Gesture Controlled Virtual Mouse Along With Voice Assistant

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Abstract—**A real-time fingertip-gesture-primarily based interface is still difficult for human,-pc inter actions, due to sensor noise, converting mild stages, and the complexity of tracking a fingertip across a diffusion of topics. using fingertip shadowing as a virtual mouse is a popular fashion of interacting with computers without mouse tool. Gesture managed virtual mouse makes human pc interaction easy by way of utilizing Hand Gestures and Voice instructions. The pc requires almost no direct touch. This venture uses the nation-of-art device gaining knowledge of and computer imaginative and prescient algorithms to apprehend hand gestures and voice instructions, which works easily without any additional hardware necessities. Now-a-days, each and every task that you perform everyday can be done with the help of Artificial Intelligence and Machine Learning. A Voice Assistant is once such innovation which can help us in many things. The users can ask their assistant questions or to help them in basic tasks such as opening the browser.**

Keywords—*Human-pc Interaction (HCI), Graphical User Interface (GUI), Red Green Blue (RGB), Artificial Intelligence (AI),*

I. INTRODUCTION

In this high-tech international, it's almost impossible to imagine lifestyles without computer systems. The invention of computer systems is one of the best humankind innovations. Computer systems have turn out to be a crucial part of almost every day use for individuals of each age. In each day lifestyles, we engage many instances with computers to make our work easier. Hence, human-pc interaction (HCI) has emerged as a hot topic for studies. In our everyday lifestyles, imaginative and prescient and gestures are important techniques for communication among humans, and the equal role is played by using the mouse in Graphical user Interface (GUI) based totally computer systems. So, a blended methodology can be used to make a higher interactive machine for Human-laptop interaction. computer imaginative and prescient strategies may be an alternative manner for the contact screen and create a virtual human computer interaction tool using a webcam. in this task, a finger tracking-based totally digital mouse utility could be designed and applied the use of an everyday webcam. To put in force this, we can be the use of the object tracking idea of synthetic Intelligence and the OpenCV module of Python. Voice assistant is a software that communicates with the user audibly and responds to the verbal commands. It is very helpful for the users as it is less time consuming and easy. The main motive of the voice assistant is to reduce the use of input devices such as mouse, keyboard, etc. It also reduces the hardware cost. This voice assistants can be used on cell phones or computers. In this project, we have developed a voice assistant which will help to open any browser on the device, keeps the track of weather or give the user current date and time.

II. PROBLEM DEFINITION

The artificial intelligence virtual mouse framework that has been proposed can be utilized to take care of issues in reality, similar to when there isn't sufficient room to utilize an actual mouse. Furthermore, since hand motion and tip identification are utilized to control the PC mouse's capabilities by means of a webcam or implicit camera, the proposed man-made intelligence virtual mouse can be utilized to conquer these issues in the Coronavirus circumstance, when utilizing gadgets by contacting them isn't protected. This isn't shocking given that each piece of specialized gear has its own limitations, especially as to PC equipment. The issues are recognized and summed up in the wake of considering an assortment of actual mouse species. Coming up next is an overall issue with the actual mouse as it is currently: mechanical mileage, the requirement for specific equipment and surfaces, trouble adjusting to different circumstances, and execution varieties in view of the climate are burdens of actual mice. A mouse can do a predetermined number of things, even in the present functional circumstances, and both wired and remote mice have a restricted life expectancy.

III. LITERATURE SURVEY

In [1], the system has the features such as showing weather conditions, showing date-time, etc. This system is made by using python language. It uses packages such as datetime, Google's text-to-speech, Smtplib, Pyaudio, etc. The limitation of the system is that the distance between the user and the device should be very less.

In [3], this system works by identifying the color of the hand. This system uses RGB parameters for skin color extraction. The algorithm of this system shows less accuracy when there are background noises present, different light conditions, etc.

In [4], this system works by identifying the fingertips of the user. Baes on fingertips it decides the position of the cursor. In this system the contour of the hands is extracted by using border- tracing algorithm. But the drawback of the system is that the accuracy of the right hand is very less and it sometimes get confused between different gestures.

