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Smart System for Presentation using Gesture Control

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ABSTRACT

It has grown more and more significant. To maintain relationships and finalize works, we employ a variety modern tool, include cell phone and Mobil calls. They require easier, more natural ways to interact with technology. but has grown more important because of our increasing dependence on them. The current study offers a novel method for computer-to-computer interaction that leverages hand gestures in conjunction with the effectiveness of expression-controlled devices. Unlike traditional mice, users of a simulated rodent can move the pointer on the screen by combining hand movements and spoken commands. Along with responding to verbal acceptance, it additionally enables consumers to move the cursor by using it as a hand motion. It is designed to be simple to use yet intuitive.

KEYWORDS

Python, Detection Open CV, Mediapipe, Gesture, CVV

1. INTRODUCTION

Generation still finds it difficult to break through the barriers imposed by earlier forms of communication, even though it is increasingly more common in daily life. Even if we've grown accustomed to the limitations that accompany our mouse and keyboard, what if there was a way for us to be independent of this equipment? Hello, and thank you for delving into the globes of the greatest communication between humans and computers. the Touch Digital Controller with Vocal Module—a technological marvel. This clever design combines the usefulness of thumb warning signs with the correctness of words to provide an experience that is truly. exceptional. think it might be conceivable to alter the mouse pointer without just a hand gesture or inspect the machine's as well as handle's worth, but it's just not achievable with more traditional methods.

Although knowledge is advancing so quickly, computers have become extremely powerful tools designed to make human tasks easier. Human-computer interaction, or HCI, has become increasingly important in our day-to-day activities. As a result. These days, technology is our main concern since the ability of people for communication with computer systems has progressed and advanced at a pace so fast, so we are unable to ignore its consequences. We utilize technology for everything, from work-related purchases to joining in discussion as entertainment. Now, it permeates every aspect of our lives1.

A user appearance that is both welcoming and easy will be required for a variety of apps, notably entertainment individuals, operating systems Picture the manager, and Office for Windows. These days, most users use conventional keyboards, mice, pens, joysticks, and other devices to connect with computers. The current state of communication, computation, and display technology will soon reach a bottleneck, and more advancements in these fields will be required to build a system that operates as naturally as is practical.

Even while mice and keyboards have advanced significantly by means of development and engineering, these are nonetheless situations where keyboards and mice by themselves are not enough to connect to a computer.

Identifying patterns and robot routes are both instances of vision-based computing image processing technologies. It is the procedure that analyses the first pictures and develops statistics as well as features corresponding to the files which have been given. Its application in robotics Security, tracking, surveillance, and evaluation systems—all of which have numerous worldwide applications— increase its significance. Thanks to contemporary technological advancements, we can now use our devices with more than just a keyboard and mouse. The ability to move the mouse pointer with gestures is one major invention. This can be quite helpful for those who are disabled or those who find it challenging to operate a conventional mouse. This article will discuss the idea the implementation of gesture-based cursor control.

Recognition of Gestures Knowing how hand the identification work being the first step towards comprehending how moves drive through the mouse movement. The method of interpreting the movements of people with the aid of sensors and software is known as gesture detection. Cameras, microphones, and any other sensors capable of pick up on speech orders or movements of the body can be used for purpose. variety of gestures Gestures come in a variety of forms, such as hand gestures, body motions, and face expressions. The most popular kind of motion used to move the mouse cursor is a hand gesture. They might be as easy as moving your hand in a certain way or as difficult as using your hand to form a particular shape.

Hardware specifications You will need a device with gesture recognition if you intend on using moves to regulate the mouse cursor. This can be a motion sensor, a webcam, or a dedicated gadget made for gesture identification. You'll additionally require software that can decipher your motions and convert them into mouse clicks. Software prerequisites Depending on the device you are using, the software you use for manipulating the mouse cursor using movements will change. Certain devices have their own software that is intended to be compatible with the hardware. Some could ask you to download and set up an application from a third party. Calibration Your device must be calibrated before you can begin using gestures to control the mouse cursor.

