional designs including item bank construction, auto-generating examination paper and test paper analysis and discuss various network programming development technology during teachers' speaking network examination intensively. Directed by software engineering theory, the system is finally designed and realized through feasible research, requirement analysis, general design, detailed design, and tests with popular system development language and powerful database management.

5. In this paper [5], with the advent of COVID-19, remote learning has blossomed. Schools and universities may have been shut down but they switched to applications like Microsoft Teams to finish their academic years. However, there has been no solution to examinations. Some have changed it to an assignment form where students can just copy and paste from the internet, while some have just cancelled them outright. If the way we are living is to be the new norm there needs to be some solution. We shall aim to track the eyeballs of the test-taker and report if he is looking to the left, right, or up which he might do to have a glance at a notebook or signal to someone. This can be done using Dlib's facial key point detector and OpenCV for further image processing. We used the pre-trained weights of YOLOv3 trained on the COCO dataset to detect people and mobile phones in the webcam feed. The online education system, which increasingly demands full remote teaching, continues to find its Achilles heel in the evaluation system. Nowadays, according the UNESCO Educational Disruption and Response to COVID-19 crisis, most governments around the world are closing the educational institutions and moving their activity to online and remote modality impacting over 89student population. For example, in Spain, most universities have decided to move the exams in online modality. Thus, e-proctoring tools are very pertinent and significant supporting this process. The e-proctoring (electronic proctoring) is a system formed by electronic tools that allows the monitoring of the remote evaluative process through telematic resources, trying to make the results reliable. Despite the fact that there are already electronic proctoring tools that seek to guarantee the quality of the evaluation process without requiring the physical presence of the student in a specific place or the union of the student and the examiner in that place, e-proctoring still continues without widespread use in institutions.

6. In this paper [6], The system is an open one and the examination topics databases can be browsed, appended and edited by users, the contents of the topics can be anything which can be recognized and accepted by application Word; This system can create examination topics Databases for many different curricula and manage their own databases by users using its corresponding functions; All the automatically saved examination papers can create a examination paper databases gradually and this makes it possible for users to choose a paper from it for exam directly (can edit it if necessary); Choosing topics can be done both manually and can be done automatically, randomly according to the given conditions too. In the end examination paper is created in a Word document. The contents of the topics are inputted through application Word window. On Windows 98/2000 platform the current examination paper topics Databases System is developed by Visual basic 6.0 and OLE technology. The version 1.0 of the system has been patented nationally, applied in teaching area and works well.

3.METHODOLOGY

To deal with the problem, we developed a website to solve this issue easy. Also determine the features and functionalities required for running the examination system. Voice assistants are all written in programming languages, which listens the verbal commands and respond according to the user's request. In this project, we have used Java programming language to build the AI based Voice assistant. A user can give any exam verbally by using voice assistant. The voice assistant waits for a pause to know that users have finished their request, then the voice assistant sends users request to it's database to search for the request.

1. Frontend Development for the website: For the development of the environment for the frontend, including installing Java and any required libraries. Implement frontend logic to make API requests to the backend server and display the fetched data content using the app.

2. Backend Development for the website: For the development of the environment for the backend, necessary tools and frameworks (e.g., Java, MySQL, XAMPP, Eclipse). Also the MERN stack gives us Scalability, Flexibility, Extensive Community Support Code, Reusability Strong Backend Capabilities.

3. Backend Development for the mobile app: Installing the necessary tools and frameworks (e.g., Java, Eclipse, XAMPP). Develop server-side logic to handle API requests from authentication, and integration with the YouTube Data API. Implement secure data transmission and storage practices. Test the backend APIs to ensure they return the required data.

4. The request asked by the user gets split into separate commands, so that our voice assistant can able to understand.

5. Once within the commands list, our request is searched and compared with the other requests.

6. The commands list then sends these commands back to the Voice assistant.

7. Once the voice assistant receives those commands, then it knows what to do next.

8. The voice assistant would even ask a question if the request is not clear enough to process it, in other words, to make sure it understands what we would like to receive.

9. If it thinks, it understands enough to process it, the voice assistant will perform the task which the user has asked for.

