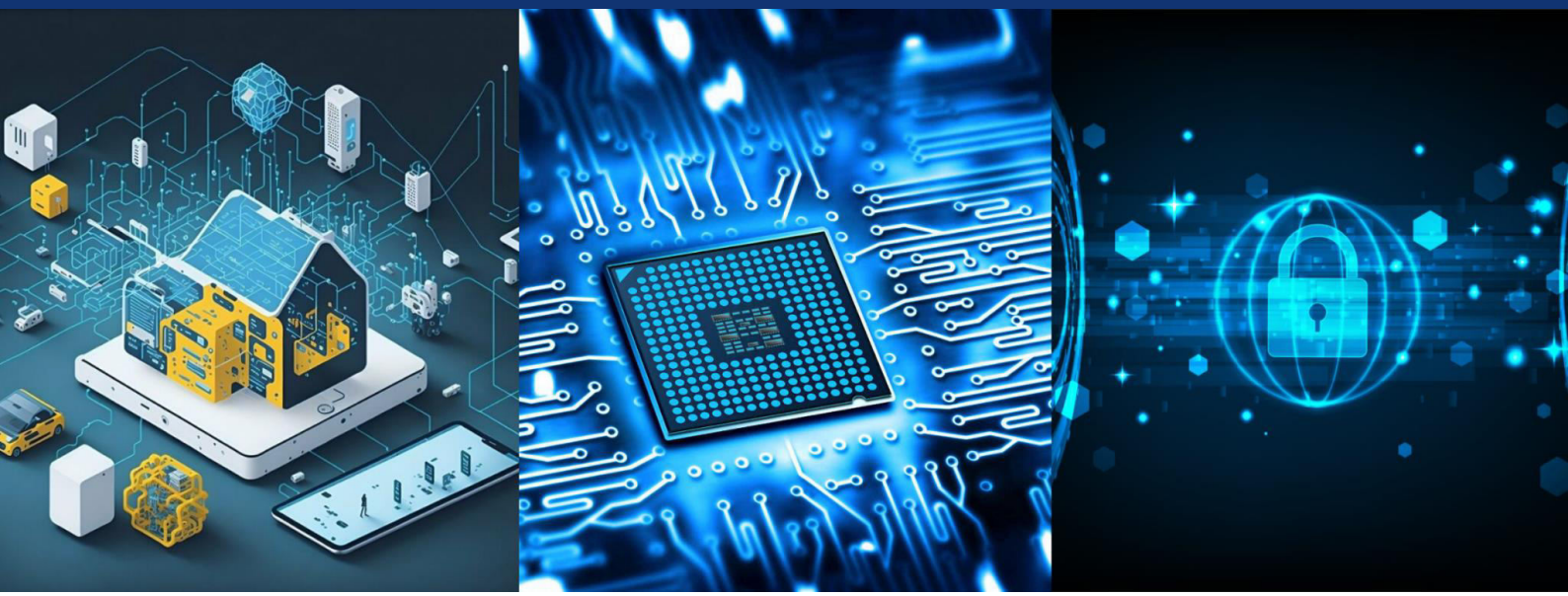
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