



Gesture Control Virtual Mouse and Voice Assistant – A Project Review

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ABSTRACT

The arrival of Gesture Control Virtual Mouse and Voice Assistant systems has ushered in a significant transformation in human-computer interaction, offering innovative and user-friendly methods of interfacing with digital devices. This paper presents a comprehensive review of a project that leverages advanced technologies, including MediaPipe, OpenCV, and Convolutional Neural Networks (CNNs), to develop an intelligent and efficient system in this domain. The effectiveness of Gesture Control Virtual Mouse and Voice Assistant systems depends on multiple factors. Among these factors, three important parameters are : the recognition of gestures, the operation of the virtual mouse, and the functionality of the voice assistant. Although direct control over these parameters may not always be feasible, their performance intricately links to various variables within the system. This review examines the body of research dedicated to understanding, measuring, and enhancing these critical parameters.

Keywords: Process control; Gesture recognition; Virtual mouse; Voice assistant; Human-computer interaction.

1. Introduction

Gestures are used to communicate messages nonverbally which can be sent through a person's fingers, hands, body movements. While interacting with others, gestures can be used to express easy to highly difficult all kind of hand motion information. For illustrative example, we can utilize straightforward gestures which are demonstrated in sign languages and are included into their syntax to point to an object or person, or employ range of other different simple gestures or motions. As a result, implementing hand gestures as a tool, humans can take on with each other more competently with computers.

The movement of a visual object is one mouse function that has now been substituted by hand movements. The work is designed to be inexpensive, and it captures hand gesture via a cam, which is one of the many inexpensive input gadget's. There are innumerable current systems. One can move around the monitor screen using a standard hardware mouse. The monitor screen cannot be accessed with hand gestures with this hardware tool. Furthermore, the functions are static and simple in nature. Using current technique, we could operate the mouse and do some basic tasks on a computer or laptop with web camera and microphone without the need of any other computer hardware tool. Other procedures can be done with a voice assistant.

The Gesture Controlled Virtual Mouse and voice assistant is designed using the latest technology and is capable of recognizing both static and dynamic hand gesture of the users in addition to voice commands by the users, making the interaction with computer system or desktop more natural, user-friendly and effective.

2. Implementation of system

The windows show is marked with the rectangular place for taking pictures the hand gesture to carry out mouse movement primarily based on the gesture. when the palms are find under those square location the detection begins to stumble on the action based on that the mouse cursor capabilities will be completed. The rectangular location is drawn for the reason of taking pictures the hand gestures thru the internet camera which can be used for mouse cursor operations.

Mouse capabilities depending on the Hand Gestures and Hand Tip Detection using computer vision:

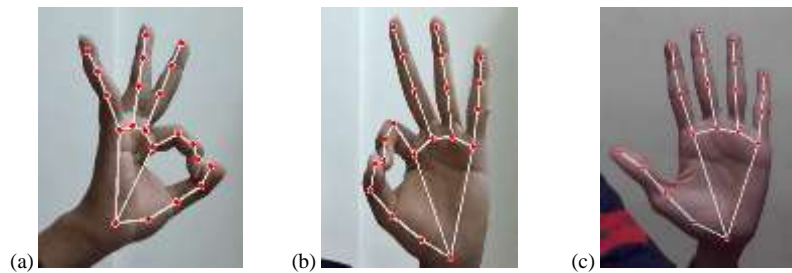


Fig. 1 - (a) Scroll Up/ Down (b) Brightness & Volume (c) No Action

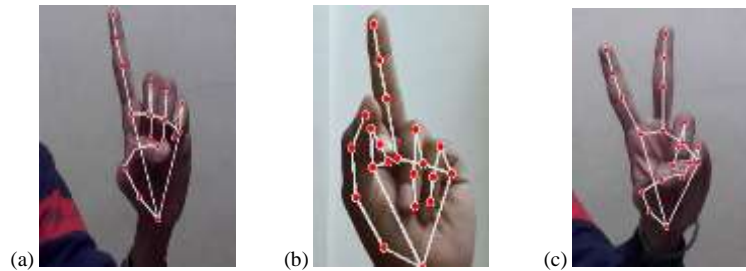
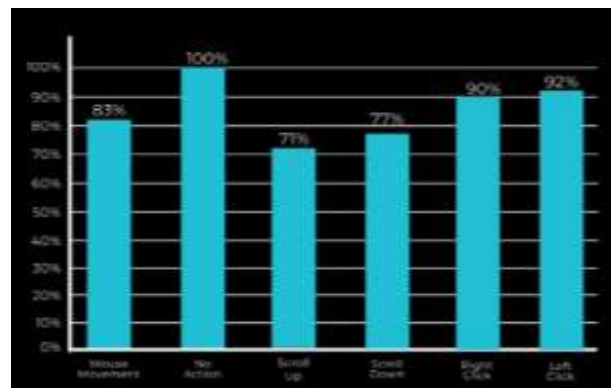


Fig. 2 - (a) Left Click (b) Right Click (c) Mouse

3. Result and inferences

A hand-gesture-managed digital mouse could serve as an alternative for human beings with disabilities who may struggle with traditional input gadgets. This generation can decorate accessibility by using imparting a more intuitive manner to have interaction with computers and devices. moreover, it could offer greater freedom of movement for folks that choose no longer to apply a physical mouse or touchpad. depending on the implementation, this technology could probably provide progressed accuracy and velocity in comparison to conventional input methods. The achievement of this era will in the end rely upon its person revel in. If it is user-friendly, reliable, and gives an intuitive interface, it's far in all likelihood to be nicely-obtained. however, if it's miles hard to use, unreliable, or unintuitive, customers can be reluctant to adopt it.

The hand gesture-managed virtual mouse with the use of synthetic intelligence has the capability to improve the accessibility and comfort of computer interaction for users with bodily disabilities or for customers who opt for an opportunity to standard input gadgets.



4. Conclusion

In summary, the research demonstrates the potential of integrating voice assistant technology with gesture control to create a more accessible and intuitive human-computer interaction system. By leveraging advanced Machine Learning and Computer Vision algorithms, including Convolutional Neural Networks, the study showcases the system's capability to accurately interpret hand gestures and voice commands, offering a promising solution for individuals with physical disabilities and those seeking hands-free computer interaction.

Moreover, the system's robust performance in various lighting conditions makes it adaptable to different environments. This technology has the potential to significantly enhance the quality of life for individuals with disabilities and opens up new avenues in healthcare, education, and assistive technology. In conclusion, the research lays the groundwork for further advancements in voice assistant and gesture-controlled virtual mouse technology, emphasizing its role in improving accessibility and user experience in the digital realm.

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