10. Working of Automatic Speech Recognition(ASR):
As Shown in Fig, 1. Automatic Speech Recognition which is termed as ASR is the main principle behind the working of AI-based Voice Assistant. ASR systems, at first it records the speech, then the wavefile has been created by the device which consists of the words it hears, later the wavefile will be cleaned so that the background noise would get deleted and the volume will be normalized, then it will break down into elements and it will be analysed in sequences, then the ASR software examines these sequences and it implements statistical probability to find out the entire words and then it will get processed into text content. The better method to recognise elements is Element Recognition as it provides better results than the method of word decoding.

Fig. 1. Process of ASR

It does not matter what kind of speech recognition software we may use, because all the work happens in its ASR. During a nutshell, at first the method starts with the device gathering audio with the source, where source is microphone, then the Recorded speech waveforms will be sent to acoustic analysis, which will be performed on three different levels, as shown in Fig 2.,

Acoustic Analysis

- **Acoustic Modelling:** In this process, it represents that the elements were pronounced or not and what are the words which can complete these elements.

- **Pronunciation Modelling:** That analyses the way, where how these elements are pronounced, it will check whether there is any accent or other peculiarities.

- **Language Modelling:** This is often aimed toward finding contextual probabilities counting on what elements were captured.

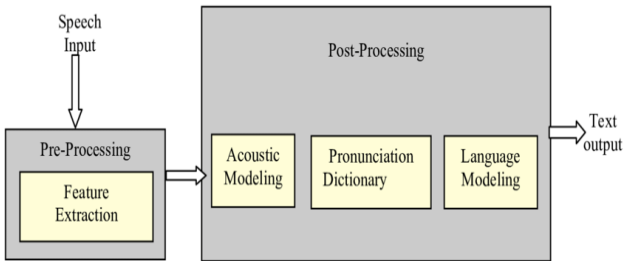


Fig 2. Acoustic Analysis

4.SYSTEM ARCHITECTURE

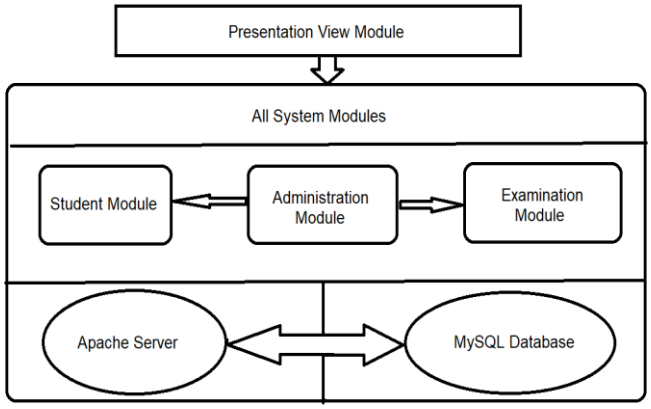


Fig 3. System Architecture Diagram

5.USE CASE DIAGRAM

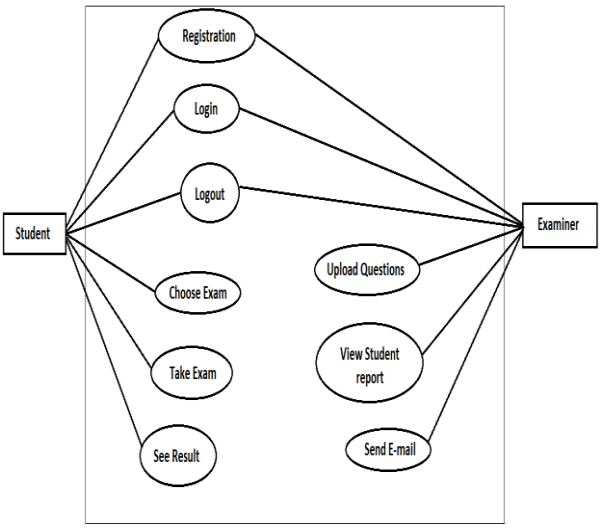


Fig 4. Use case Diagram

6.SYSTEM SPECIFICATION

- Processor: Intel Core i5
- Speed: 2.80 GHz
- Hard disk: 40GB
- RAM: 8GB
- Android 9.0 or iOS 12 or later

