

# AI Based Virtual Quiz System

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**Abstract:** *We have suggested an AI-based virtual quiz system that recognises hand gestures and extracts features using a web camera. For students, we have provided Register/Login in this. To take the test, each of them must sign up. To answer the quiz questions in this case, we employed the hand tracking module. This method uses a webcam that is attached to the system to record live footage. Hand segmentation and live video processing are done first. Following segmentation, hand landmarks are tracked to identify hand gestures. The minimal distance between two defined landmarks is determined by comparing the defined gesture in the system with the hand gesture in the live video. As a result, the response will be saved and compared to the model response. The Score is presented at the end of the quiz in percentage form, along with the correct, incorrect, and skipped questions. For those with disabilities, this system is efficient and helpful. Using this cutting-edge gesture recognition technique, the system will shorten the time required for manual exam systems.*

**Keywords:** Artificial Intelligence, Hand Gesture, Gesture Recognition, Human Computer Interface, CNN Algorithm, MediaPipe, OpenCV, CSV File

## I. INTRODUCTION

The advancement of technology has revolutionized the way we interact with computers. In the past, keyboard and mouse were the primary input devices for human-computer interaction (HCI). However, with the development of hardware and software, new methods of HCI have emerged. Among these methods, speech recognition and gesture recognition are gaining increasing attention. Gesture recognition technology enables users to interact with computers using hand gestures, making the interaction more intuitive and natural. Hand gesture recognition is becoming an essential part of HCI, and it has various applications, including gaming, virtual reality, and healthcare.

### Hand Gesture Recognition

Hand gesture recognition is the process of interpreting hand movements to perform a specific task. It involves using a camera to capture images of hand gestures, and then using machine learning algorithms to interpret these images. The algorithms are trained to recognize specific hand gestures and associate them with specific actions.

Gesture-based HCI is becoming increasingly popular, especially in the gaming industry. Hand gesture recognition technology allows gamers to control the game using their hand movements, providing a more immersive experience. For instance, in a quiz game, hand gestures can be used to select answers, making the interaction more engaging and fun.

### Applications of Hand Gesture Recognition

Hand gesture recognition has various applications, including:

1. **Gaming:** Hand gesture recognition can be used to control video games. Gamers can use hand gestures to perform various actions, such as selecting options and controlling characters.
2. **Virtual Reality:** In virtual reality, hand gesture recognition can be used to interact with the virtual environment. Users can use hand gestures to perform tasks such as grabbing objects and opening doors.
3. **Healthcare:** Hand gesture recognition can be used in healthcare to provide an alternative input method for patients who have mobility issues. For instance, patients with cerebral palsy can use hand gestures to control their wheelchair or communicate with doctors.

4. Sign Language Recognition: Hand gesture recognition can be used to recognize sign language. This technology can be used to develop applications that can interpret sign language and translate it into spoken language.

### Challenges in Hand Gesture Recognition

Despite the numerous applications of hand gesture recognition, there are various challenges that researchers face in developing reliable hand gesture recognition systems. These challenges include:

1. Lighting: Lighting conditions can affect the performance of hand gesture recognition systems. Poor lighting can result in low-quality images, making it difficult for the system to recognize hand gestures accurately.
2. Occlusion: Occlusion occurs when an object obstructs the view of the hand gesture. This can make it challenging for the system to recognize the hand gesture accurately.
3. Gesture Variability: Hand gestures can vary depending on the individual performing them, making it difficult for the system to recognize them accurately.
4. Real-Time Processing: Real-time processing is essential in hand gesture recognition systems, especially in applications that require immediate feedback, such as gaming. Achieving real-time processing can be challenging, as it requires processing large amounts of data quickly.

## II. PROBLEM STATEMENT

The goal of this project is to create a virtual quiz system powered by AI that can improve the experience of taking a traditional quiz by cutting down on the time-consuming process of utilising a keyboard and mouse. Students will be able to respond to quiz questions by using hand gestures thanks to the system's hand gesture detection technology. The virtual quiz system will be created utilising artificial intelligence methods, such as machine learning algorithms, which will give it the ability to swiftly and effectively recognise and understand hand movements. Overall, the method will give students a fun and participatory experience, improving both the quiz's productivity and fulfilment.

## III. RELATED WORK

Online Quiz System is an electronic test framework for getting to under studies. It's anything but a framework by which understudies can sit in a test that needs no pencil and paper. This system's major intention is to make online quizzes user-friendly while minimising the manual work required of learners as well as instructors. With the use of this method, teachers may precisely monitor the growth of their learners while allowing learners to take tests online. Teachers will benefit from time savings as well as better student performance monitoring thanks to this.