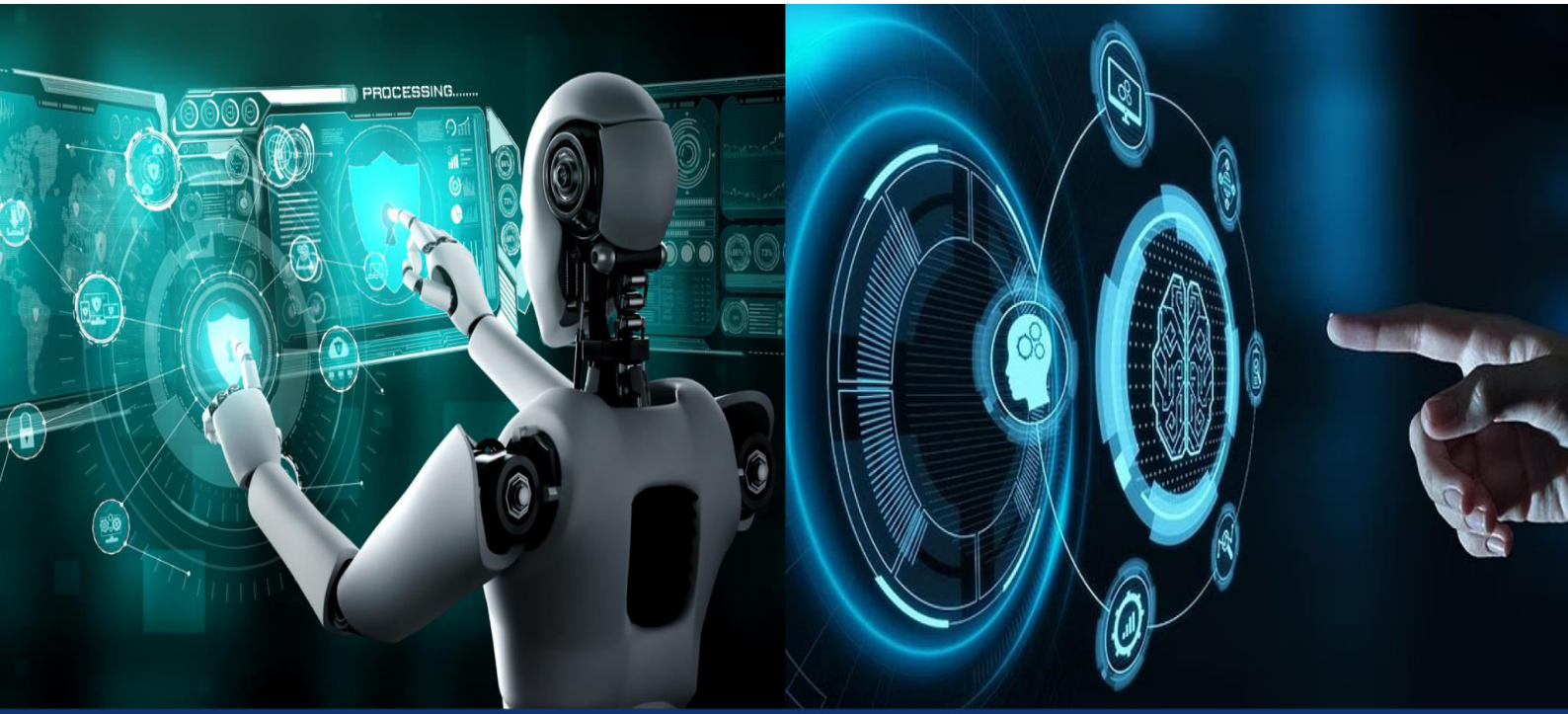
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Cursor Control using Hand Gestures