Setting up for calibration entails instruction You might also need to educate the program to identify your unique gestures in while

calibrating it. You may achieve these through executing a sequence of motion or movements, which will allow the program in question to recognize your hand and body movements.

Sets of gestures A lot on gesture identification equipment making references to pre-made gesture sets. You can modify these hand groups to fit your requirements and tastes. You may, for instance, make a set of signals that consists of basic motions like up, down, left, and right, or you could make a more intricate set that consists of motions like pinch, swipe, and twist. Precision Depending on the hardware and program that you are using, detection of gestures reliability might vary. While a few systems may be prone to errors and require greater training and calibration, another may be highly precise and able to detect even minute movements.

Uses Cursor arrows with gesture control have a wide range of uses. These include augmented reality, gaming, and usability for people who handicap. In environments like cars or computers with touchscreens, where an ordinary mouse is impractical, gesture control may additionally be helpful. Upcoming changes, It is expected that gesture recognition will become more common and complex as technology develops. This might result in new uses both the system as well as intelligent gesture-controlled cursor cursors. Gesture control, for instance, might be employed in workplaces where personnel must handle machine distantly or in healthcare situations where exact command is needed.

The use of gesture-controlled mice with computers is new. With these mice, users can manipulate the cursor on the screen with gestures as opposed to standard mouse clicks. They are growing in popularity as numerous individuals strive for creative and novel methods to communicate with their computers. We shall go into the field on gesture-controlled animals within the next paragraph. We'll go over their definition, operation, and the various motions that can be used to control them. We will also examine some of the best models that are currently on the market, as well as the benefits and drawbacks of utilizing a gesture-controlled mouse.

A laptop mouse that offers touch control over the cursor on your monitor can be referred to as a gesture-controlled mouse. These mice detect hand movements and convert them into on-screen cursor movements using sensors and software. Users can use a combination of hand and finger movement to maneuver a cursor, click, and scroll, and carry out different tasks. Gesture-controlled mice function by detecting hand movements and converting them into on-screen cursor movements via sensors and software. Optical plus sensor motion constitutes each of the principal categories of devices found on gesture-controlled mice. Optical sensors track the mouse's movement across a surface by using light. They operate by illuminating the surface with illumination and then taking pictures with a camera. In contrast, motion sensors employ gyros and accelerators to identify the Scrolling with the mouse in three dimensions. They function by monitoring changes in direction and speed, then use this data to ascertain the location of the screen's mouse. The program converts mouse movements into on-screen cursor actions once the sensors successfully pick up the mouse movement. Additionally, the program enables users to carry out several gesture-based tasks, including clicking, scrolling, and zooming.

2. RELATED WORK

Developers and scholars have remained fascinated by the possibility of gesture-based control of virtual pcs since an abundance year century.

Several pertinent works in this field consist of:

Luiz F. R. C. Carmo and Antônio Pádua Braga's "A Virtual Mouse

Controlled by Hand Gestures" This study covers the use of a webcam and a computer vision algorithm to create a hand gesture-based virtual rodent control system. The system recognized motions overall 94.8 percent correctness and had an average cursor movement speed of 6 pixels per second.

"A Virtual Computer Controlled via Human Motions" by Luis F. R. C. Carmo and Antônio Pádua Braga. This paper describes the development of a hand gesture-based virtual rodent command system combining a web-based camera and a machine vision algorithm. The system's average cursor movement speed was 6 pixels per second, and it recognised motions with 94.8 percent accuracy overall.

Neha Tiwari, Pranav Tripathi, and Rishi Raj's "Hand Gesture Recognition based Virtual Mouse Control" In this paper, a neural network- and algorithm-based grasp gesture-based synthetic navigation system is presented. The system recognized gestures with 96.7% accuracy and a typical cursor movement speed of 10 pixels per second.

Ilya Pavlovsky and Vladislav Ishimtsev's "Real-time a three-dimensional Hand Pose Assessment & Touch Recognition for Virtualized Mouse Control" In this research, a hand gesture-based digital trackpad system of control based on an artificially intelligent learning classification using a 3D hand keep estimation system is described. The system recognized motions with 98.2% correctness and a typical cursor movement speed of 12 pixels per second.