In [5], this system the user gives input by speaking to the device and the device than gives the suitable output through text. This system Python for programming. It uses pyttsx3 package which is a text-to-speech package of Python. As this system works offline, it doesn't allow the user to do work online.

In [8], this system works as a personal assistant for the user. This system responds to basic commands such as open

application, close application, run any media file and answer any user question. The response time of this system is more.

In [9], This system used hand pad to give better hand detection. The user has an increased comfort in use of the system due to proposed hand positions. The angle hand gesture is difficult for some of the users to learn.

In [23], this system used vision-based interface for controlling a mouse. It uses 2D and 3D hand gestures. This system can track multiple hands at a time. For any gesture, it requires two hands at a time.

IV. WORKING OF SYSTEM

The planning of the system is basically divided into 2 parts - Virtual Mouse and Voice Assistant. The virtual mouse starts with the basic user interface. The user has to give input "Proton turn on gesture recognition" and the camera/webcam turns on.

1. Neutral Gesture: If all the fingers are up, the execution of the current gesture stops.

2. Move Cursor: If index finger is up and the middle finger is up, the cursor makes the movement as the fingers move.

3.Left Click: If both index finger and the middle finger is up and index finger is half closed, it performs left click feature.

4.Right Click: If both index finger and middle finger is up and middle finger is half closed, it performs right click feature.

5.Double Click: If both index finger and middle finger is up and moved closed to each other and joined, it performs double click feature.

6.Scrolling: If both index finger and thumb is joined to each other, it performs scrolling feature.

7.Drag and Drop: It is used to move files from one directory to other.

8.Multiple Item Selection: It is used to select multiple items.

9.Volume Control: It is used to increase and decrease the volume of the computer.

10. Brightness Control: It is used to increase and decrease the brightness of the computer.

To close the virtual mouse, the user has to put input "Proton turn off the gesture control".

The voice assistant starts with the basic user interface. The user has to give input "Proton Turn on Voice Recognition" and the assistant starts. The user can give an input to the assistant verbally. The input can be opening the browser, date and time, weather conditions, etc. To close the virtual assistant, the user has to input "Proton turn off the virtual assistant".

1.Google Search: The user has to speak "Proton {what you want to search}. It will open the browser and the search the given text on Google.

2.Find a Location on Google Maps: The user has to speak "Proton Find a {Location you want to find}. The required location will be displayed on Google Maps in the Chrome tab.

3. File Navigation: The user has to speak "Proton list files". It will show the Files with File Numbers. Then the person has to specify the range of file which he/she has to open. It will open the stated file.

4. Current Date and Time: The user has to speak "Proton what is today's date?". It will show the current date. Same will be for time.

5. Copy and paste: The user has to speak "Proton Copy" and "Proton Paste". It will copy and paste the given text.

V. OBJECTIVE

The main objective of the project is to reduce the use of hardware. It will also help to reduce the use of input devices such as keyboard and mouse. Since there is no use of hardware it will reduce the cost. It is portable as it can be carried anywhere. Everyone can use it despite of their age.

VI. REQUIREMENT ANALYSIS

- Hardware Requirements
  - Memory (RAM): Minimum 4 gigabytes.
  - System type: 64-bit, x64-based processor.
  - Base frequency: 2.30 GHz.
  - Input Device: Webcam, Microphone
- Software Requirements
  - System software: Windows XP, 7, 8, and 10.
  - Python 3.8.5 version
  - Anaconda Distribution

VII. DESIGN

1. Flow of Virtual Mouse

Fig.1 shows the flow of virtual mouse and how the gestures are controlled.

