VIRTUAL MOUSE WITH VOICE ASSISTANCE

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ABSTRACT

This study intends to decrease computation time, increase user comfort with regard to human hand postures, and enhance the recognition of human hand postures in a Human Computer Interaction application. An application for computer mouse control was created by the authors. The programme performs well time-wise based on the suggested algorithm and chosen hand feature. Due to the suggested hand postures and voice assistant, the user finds it simpler to utilise the device. A software-based device called a "virtual mouse" enables users to operate the mouse cursor on a computer screen without a hardware mouse by using voice instructions and hand motions. This study describes a system that uses speech recognition and image processing to generate a virtual mouse that can be controlled by voice.

Keyword: *Unsighted, Detection, Gesture, Media pipe, OpenCV, Python.*

1. INTRODUCTION

The interest in creating systems for human-computer interaction has grown during the last few years. The availability of software packages that offer capabilities for specific processing and facilitate communication between computers and computing devices motivates researchers, engineers, and students to focus on the development of intuitive, natural user interfaces. created a multimodal interface for people with disabilities who use wheelchairs. By providing people with disabilities with a few different options for using their wheelchair, a user interface such to this one can enhance their quality of life. The research community is interested in leveraging human hand postures and gestures to control or interact with artificial systems since they continue to be a powerful form of interhuman communication. the use of hand motions

1.1 Proposed System

The goal of the proposed work is to create an assistive technology that is economical, practical, and comfortable for people with disabilities. ensuring that they can communicate normally with others without assistance from others. The goal of the proposed effort is to create a low-cost, easily transportable, and helpful device for the blind, deaf, and nonverbal.

1.2 Objective

The suggested method aims to create a virtual mouse utilising voice assistance and hand gesture recognition. In order to swiftly navigate the system controls, this work offers a cursor control system that makes use of a web cam to record human hand movements.

1.3 LITERATURE SURVEY

To accomplish each module in this project we went through a lot of previous works. One of the major parts of this project is the face detection part. 1]Journal of Healthcare Engineering | Hindawi in 2021,"Deep Learning-Based Real-Time AI Virtual Mouse System Using Computer Vision to Avoid COVID-19 Spread". The concept of advancing the human-computer interaction using computer vision is given. 2]V. Geetha, C.K.Gomathy, Kottamasu Manasa Sri Vardhan, Nukala Pavan Kumar, "The Voice Enabled Personal Assistant for Pc using Python April 2021" , International Journal of Engineering and Advanced Technology 10(4):162-165. 3] Chaithanya C, Lisho Thomas, Naveen Wilson, and Abhilash SS in 2018 proposed "Virtual Mouse Using Hand Gesture" where the model detection is based on colors. 4]L. Thomas, "Virtual mouse using hand gesture," International Research Journal of Engineering and Technology (IRJET, vol. 5, no. 4, 2018.View at: Google Scholar 5]Vinay Kr. Pasi, Saurabh Singh, and Pooja Kumari in 2016 proposed "Cursor Control using Hand Gestures" in the IJCA Journal. The system proposes the different bands to perform different functions of the mouse.