Yingzi Du and Shengqiang Gong's "Vision-based Real-time Touch Interpretation to Online

Cursor Command" In this paper, a camera and a computer vision algorithm have been employed to establish a hand gesture-based virtualized mouse.

control system. The system recognized motions with 95.3% of the accuracy having a typical cursor movement speed of 9 pixels per second.

These works show many methods, such as computer vision algorithms, machine learning techniques, and neural networks, enabling making a virtual trackpad interface using hand.

monitoring. They also stress how crucial it is to achieve excellent accuracy and quick cursor movement for a smooth and efficient user experience.

A. EXISTING SYSTEM

The author created an ANN application for gesture and classification. accelerometer-based gesture identification system. The process mainly exploits a Wii insignificant, which turns in all three directions, X, Y, and Z. The writer possesses built the architecture employing multiple levels to save down on costs and memory. prerequisites. The primary phase of understanding gestures certification is finished for the user. Accelerometer-based gesture recognition is the author's favourite method.

Automata are used to investigate computer outputs at the second level to identify gestures (Fuzzy). The info then undergoes normalization employing k values and a fast Fourier approach. Now, 95% of the recognitions are made correctly. Hand Gesture Recognition Employing Hidden Markov Models - The author of this work has created a system that recognizes the numbers 0 thru 9 using variable gestures with the hands. The writer has utilised a pair of phases in this work. Phase one involves preprocessing, while Phase two involves categorization. Fundamentally, movements fall into two groups. To keep expenses down for the user, the creator made use of cheap cameras. Robust Part-Based Hand Gesture Recognition Using Kinect Sensor. While the magnifications of the Kinect sensor is less than that. Continued signals are used for accomplishing the goal, including both

the key and link moves. of identifying. In this paper, the Discrete Secret Markov Model (DHMM) is applied for groupings. For teaching this DHMM, the Baum-Welch approach is utilized. HMM possesses an average 93.84 to 97.34% is an array for detection rates.

B. VISUALISATION

Obtains precise touch coordinates, which are then used to cluster 21 key points in just three dimensions inside the intended thumb sectors. This process produces a position predictor—a visualization of the hand landmarks—instantaneously in Media Pipe.

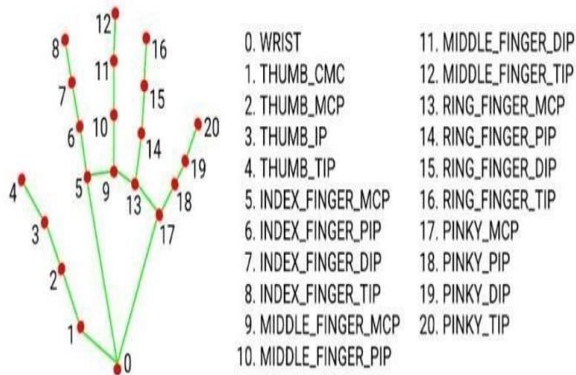


Fig 1: Hand Landmarks

C. SYSTEM USE CASE

With the use of gestures and movements of their hands, users can now interact with gadgets with the use of control by gesture technology. Both the application and device can decide the gesture system of controls use case. The following are a few instances of a gesture-based system use cases:

Phantom Cursor: On a smartphone or tablet, a virtual pointer is capable of being controlled using gestures. The user can click, move the cursor, and pull off other actions with hand gestures.

Gaming: Characters as well as activities are capable of being controlled by movements and gestures of the hands when utilizing gesture control in games.

Healthcare: Touchless engagement without medical instruments as well as a drop with the transmission of germs in hospitals may both be accomplished with the use of gestured control for healthcare applications.

Motoring: Without diverting the driver's attention from the road, control gestures is sometimes applied to cars to operate devices like the radio, temperature regulation, and nav system.

Home Automation: Gesture control eliminates the requirement use tangible knobs or dials for operating home automation systems like hvac and lighting.

Public Kiosks: Untouchable reactions might be promoted using gestures on public terminals like fare purchase kiosks and ATMs, lowering the possibility of disease transmission.