Flowchart shows how the camera detects the hand and finger tips. It shows how the fingers need to align with each other so that the mouse can make a movement.
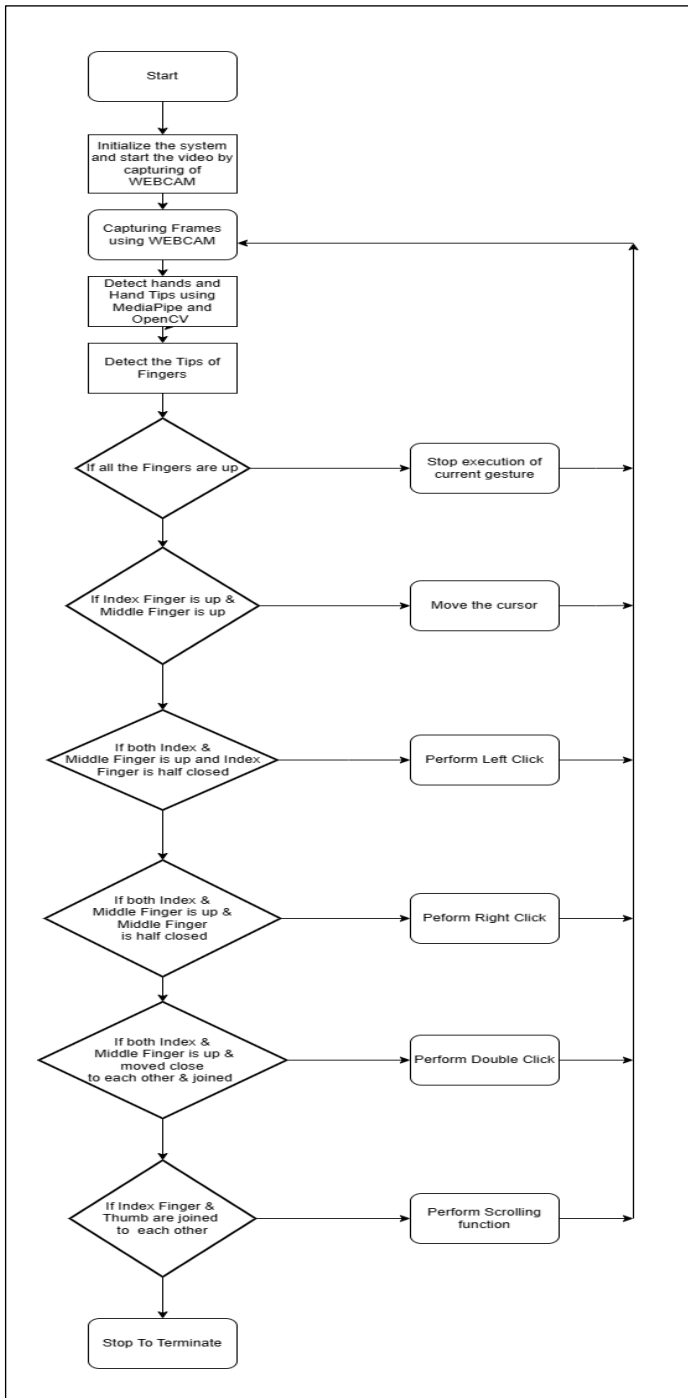
Fig.1 Working of the Virtual Mouse

2. Flow of Voice assistant

Fig.2 shows the flow of Voice Assistant.