2. METHODOLOGY

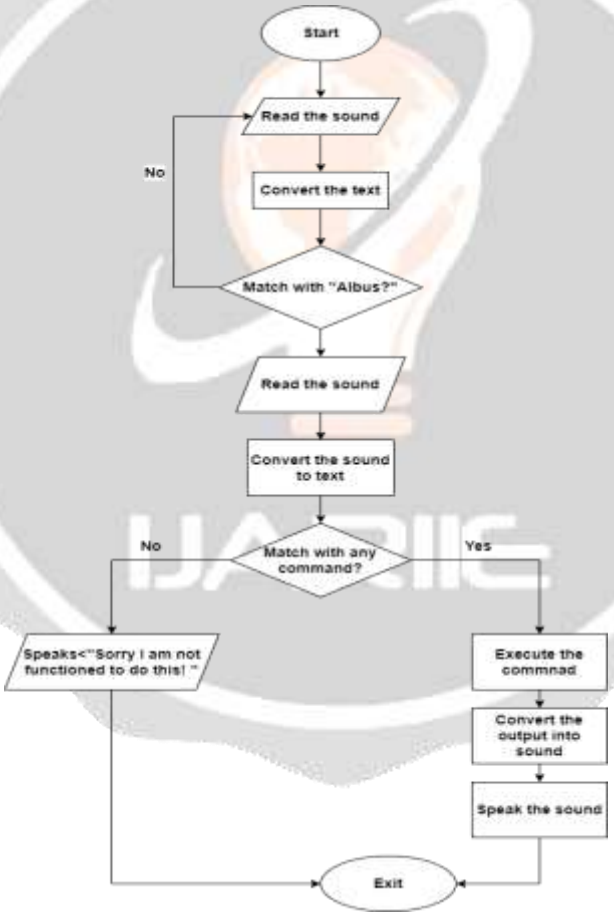


Fig -1: Block diagram of the proposed system

Firstly we need to import the required libraries for the program like Speech Recognition, Gesture_Controller, pynput, pyautogui, Wikipedia, opencv-python, mediapipe, ctypes, comtypes, pycaw, screen-brightness-control, eel, webbrowser, datetime, math, os, etc.

CAMERA: The proposed AI virtual mouse technology is based on the frames captured by the webcam on a laptop or PC. The video capture object is created by leveraging the Python computer vision package OpenCV, and the webcam begins to record video. The webcam then captures the frames and sends them to the AI virtual machine.

VIDEO CAPTURE: The AI virtual mouse technology uses a webcam to capture every frame till the programme is terminated. The code below finds the hands in the movie frame by frame by converting the BGR frame to the RGB frame of the video. Defines the mp_hands function, which will assist us in tracking the position of our hands. Detecting Which Finger is Up, and our goal at this point is to detect which finger movements are up, as well as the respective coordinates of the fingers that are up, depending on the information discovered in the library, and then perform the mouse function accordingly. This stage entails keeping track of which finger is up based on the tip Id we discovered via the MediaPipe, as well as their corresponding coordinates, and performing the necessary mouse function accordingly. It initiates a loop that monitors the position of our hands every 0.1 second. Mouse Characteristics Hand Gesture Recognition and Hand Tip Detection Using Computer Vision When the index and middle fingers are up for the Moving Function, the mouse pointer is made to move across the computer's display using the Python AutoPy library. The Hand Label of the person's right hand is used to initialise the HandRecog class. The initialize_hand_result method is used to populate the hand result with the landmark points from the first frame. When the optical flow is complete, this procedure is invoked. If the hand is moving, the update_hand_result method returns a None with the Gesture.d type.

MOVING: If the hand is not moving, the landmark points are reviewed to see if there is a known gesture. The function then determines whether the gesture has changed. If it has, it changes the current gesture and increases the number of gesture frames. The get_signed_dist method delivers the signed distance between two landmark sites in pixels.

Left Button Click: This is accomplished by widening the index finger and dragging it onto the file or folder.

Right Button Click: Right button click is enabled by widening the middle finger and dragging it onto the file or folder to explore more actions on it.

Scroll Up/Down: The computer is programmed to perform the mouse motion of scrolling up and down by simply pinching.

3. TECHNICAL OVERVIEW

The goal of this project is to eliminate the need for touch by utilising Hand Gesture Recognition and a Voice Assistant. It is divided into two sections: Gesture Recognition and Voice Assistant (Albus).

Hand Gesture as a Virtual Mouse: We used a web camera and a colour detecting method to control the position of the mouse cursor and other click events. It is possible to virtually control all i/o activities using voice commands and both static and dynamic hand gestures. To conduct mouse operations in Python, the OpenCV module, which is necessary for mouse activities, must be used. A webcam records the hands in real time. Using a specific method, only the coloured fingertips are retrieved from the movie. Several actions are taken.