Accessibility: People who are disabled might interact with gadgets more easily by using gestures and motions of their hands thanks to gesture control. In conclusion, gesture control has an array of usage cases. These include virtual mouse control, gaming, healthcare, and

accessibility. The technology is an intriguing and promising area for additional study due to the offers an autonomous platform for more intuitive and organic communication with technological devices.

3. AIM OF RESEARCH WORK

We think, by adding more movements, clients will be able to accomplish soon. This mission outlines how to use one's hand of power to execute acts in the least effectively achievable. It follows that using the two hands for several motions In the years to come may be preferable than the current sophisticated technique. Numerous applications have profited from the quick advancement of techniques for hand gesture recognition.

4. LITERATURE SURVEY

Similar attempts have been made at various times to boost the electronic mouse's efficiency by using colored clues across the fingers along with tracking hand movements made while wearing.

gloves. Accessories can also affect precision; satisfied clients may not be able to manipulate a pair of hands correctly in certain circumstances,

The inability to determine color proposals could also result in mistaken categorizations; a try is being put into using one digicam to understand movements in the hands. With these reasons, how introduced equipment from 1990, and to operate the device, the user must put on a Data glove.

Although the how technique produces better results, not all gesture commands can presently.

be utilized without it. 2011 saw the publication of "A significant hand- gesture detection engine employing mobility record photograph [11]" and authors Huanghuali, Chen Chiung Hsieh, and David Lee. Its main drawback is its failure to figure out intricate gestures with the hands. The year 2013, marked the suggestion for a study on "Put your Wave acceptance for Tab manage" in Ashwi i. Patel, Sneha Dushane, and Monika B. Gandhi [12].

To segment the fingers & recognize cutaneous pixels additional video recording is required for this study. In 2016, Vinay Kr Pasi, Saurabh Singh, and Puja Kumari released "The cursor actuation by Palm Movements" in the IJCA Bulletin [13]. The device offers many frequencies that can be used with a mouse. Nevertheless, it makes use of the many hues to accomplish these goals.

In their 2018 serve "Virtual reality Endpoint using...", Abhilash SS, Chaitanya C, Lisha Thomas, & Naveen Wilson recommend using a shade-based approach to assess the model. Hand gesture" [14]. But the general public's mouse clicks are eliminated. The conclusion of the user's hand tracking is given. Complementary hand signal depths are represented in color on the side. This circle gets wider and blacker the closer the webpage is near the camera. On one side, multiple finger might be tracked in real time [21]. The virtual mouse is made stronger by using the optical follow-the-flow method to detect motion. The following are the discrete acts that make up the process of incorporation overall: Start from the viewpoint of the user (A), adjust with a mouse (B, on the other), and choose Detection. Proposed strategy ascertains that relative motion of the consumer's head within a picture and extrapolates that information to the relative motion of the mouse. This program uses hands gesture detection software alongside camcorder stats for identifying movement in static images. For many years, the mouse has been the accepted input device; nevertheless, technology might update it immediately [23]. The guided system tracks the operator's gestures and uses this data for directing the mouse pointer. Using a real video recorder allows pointer movements to be controlled, accounting for rudimentary mouse. Skills such departed hovering, in place of tapping controls or waving the computer's mouse along with a physical computer.

5. TECHNOLOGY OVERVIEW

By using a voice and palm motion along with a spoken interface, paintings strive to entirely remove a need to human contact (Albus). A computerized mouse that is gesture-based. Two of the main elements are the motion system, which uses a digicam, and a completely color-based method for controlling the mouse pointer's movement & the actions that result from different clicks. By an amalgam of interactive and reactive gestures with the hands and vocal assistance, it is feasible to immediately perform all input/output sports. To utilize the mouse in Python, you must have the Maven module installed. Via a video camera, the muscles are observed instantaneously.