The flowchart shows how the system reads the sound of the user and converts it into text so that the system can understand it. It shows how the commands given by the user are executed.
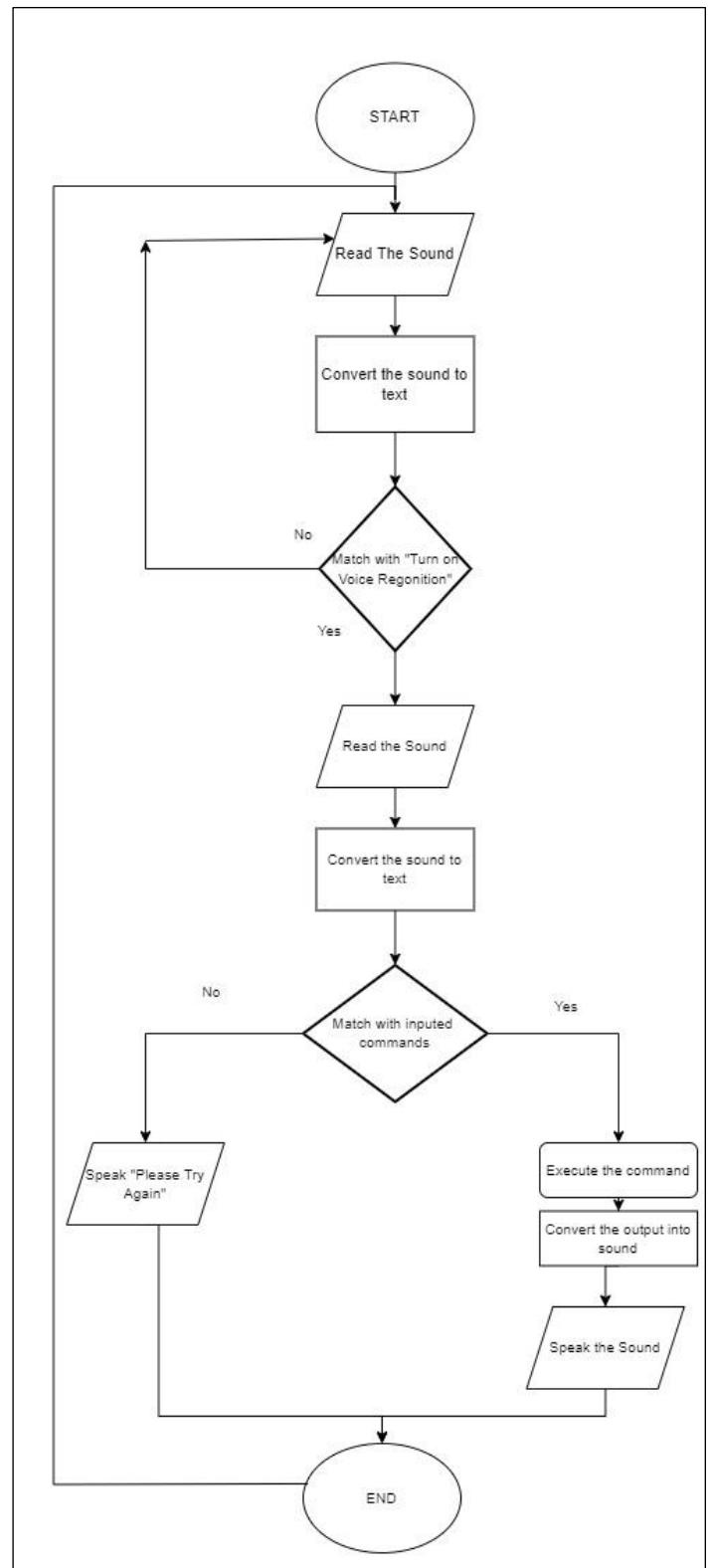