Software Specifications

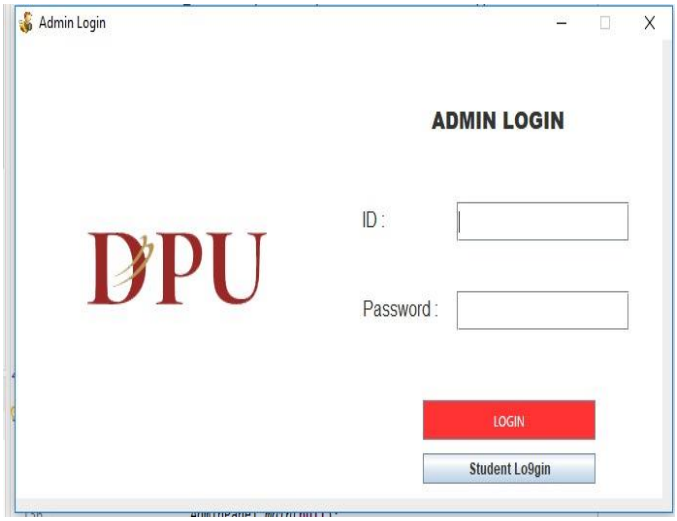
- Operating system Windows 7 or further.
- IDE: Vs Code, Android Studio,
- Coding Language: JavaScript, Dart MERN

Result:

GUI Main Page: This is the main start page of the project. It consists of two logins i.e. Admin and User.

Admin Dashboard: On the admin dashboard, all the operations which can be done by the admin will show. The operations that can be performed by admin are as follows: Add Student, Edit Student, Delete Student, Manage Exam, View Results and View Student's data available in the server.

Fig 5. Admin Login Page



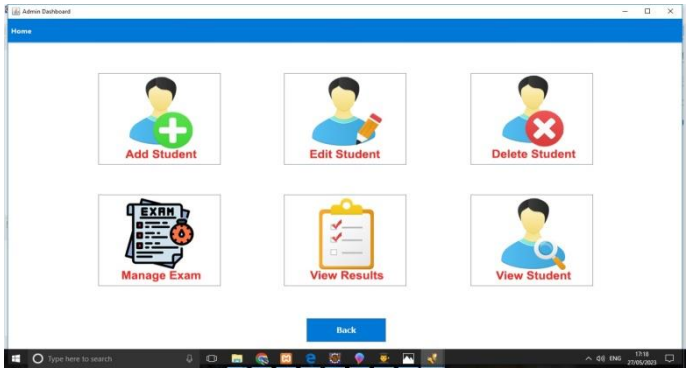


Fig 6. Admin Dashboard Page

Add student: If you want to add new student in the system then you should have the admin role else you cannot add new student in the system.

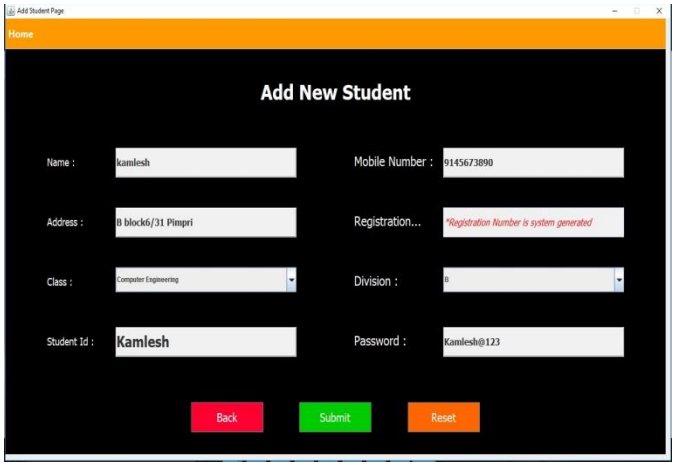


Fig 7. Add New Student Page

Exam Dashboard: This is used to add new questions in the system for the examination. By two ways, we can add the questions into the system that is manually and by importing the file.