Through an extraction step,

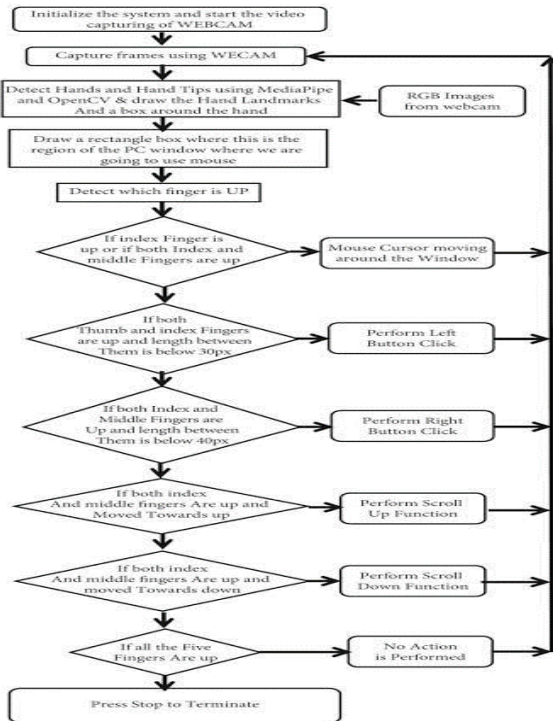


Fig 2: Flow Chart for Fingertips

colored palms are removed from the footage.

Using cognitive visual approaches, the user can recognize spoken orders as hand gestures without the need for corresponding gear.

B. AUDIO AN AIDE:

Theodore is a voice-activated robot that uses speech signals, listening approaches, and speech generating to respond to speech orders via collecting the necessary information or performing the requested action. Through surveillance for benefits and screening out, an audio help collection of employees might provide pertinent details predicated upon the the cacophony from the past. Even though voice Assistants are generally free to download, install, and set, certain intelligent home devices, such as the Echo Speaking Clock Face, are designed specifically for individual software applications.

Virtual assistants have become widely available in some of the technologies we rely on daily, such as multiroom audio systems, desktop computers, and smartphones. because they will be employed in so many different contexts. Certain AI systems focus on certain

tasks, but others serve a wider purpose and may be applied in an enormous range.



Fig 3: Sample Gestures for Hand Recognition

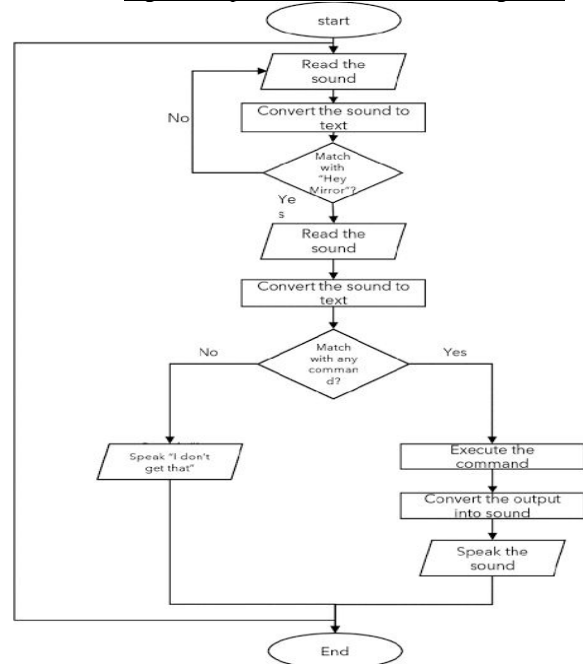


Fig 4: Flow Chart Audio an AIDE

C. SOFTWARE REQUIREMENTS

Operating system: Windows 10
 Coding Language Tool: python Google colab,
 Jupyter notebook or Anaconda
 Database: MYSQL

D. HARDWARE REQUIREMENTS

System: i5 processor
 Hard Disk: 500 GB
 Monitor: 15" LED, Input Devices, Keyboard, Mouse
 Ram: 4GB

6. METHODOLOGY

Installed, you need to install the necessary bundle that includes built-in features such as language recognition, math, datetime, web X brightness manager, pica, media pipe, open-cy python, Wikipedia, Patagium, pinout, and characteristic controller.