Fig.2 Working of Voice Assistant

VIII. RESULT

Fig.3 shows the movement of the cursor

Fig.4 shows the scrolling movement of the cursor

Fig.5 shows the Left Click movement

Fig.6 shows the Right Click movement

Fig,7 shows the Neutral Gesture

Fig.8 shows the Multiple Item Selection Movement

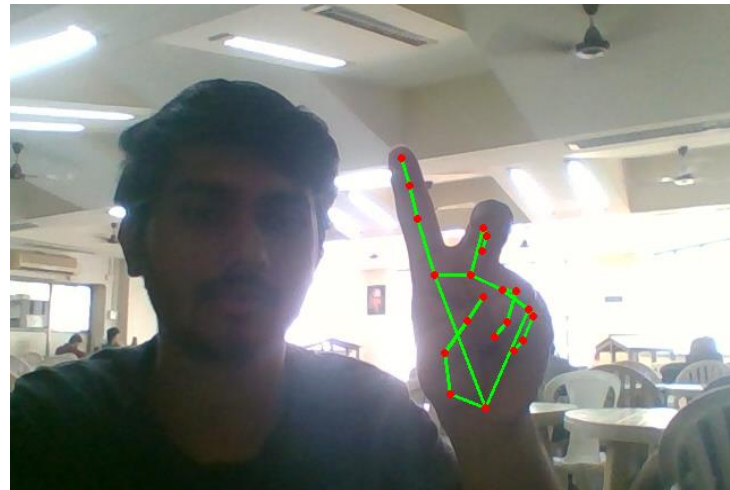Fig 9. Shows the GUI Interface
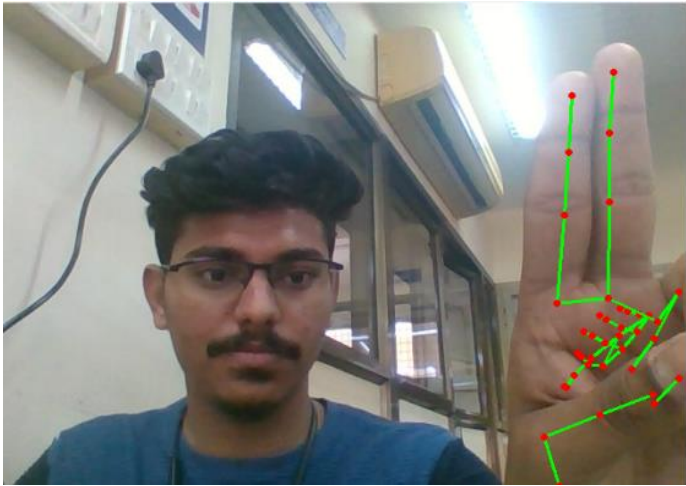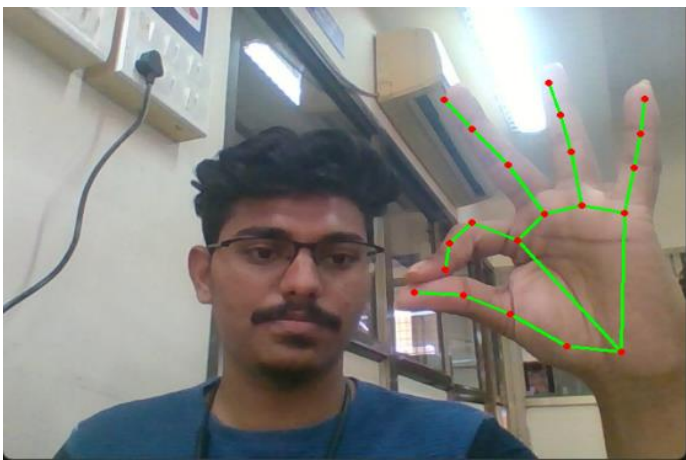

