MINI PROJECT

VIRTUAL SYSTEM CONTROLS

USING COMPUTER VISION

CHINTHA NITHISH	ABHINAV P	GANGULA ANIRUDH
21P61A6635	21P61A6601	21P61A6654

ABSTRACT :

This project presents a hand gesture recognition system designed to control a computer cursor using hand movements and gestures, enhancing interactivity during presentations. The system leverages computer vision and deep learning to accurately track and interpret hand gestures in real-time, offering a contactless and intuitive user interface. This innovation is particularly beneficial in teaching or business presentations, eliminating the need for presenters to frequently return to their computer to control slides, thus improving the presentation experience. The development involves collecting a diverse dataset of hand gestures, followed by preprocessing steps like resizing, normalization, and annotation. A convolutional neural network (CNN) is designed and trained using TensorFlow to recognize different hand gestures with high accuracy. Data augmentation techniques are employed to enhance performance. The system supports cursor movement, clicking, and drag-and-drop. Cursor movement is controlled by the index finger tip position, clicking is triggered when the thumb and index finger tips come close together briefly, and drag-and-drop is initiated when they stay close for a longer duration. The system is tested and fine-tuned for optimal performance and responsiveness, providing a seamless user experience. This project showcases the potential of combining computer vision and deep learning to create innovative human-computer interaction interfaces, significantly enhancing presentation and teaching experiences. Looking ahead, the system could be expanded with additional features to further enhance its functionality. Future improvements may include multi-gesture recognition for more complex commands, integration with various presentation software for broader compatibility, and the addition of voice commands to offer a multimodal interface. Continuous advancements in deep learning and computer vision will drive the evolution of this system, making it even more versatile and user-friendly.

KEYWORDS: OpenCV, Mediapipe, Computer Vision, Convolutional Neural Networks(CNN), Python Script, Jupyter Notebook, etc.

INTERNAL GUIDE   **HEAD OF THE DEPARTMENT**

Mrs. S. Surekha   Dr. K. Shirisha Reddy