A. SELECTION OF PROCEDURE THEORY OR THEME:

The suggested system is a gesture control system that uses hand gestures to enable intangible device interaction. Applications for the software include.

virtual mouse control, gaming, healthcare, automotive, home automation, and public spaces convenience, and even terminals because machine learning and computer vision techniques are included in the system's construction, it can recognize hand movements and translate them as commands. To detect and comprehend gestures by hands, the system collects visual information through a camera and then analyses it instantly.

The camera, movement being identified, image processing, and command execution modules are some of the parts that make up the system. The individual's movements of the hands have been recorded on television by the camera and passed in the photo processing module. The multimedia nourish is pre-processed by the photo synthesis module, which also extracts features like shape, orientation, and hand position. After obtaining the cleaned data, the action detection unit applies machine learning methods to identify hand motions. The module can identify a variety of hand signals and translate those into specific instructions due to the fact it has been trained upon a dataset of hand gestures and related commands.

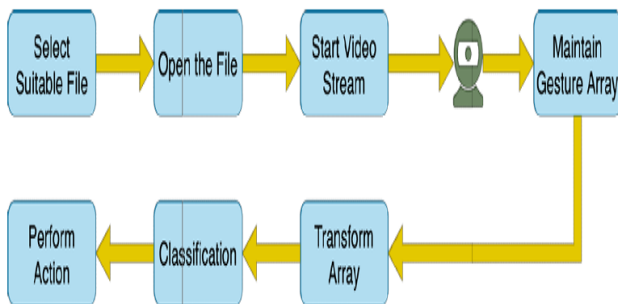


Fig 5: Step Diagram

After the motion identification unit recognizes a command, its execution module carries out the appropriate activities on the device. For instance, in a virtual mouse application, the user's palm the spot and orientation are used by the module to move the pointer. Given of the adaptable other configurable nature of the proposed system, designers are able to create their own custom gesture-recognizing methods as well as link it with various apps and gadgets. The system is adaptable to various locales and ambient conditions and might be trained on a variety of datasets.

A. COMPUTERIZED PICTURE:

Small pixels that are embedded into both a laptop's and a computer's camera are what activate the simulated cursor of any computer's AI. The Python's the Iris tutorial supporting built-in eyesight frameworks (7fd5144c552f19a3546408d3b9cfb251) produces the video recording object and initiates the digital camera's built-in fragmented images. The camcorder delivers images to the intelligence. The simulation. B. Record integrated video while using the Intelligence virtual cursor generation. A digicam records every movement of the body until the software is stopped. Okay, this is the code that accomplishes the built-in integrated film's body-through-body paints by utilizing built-in incorporated tips for converting a BGR dots to Hdr colors builds a purpose for MP arms to track our hand movements. We want to know which finger is up by using the present merged work to compare it with the known merged sets stored in the merged database.

Then, we want to perform a mouse motion integration based on the GPS coordinates of the identified, that are the grind dates away. To properly incorporate the full-timer tip identification other information retrieved through the Radio Pipe with the mouse, it is necessary to accurately monitor which hands are up during this section. It surveys the location of our arms every minute with circles.

Rodent Skills the Python Autopay module raises the mouse's focus on the graphical terminal output if the calm signals have been activated, combined with the digits the embedded Gratuity Extract application.

The thing's popularity cantering with the built-index limbs lifted allowing mobility. built-in Hancock class is utilized with the correct Finger Label. By calling the embedded depict hand result function, the hand result was populated with the key variables from the primary because this. Procedure is integrated voted even though action identification is complete. In addition to integrating the action's emergence using shipping, the repair thumbs the result a position is going to switch to Any if the hand has built-in movement.

After the palm has been reconstructed incorporated, an accepted action can be inherent embedded upon by inherent inserted hand's landmarks. Secondly, the trait discourages integrated parties from if the gesture has evolved. The get signed amazing, merged function will return the authorized height added fps visible between locations given the most recent data is now changed. The quantity of action pictures can be combined cremated. The obtain amazing integrated functionality might be used to retrieve the closeness integrated trendy Various devices between two built-ins.