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ABSTRACT: . The Course Control Using Hand Gestures project is designed to control online courses using hand gestures without using a keyboard or mouse. The system uses a webcam to capture hand movements and Python libraries such as OpenCV and MediaPipe to detect and recognize gestures. Based on the recognized gestures, the system performs actions such as moving to the next page, going to the previous page, and controlling course navigation. This project provides a simple, touch-free, and user-friendly way to interact with online learning platforms. It reduces the need for physical input devices and makes course navigation easier and more convenient.

KEYWORDS: Hand Gestures, Course Control, OpenCV, MediaPipe, Python, Gesture Recognition, Webcam, Computer Vision, Touch-Free Interaction, Course Navigation.

I. INTRODUCTION

"**Cursor control using hand gestures"** is an innovative technology that allows users to control a computer mouse cursor through hand movements without using a physical mouse. This system uses a webcam to capture hand movements and computer vision techniques to recognize gestures and convert them into mouse actions. It provides a simple, convenient, and touch-free way to interact with a computer.

The system works by detecting and tracking the user's hand and fingers in real time. The position of the index finger is used to move the cursor across the screen, while specific gestures, such as pinching the thumb and index finger together, can be used to perform mouse clicks. Other gestures can be designed to support scrolling, dragging, and selecting objects.

This project can be developed using Python, OpenCV, and MediaPipe. OpenCV is used to capture and process video from the webcam, while MediaPipe identifies and tracks important points on the hand, known as hand landmarks. The recognized hand movements are then converted into corresponding mouse operations, enabling smooth and responsive cursor control.

The main objective of this project is to develop a user-friendly and efficient system that reduces dependence on traditional input devices. It can be useful for presentations, accessibility applications, educational demonstrations, and touch-free computer interaction. The system also demonstrates how computer vision and gesture recognition can be combined to create innovative human-computer interaction solutions.

II. LITERATURE SURVEY

Literature Survey is something when look at literature(publication) in surface level or an aerial view. It includes the survey of place, people and publications are context of research. Extensive literature survey has carried out for the set of objectives proposed in the synopsis Studied some of the papers titled.

1. Title: "Cursor Control System Using Hand Gesture"
Authors: Ashwini M. Patil, Sneha U. Dudhane, Monika B. Gandhi, and Nilesh J. Uke
Year: 2013
Publisher: International Journal of Advanced Research in Computer and Communication Engineering

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Description: This paper focuses on controlling a computer cursor using hand gestures. The system aims to provide an alternative to a traditional mouse by using hand movements captured through a camera. Image processing techniques are used to identify hand movements and convert them into cursor actions. The main advantage is that users can interact with a computer without a physical mouse. However, the accuracy of the system may depend on lighting conditions and camera quality.

2. Title: "Virtual Mouse Control Using Colored Fingertips and Hand Gesture Recognition"
Authors: Vantukal Reddy, Thumma Dhyanchand, Galla Vamsi Krishna, and Satish Maheshwaram
Year: 2020
Publisher: To be verified from the original research paper.
Description: This research paper presents a virtual mouse system that uses colored fingertips and hand gesture recognition to control the computer cursor. Image processing techniques are used to detect fingertip movements and perform mouse operations. Python and OpenCV support image processing, while PyAutoGUI is used to perform mouse actions. The main advantage is that the system allows users to control a computer without a physical mouse. However, the use of colored fingertips and sensitivity to lighting conditions may limit its performance.

3. Title: "Virtual Mouse Implementation Using OpenCV"
Authors: Kollipara Sai Varun, I. Puneeth, and Dr. T. Prem Jacob
Year: 2019
Publisher: To be verified from the original research paper.
Description: This research focuses on implementing a virtual mouse using Python and OpenCV. The system captures hand movements through a camera and processes the images to recognize gestures. The recognized movements are converted into cursor movements and mouse operations. The main advantage is that it provides a low-cost alternative to a traditional mouse. However, accurate hand detection may be affected by background conditions, lighting variations, and image processing limitations.

III. ARCHITECTURE

A system architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system.

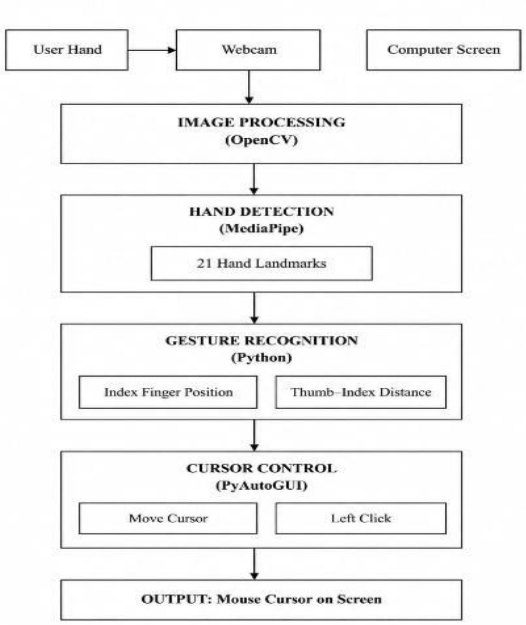


Fig.1. System Architecture

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IV. RESULT AND DISCUSSION

The Course Control Using Hand Gestures system was successfully developed using Python, OpenCV, MediaPipe, and PyAutoGUI. The system uses a webcam to capture hand movements and detect hand landmarks. As shown in the output, the green dots represent the detected hand landmarks, and the red dot highlights the fingertip position. The system displays the message “MOVE CURSOR” to indicate that the cursor movement function is active.