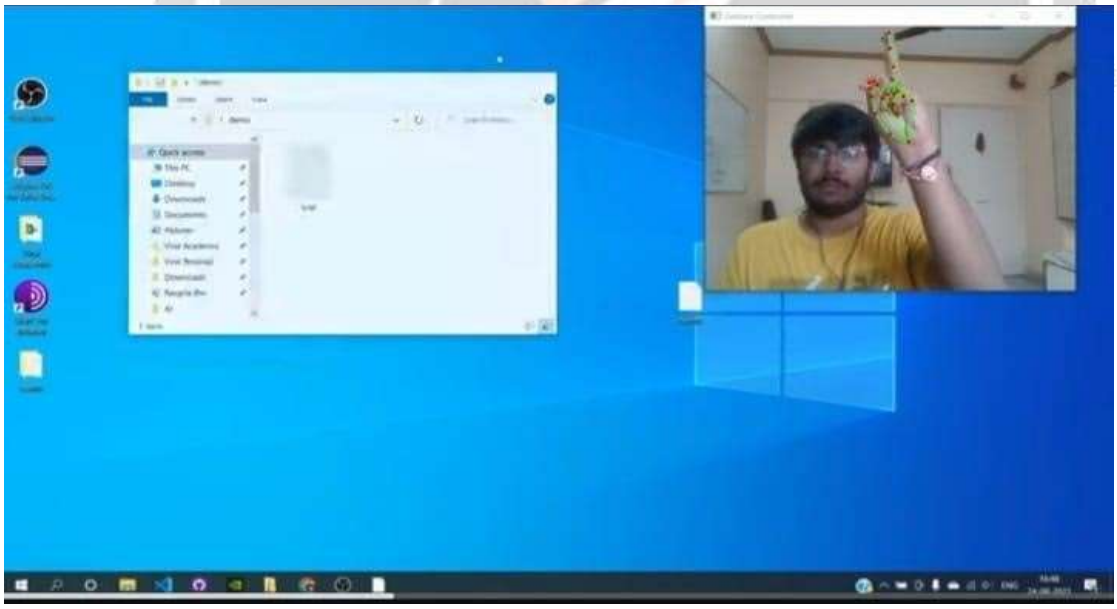
A voice assistant - Albus is a digital assistant that listens to particular voice commands and returns relevant information or performs specified actions as asked by the user using speech recognition, language processing algorithms, and voice synthesis. Voice assistants can return relevant information based on particular commands, sometimes referred to as intentions, voiced by the user by listening for certain keywords and filtering out extraneous noise. While some voice assistants are purely software-based and can be integrated into most devices, others are hardware-based. designed specifically for single device applications, such as the Alexa Wall Clock from Amazon.

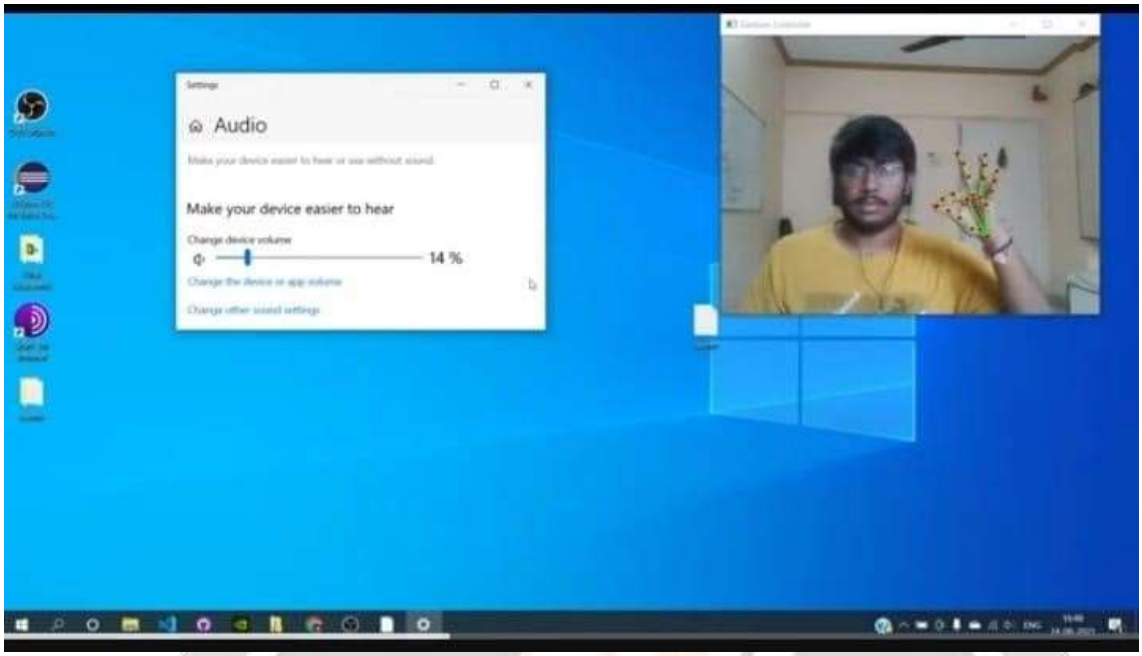
Voice assistants are already built into many of the gadgets we use every day, including cell phones, PCs, and smart speakers. Because of their extensive range of integrations. There are various voice assistants that specialise in a specific feature set, while others are more open-ended and can assist with practically any circumstance.

