



DEPARTMENT OF APEX INSTITUTE OF TECHNOLOGY

PROJECT PROPOSAL

1. Project Title: - Ai-powered Gesture Recognition Smart Board

2. Project Scope: -

The AI-powered Gesture Recognition Smart Board is an innovative project aimed at transforming traditional writing and drawing experiences into a futuristic, touchless interaction. This smart board will leverage advanced AI algorithms and computer vision techniques to recognize hand gestures captured by a high-definition (HD) camera, allowing users to write or draw in the air seamlessly on a 2D plane. The scope of this project encompasses several critical aspects, from gesture recognition to real-time visualization, ensuring a comprehensive and user-friendly experience.,

In-Scope Activities:

1. Gesture Recognition:

- **Algorithm Development:** The core of this project lies in developing robust AI models capable of accurately recognizing a wide range of hand gestures. The focus will be on training models using datasets that capture various writing gestures, ensuring precision and reliability.
- **Real-Time Detection:** Implementing real-time gesture detection using an HD camera is a priority. The system must efficiently process live video feeds, recognize gestures instantaneously, and translate them into corresponding writing or drawing actions on a 2D plane.
- **Hand Tracking:** Continuous hand tracking will be developed to ensure smooth and uninterrupted writing, even if the hand moves quickly or changes position.

2. 2D Plane Mapping:

- **Coordinate Mapping:** The project will map gestures detected in the 3D space to a 2D plane. This involves creating a seamless transition from gestures in the air to digital strokes on a virtual canvas.
- **Stroke Generation:** Based on recognized gestures, the system will generate strokes or lines on the 2D plane, mimicking the experience of writing or drawing with a pen on paper.

3. User Interface (UI) and Experience (UX):

- **Interactive Interface:** A user-friendly interface will be designed to allow users to interact with the smart board effortlessly. The interface will include features like undo, redo, and clear, providing control over the virtual writing surface.
- **Customization Options:** Users will have the option to customize the writing or drawing experience by selecting different colors, stroke thickness, and styles.

4. Hardware Integration:

- **HD Camera Utilization:** The project will be limited to using an HD camera for gesture detection, eliminating the need for additional hardware like styluses or sensors. The camera's capabilities will be maximized through software optimization to ensure accurate gesture capture.
- **Cross-Platform Compatibility:** The smart board will be designed to work across various platforms (Windows, macOS, etc.), ensuring wide accessibility and ease of use.

5. Data Collection and Training:

- **Dataset Creation:** Part of the project scope includes creating or sourcing a comprehensive dataset for training the gesture recognition model. This dataset will consist of various hand gestures captured in different lighting conditions and angles.
- **Model Training and Optimization:** Continuous training and optimization of the AI model will be conducted to improve accuracy, minimize latency, and ensure real-time performance.

Out-of-Scope Activities:

1. Hardware Development:

- The project will not involve developing new hardware components, such as custom cameras or sensors, beyond the use of a standard HD camera.

2. 3D Writing or Drawing:

- The project will focus exclusively on 2D plane mapping. Any functionality related to writing or drawing in a 3D space will be considered out of scope.

3. Integration with External Systems:

- Integration with external systems such as cloud storage, learning management systems, or collaborative platforms is not included in the current scope.

Conclusion:

The AI-powered Gesture Recognition Smart Board project will deliver a cutting-edge, touchless writing experience by recognizing hand gestures and translating them into digital strokes on a 2D plane. This project is poised to revolutionize how we interact with digital interfaces, offering an intuitive and accessible tool for education, creativity, and professional use.

3. Requirements: -

➤ Hardware Requirements

1. High-end Computer system
2. HD camera

➤ Software Requirements

1. Jupyter-notebook
2. Visual Studio Code
3. Anaconda package manager
4. Google-Collaboratory

STUDENTS DETAILS

Name	UID	Signature
Satyam Kumar Singh	21BCS11016	
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Sejal Gogia	21BCS5517	

APPROVAL AND AUTHORITY TO PROCEED

We approve the project as described above, and authorize the team to proceed.

Name	Title	Signature (With Date)
Mr. Sant Kumar (E13548)	Supervisor	