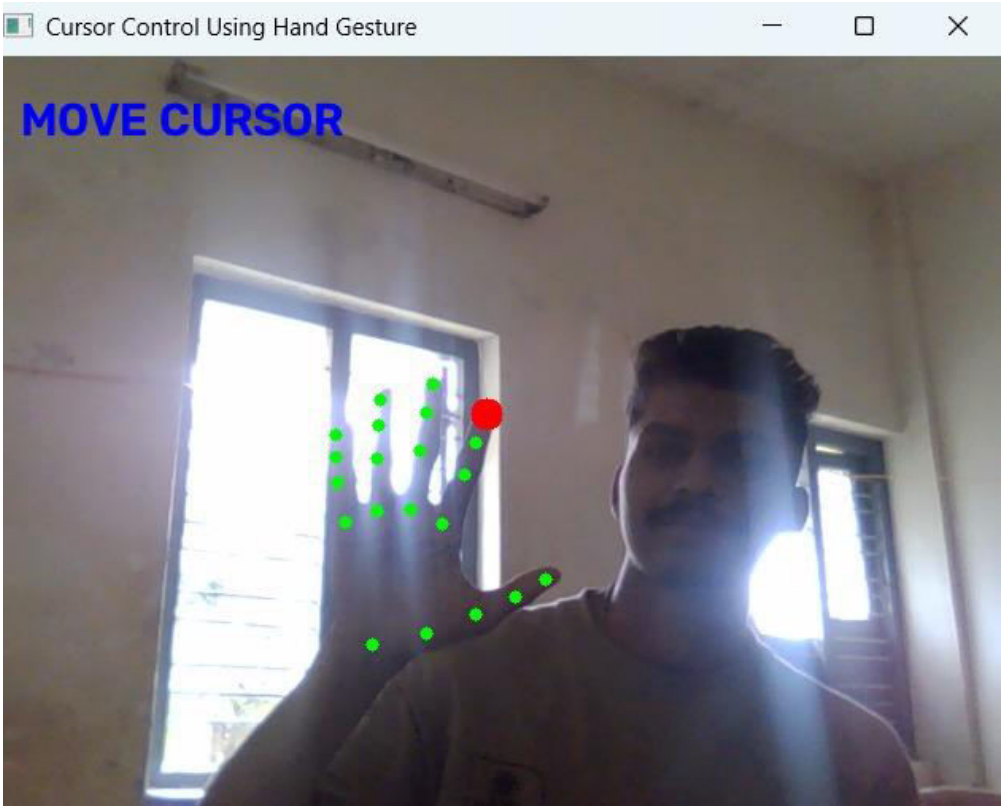


FIG.1.Cursor Control Using Hand Gestures

The recognized hand movements are converted into cursor movements and course navigation actions. This system provides a simple and touch-free method of controlling a computer without using a physical mouse. The output demonstrates that hand detection and landmark tracking work through a webcam. However, the system's performance may depend on lighting conditions, camera quality, and accurate hand detection. Overall, the proposed system provides a convenient and user-friendly approach to computer interaction and course control using hand gestures.

VI. CONCLUSION

“ Course Control Using Hand Gestures” project provides a simple and effective way to control a computer using hand movements without a physical mouse. The system uses Python, OpenCV, MediaPipe, PyAutoGUI, and a webcam to detect hand gestures and perform cursor movements and course navigation actions. It provides a touch-free, user-friendly, and low-cost method of human-computer interaction. Although performance may depend on lighting conditions and camera quality, the system offers a useful alternative to traditional input devices. In the future, the system can be improved by adding more gestures, increasing accuracy, and introducing additional course control features.

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