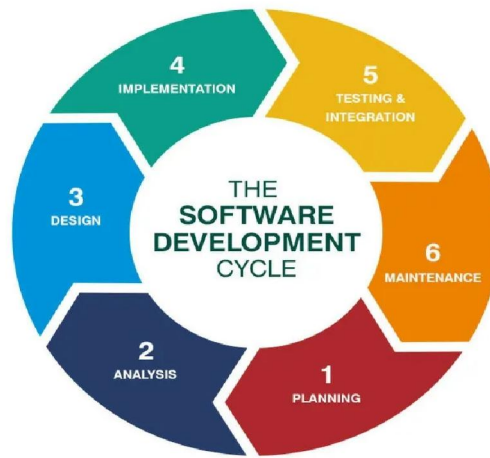
Both teachers and students will find the system to be simple to use and logical. The test will be available for students to take whenever and wherever they have an internet connection. They will be able to respond to the questions with hand gestures that the system will be able to recognise and decode utilising AI-based hand gesture recognition technology.

The system would allow teachers to design quizzes and distribute them to their students. Additionally, they will be able to monitor students' development in real-time and pinpoint areas that require development. Additionally, the system will offer automated grading and feedback, saving teachers' time and guaranteeing that students get timely feedback on their performance.

Overall, this approach will give teachers and students a quick and effective way to administer tests and track student progress. It will reduce the manual work necessary for traditional quiz systems and save time, making it a desirable option for educational institutions.

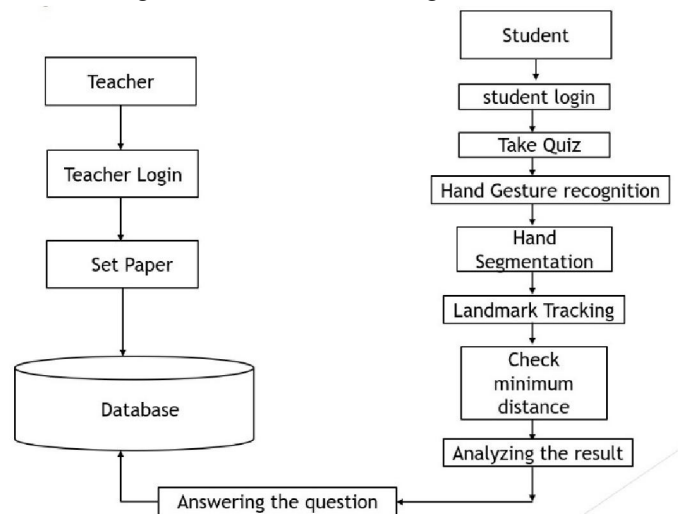
## IV. METHODOLOGY

We have discussed the nuances of the approach used in programming advancement in this section. The task approach is important since it helps with organising examination in a logical way to overcome problems and build, organise, and manage the path towards developing a data system.



**Figure 1:** SDLC lifecycle

After the framework has fully developed, it should be tested to make sure it achieves the project's objectives. We will also describe the Quiz framework's usage case graph in more detail. The Software Development Life Cycle (SDLC) employs a variety of models, which include the Agile Model, V-Shaped Model, Spiral Model, Iterative Model, and Evolutionary Prototyping Model. An Iterative Model is one of the categories. Students can log in to this quiz system to participate, and the administrator can create, amend, and delete quiz questions based on the most recent editions of the relevant textbooks. User can read questions to attempt, and after they are finished, marks will be calculated in accordance with automatic result marking, and result sheets will be generated result.



