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Virtual Mouse using Hand Gestures

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Abstract: *The Virtual Mouse Using Hand Gestures project aims to revolutionize traditional computer input methods by enabling users to control a computer through natural hand movements, replacing the conventional mouse. This system uses computer vision technology to detect and interpret hand gestures, allowing users to interact with their computers hands-free. By employing algorithms for hand tracking and gesture recognition, the system translates specific gestures into corresponding mouse actions, such as moving the cursor, clicking, scrolling, and dragging.*

The project's primary goal is to create an intuitive, accessible alternative to traditional pointing devices, particularly beneficial for individuals with mobility limitations. Through the use of technologies like Python, OpenCV, MediaPipe, PyAutoGui, NumPy and Time Module and machine learning models, the system can detect and track hand movements in real-time using a camera or sensor. This gesture recognition is powered by predefined motion patterns, allowing the system to respond instantly to user inputs. The software simulates mouse actions, including left and right clicks, drag-and-drop functionality, and scrolling, based on gestures such as fist closures, hand movements.

The system operates through a real-time feedback loop, where the hand's position and gestures are constantly tracked, and corresponding mouse movements and actions are performed. As the user moves their hand, the cursor moves on the screen; a closed fist or pinching gesture could simulate a click, while a circular hand motion may be used to scroll.

Professionals like surgeons, educators, and industrial workers can maintain sterile environments or operate systems without touching physical devices. Tech enthusiasts can explore cutting-edge technologies like gesture recognition and machine learning, while general users enjoy convenience and a futuristic experience. This technology has broad applications in

With the growing popularity of online education and

healthcare, education, gaming, and more, providing an innovative and practical alternative for many..

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