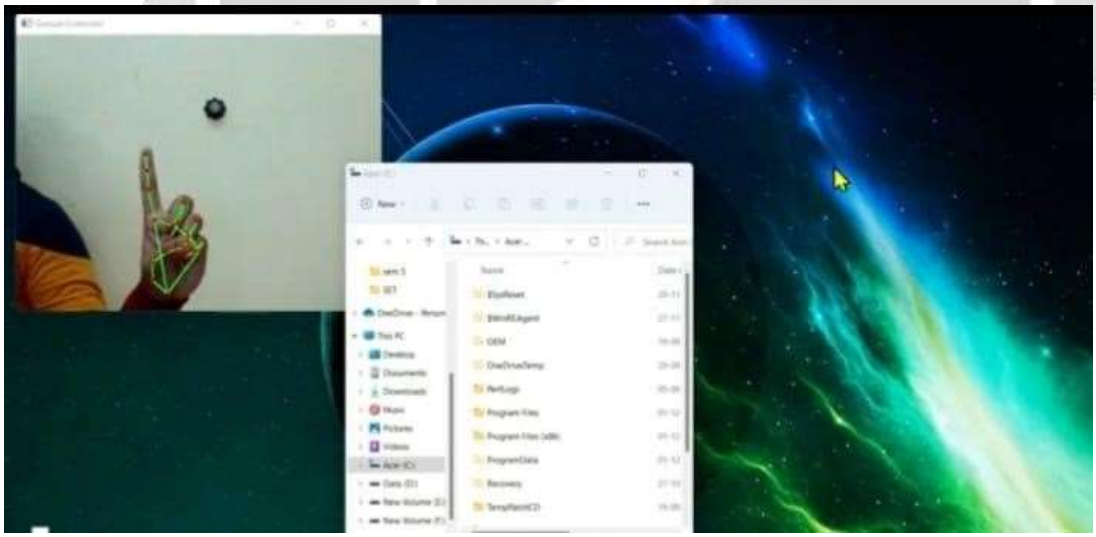
4. RESULT

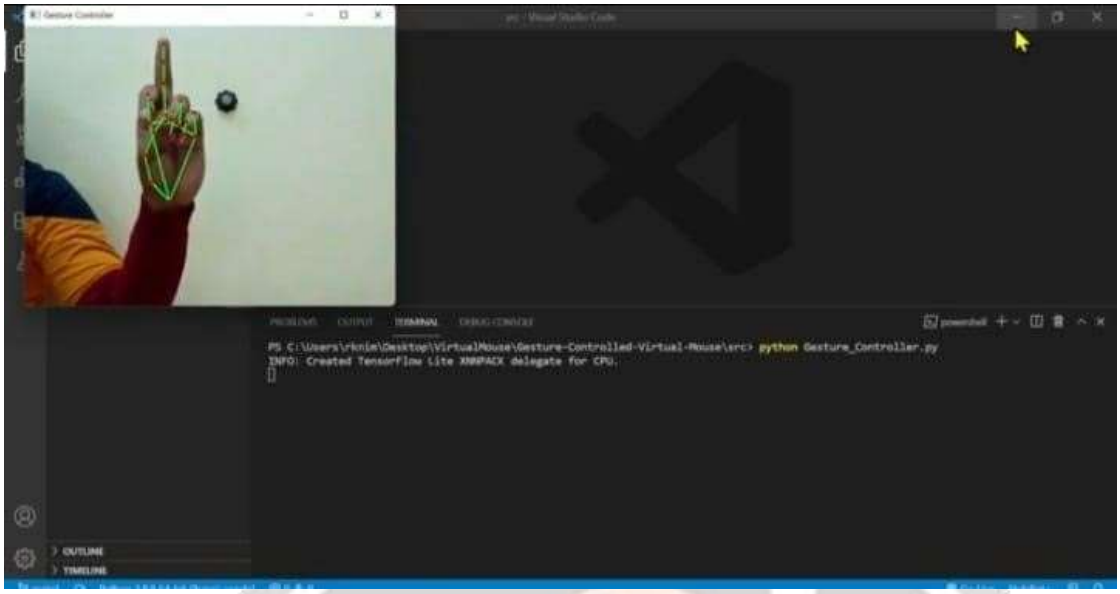
In the proposed AI virtual mouse system, the notion of enhancing human-computer interaction through computer vision is presented. It is difficult to compare testing of the AI virtual mouse system because there are so few datasets available. The webcam has been positioned at various distances from the user to follow hand gestures and detect hand tips in an effort to assess their abilities under varied illumination conditions. The model is tested multiple times using the AI virtual mouse system in a variety of lighting conditions, including bright, dim, up-close to the webcam, and four feet or more away from the screen. The AI virtual mouse technology had a 99 percent accuracy rateBecause the right click is the most difficult