**Figure 2:** System Architecture

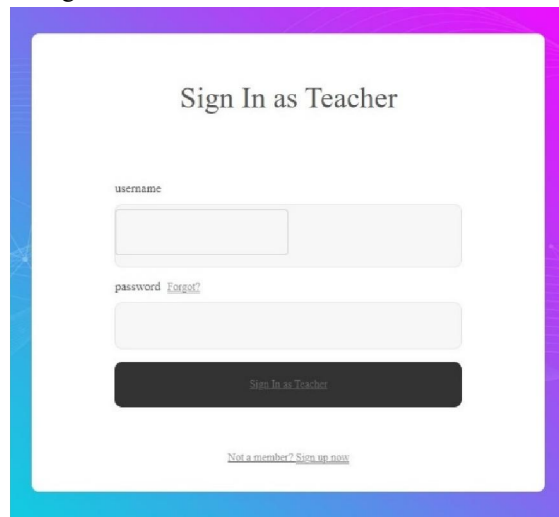
### V. METOOLS AND TECHNOLOGY

Jupyter Notebook is an open-source web-based interactive computing environment that allows users to create and share documents that contain live code, equations, visualizations, and narrative text. It supports many programming languages, including Python, R, and Julia, and provides a flexible platform for data analysis, scientific computing, and machine learning. The notebook interface allows users to combine code, visualizations, and explanations in a single document, making it easy to explore and communicate complex ideas also we have used some scripting languages to develop system including Python, HTML, CSS etc. Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to

connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. HTML (Hypertext Markup Language) basically HTML is known as markup language, and additionally as we went to make it user interface so we breaking point and its grant is freed from cost. CSS represents Cascading Style Sheets. It is customer side prearranging language and used to give style to a website page. MySQL data base we have used in this project to store the data entries, Results, user, questions and types of questions. My SQL stands for Structured Query Language. It is used for storing data database we used.

**Manger Authorities (systemadmin)**

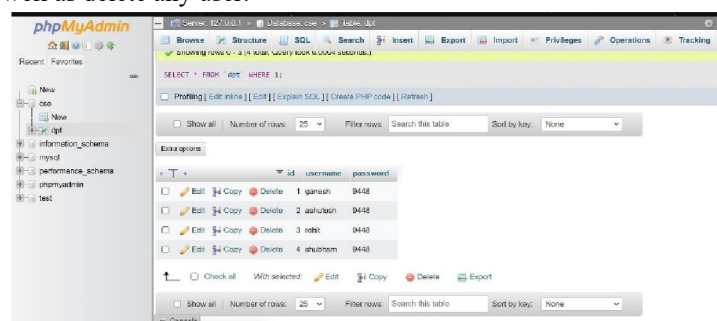
An admin is directed to the home page when he initially logs into the system. He can then start using his specialties from there. One of the specialists assigned to the administrator can create tests, develop questions, manage subjects, manage clients, and review results. The administrator can also update their own profile and view everything that is available on the administrator board. Fig3.



**Figure 3: System Admin Login**

**CRUD operations (Create, Update, Delete and Status)**

The person who manages of this created quiz system has permissions to carry out CRUD operations. Create, update, and delete, or CRUD, means that the administrator has full control over all tasks. He has the ability to change any registered user's name or address as well as delete any user.



**Figure 4: Crud Operations**

Like the above figure admin can update, create and delete the question and can perform tasks mentioned in Administrative authorities section.

### User Authorities

When a client signs up for the system for the first time, he is directed to the home page. From there, he can practise for quizzes that will evaluate their own presentation. He can take the quiz numerous times, with the questions appearing in a different order each time to help him practise more effectively. After the quiz is finished, the user's quiz score will appear at the bottom of their page, where they can review it and take the correct questions, the wrong questions, and the answers to all of the correct questions.

### VI. RESULTS

The majority of students concurred that the online quiz system allowed them to practice anywhere, at any time, which contributed to their exam readiness. This convenience factor was identified as a key advantage of the online quiz system. The findings suggest that the online quiz system designed was effective in preparing students for online exams and testing their exam readiness. The online quiz system was found to be a valuable tool for students to gauge their level of preparedness for online exams, which are becoming increasingly popular. The ability to practice anywhere and at any time gives students more control over their learning and provides them with the flexibility needed to accommodate their busy schedules. Furthermore, the instant feedback provided by the online quiz system allows students to identify areas that require more attention and focus their efforts accordingly

### VII. CONCLUSION

To assess your readiness before taking a genuine online exam, we have created an online quiz system. Users can learn about online education, comprehend how to answer questions, and manage their time during real-time online exams by using the system we have designed. The user can examine the results of the practise exam after finishing the exam. The user can try the exam again. there is no cap on practise. One person may take online exams many times. This will assist instructors in confirming the outcomes of the technology that automatically calculates marks. The manual copy check helps to save time.

### VIII. FUTURE WORK

Our quiz system has only been designed for multiple-choice questions, but it could be made even better with some additional features like description written questions, the ability for students to invite more friends, and the inclusion of a chatbox so that they can chat with friends and discuss the problem statements. Friends can each explain the problem statements in a better way through conversation.

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