Fig.3 Cursor movement
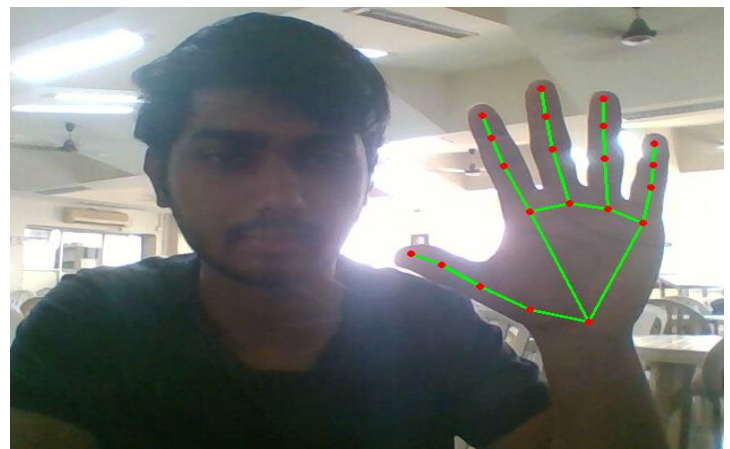

Fig.6 Right Click Movement
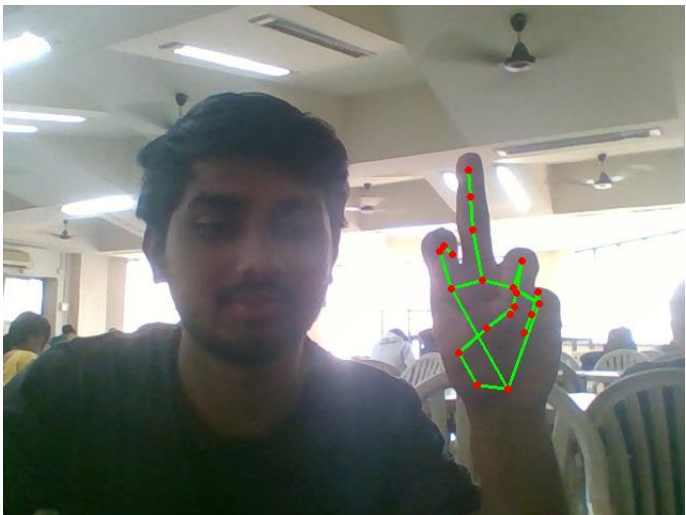

Fig.4 Scrolling movement

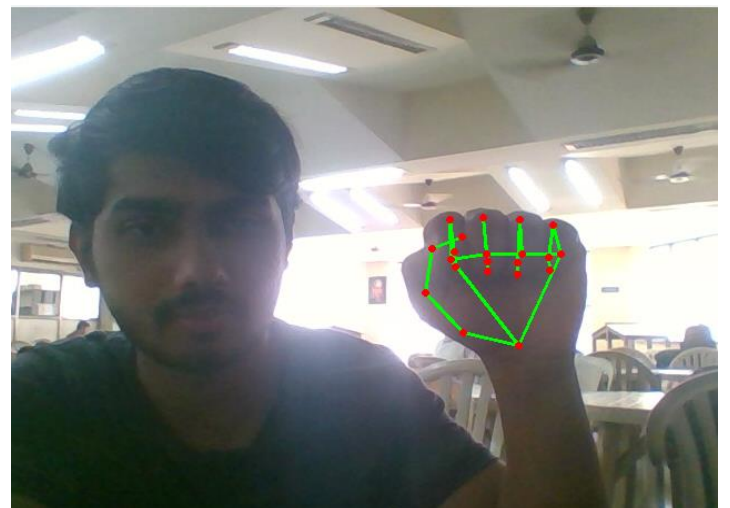Fig,7 Neutral Gesture

Fig.5 Left Click movement

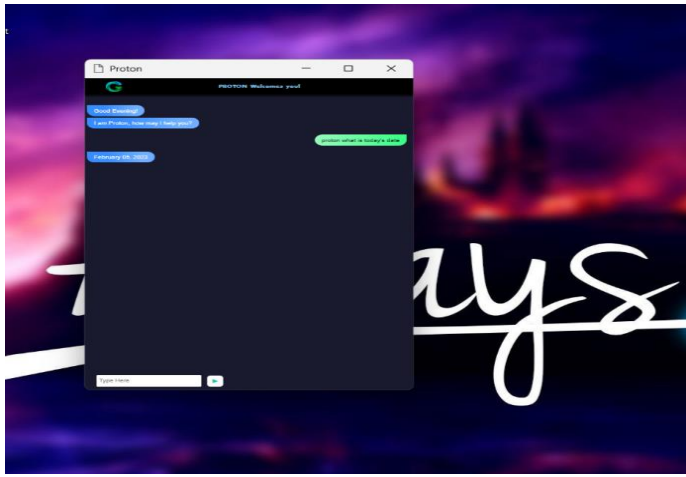Fig.8 Multiple Item Selection Movement

Fig 9. GUI Interface

IX. CONCLUSION

In this project, we created a virtual mouse using hand gestures. The user's hand gesture interacts with the mouse without use of any gloves or mouse device. The proposed system overcomes the limitation of background and light change in light. This saves a lot of time and is user friendly and can have high demand in future because of its everyday need. In this project, we have also created a voice assistant where user can open any browser just by vocal input.

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