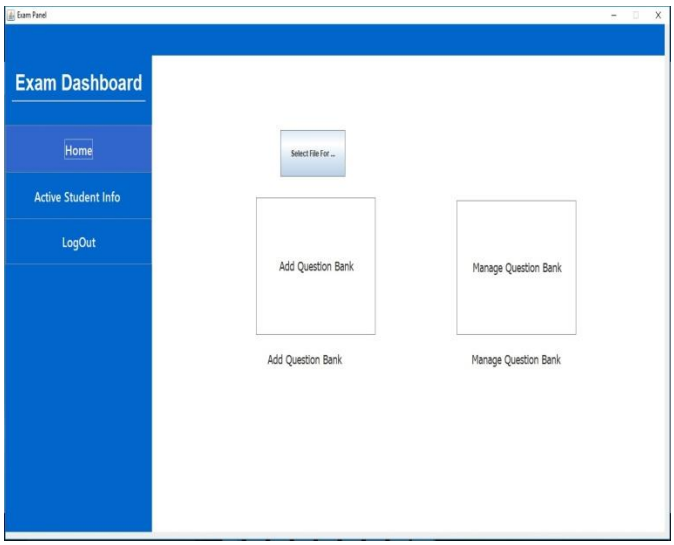


Fig 8. Exam Dashboard for Admin

Manage Questions: From here the admin can manage the questions like removal of questions or updating the questions if there is any mistake.

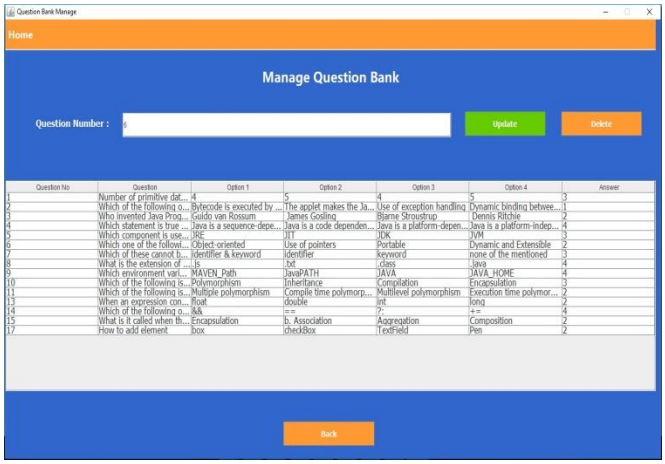


Fig 9. Manage Question Bank

Student Login: The students will get the access to the application after entering the correct userId and password. If the user is not added in the database then the particular user should have report to Administrator.

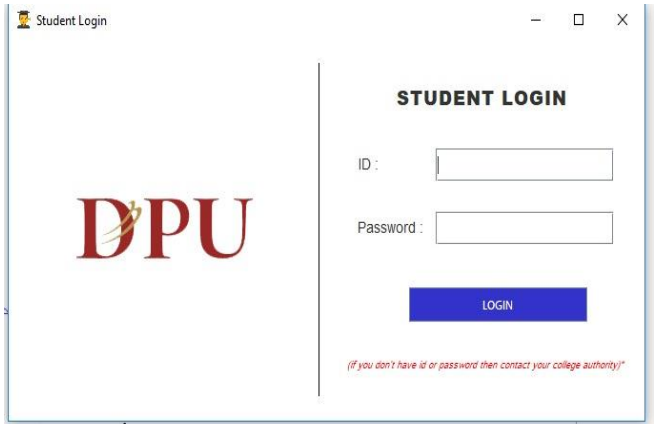


Fig 10. Student Login Page

7.CONCLUSION AND FUTURE WORK

With the completion of this project I conclude that it has achieved its purpose. The whole project provides a base for students to take their exam using software and allow lecturers to add questions and answers into the system. The system is developed using Java programming language and data are saved in the database.

In our project we have implemented many things compared to other assistants. Now a days it is very useful in human life because it is a hands-free application. It is a very simple application. As well as it is used in a business field also for example in laboratory, the person wears gloves and body suits for their safety purpose so it is difficult to type, through voice assistant they can get any information so that their work becomes easy. Voice assistants are useful in many fields such as education, daily life application, home appliances etc. and voice assistant is also useful for the illiterate people they can get any information just by saying to the assistant, luxury is available for people, thanks to AI based voice assistants. Voice assistant is developing more and more in daily life. Many companies of voice assistant trying to improve interaction and more features to the next level and many of the youth started using voice assistant in daily life and from many sources the result showing very good feedback.

In future voice assistants can be used for two developments: First quality of dialogue recognition will increase because broadband allows more complex data processing in powerful data centres. Second, from the users perspective, VAs aid for interaction. In the companies, voice assistants can be used to automate repetitive tasks for example Amazon's Alexa can open video conferencing and book meeting rooms, etc.

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