gesture for computers to understand, its accuracy is poor. The right click's precision is low since the gesture needed to perform the precise mouse action is more challenging. Additionally, all other gestures are superbly accurate. In comparison to past techniques, our virtual mouse model performed incredibly well, with accuracy of 99 percent. It is evident that the proposed AI virtual mouse has excelled all other virtual mouse models in terms of accuracy when measured against existing virtual mouse models. The proposed model's novel feature is its ability to virtually manage a computer in a manner akin to that of a physical mouse, including completing most mouse motions such as left and right clicks, scrolling up and down, and mouse.

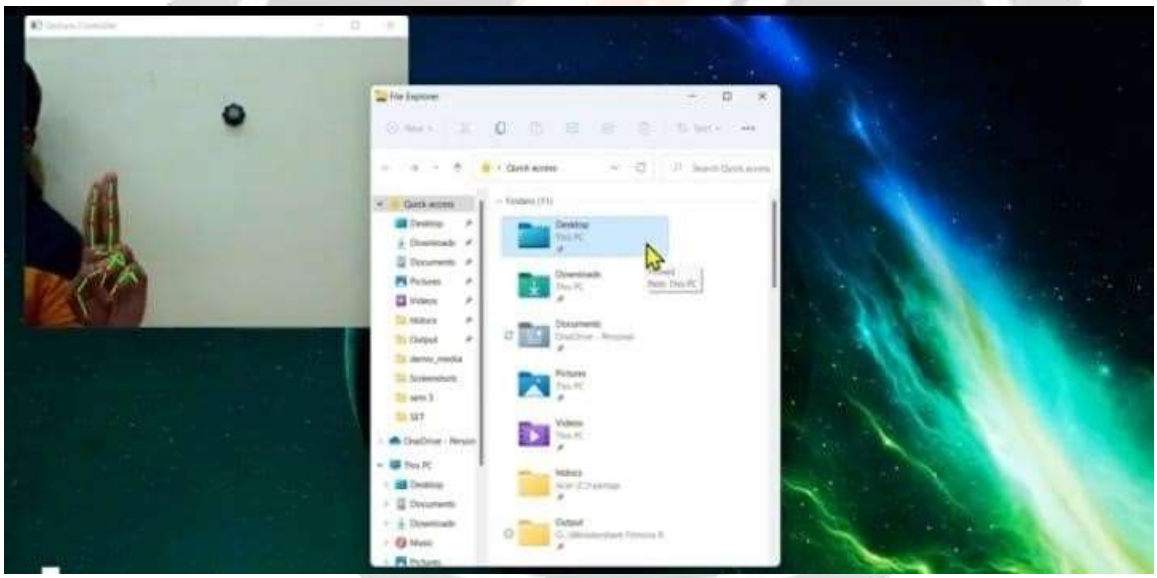
Gesture Controller Output:




Audio
Make your device easier to hear
Change device volume
14 %







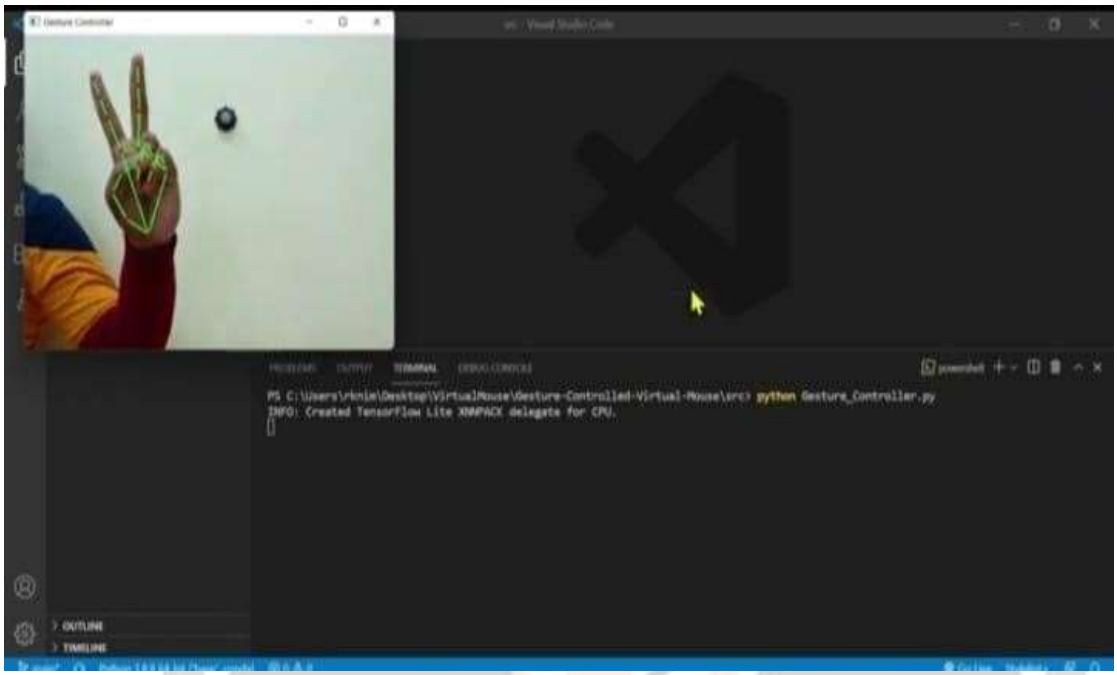
Typical Commands

"Albus Find a Location" is a command.

Based on the user's input, a location will be looked up, such as Hyderabad, Mumbai, etc. Then it will launch Chrome or Firefox and look up the address on Google Maps.

"Albus, what time is it?" is the command.

If you ask Albus "What is the current date?" it will respond with "Month Date, Year," for example: June 27, 2022.



5. CONCLUSIONS

In this project, we are developing a method for using a live camera to control the mouse pointer. The system can perform all Mouse tasks and is based on computer vision techniques. However, because there are so many different human races, it is challenging to obtain solid results. Utilising this technique would make presentations simpler and save workspace. With the use of the Palm and many fingers, it offers capabilities like window closing, window enlargement, and more. This programme is made to make physically challenged persons use desktops and laptops as intelligently as regular people do, taking into account the utilisation of new cutting-edge technologies.

6. ACKNOWLEDGEMENT

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