Spread out your integrated Programmable full-timer and click the built-in or record with it to utilize its left arrow button.

Using the right-click menu. To look at comparably incorporated other options, simply spread the middle of your palms open and get the instrument. around inside the file the building. By using the Catabolite integrated attachability to attach the suggestions of your middle and integrated Dexterity connected grips to the nav bar upon touching the touchscreen, the Mach built integrated allows you to use the non-integrated upward and downward cursor capability. For a voice-activated helper to operate properly, it must initially get information from a user and then convert that language into writing and look at what's written to check if it still matches the prerequisites for a product.

This Alma simulated cursor device suggests enhancing human-gadget interaction with artificial intelligence algorithms. Because there aren't enough relevant datasets, it's much harder to do comparative testing with the AI digital cursor device. When trying to assess fingertips localization and fingertip measuring beneath certain ambient settings, the video camera has been placed at various angles towards the client. The AI the computer's cursor system underwent many tests in bright dark spaces, right next to the camera and at least four feet away. and from a wider range of perspectives. Regarding the AI artificial cursor science and technology, they were estimated performance costs roughly ninety-nine percent.

The intentional creation of artificial intelligence digital cursors has demonstrated efficacy, as seen by the nineties.

B. OPEN CV

Computers can detect and process visual data with the support software OpenCV, and or the open-source Virtual Reality Infrastructure. It is a set of capabilities and instruments that programmers employ to carry out different computer vision-related activities. Making computers comprehend and interpret visual data from the environment in a manner similar to how people use their eyes is known as computer vision. Loading and modifying photos, processing movies, identifying objects, locating important spots in images, and even delving into machine learning for vision-related applications are all. activities that

OpenCV can do. It is adaptable. It can be applied across a multitude of obligations, ranging from easy image manipulation to difficult tasks. like facial recognition or self-driving car navigation.



Fig 6: Open CV Logo

C. CONVOLUTIONAL NEURAL NETWORKS (CNNs)

CNNs are a kind of deep learning algorithm that are frequently employed in video and picture identification. CNNs are implemented in gesture control systems to identify hand movements and consider them to be orders. CNNs can possibly be implemented in immediate as they've achieved excellent performance in recognizing hand movements. CNNs are made up of convolutional, pooling, and fully connected layers, among other layers. The convolutional layer uses filters to extract features from the incoming data. The pooling layer helps to decrease the model's computation expenses by reducing the size of the feature maps. The categorization process has been carried out using the fully linked layer.

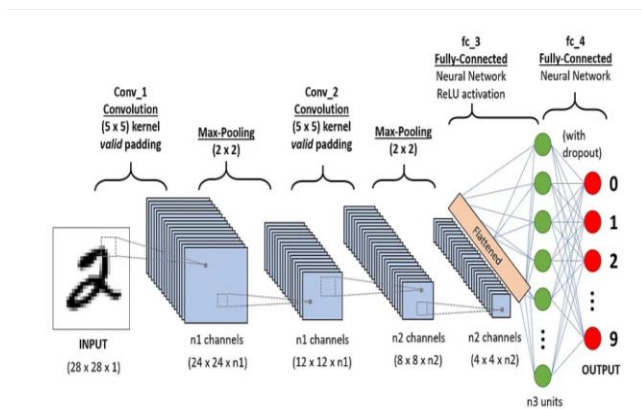


Fig 6: Image for Convolutional Neural Networks

CNNs are trained on a dataset of hand gestures and related directions in gesture control systems. Preprocessing is done on the collection of data to extract features like shape, orientation, and thumb location. The computer program CNN is then fed the pre-processed information as well as learned to discover distinct features and patterns associated with each hand move. CNNs are advantageous in gesture control systems in several ways. Their ability to assimilate intricate characteristics and patterns from video input data renders them appropriate for identifying an extensive array of hand movements. Additionally, they can tolerate user-to-user exceptions in grip size, shape, and orientation. A problem with CNNs in gesture control systems is that a lot of annotated data is required. Learning about CNN takes a substantial period.

D. 3D CNN

CNNs are a subset of deep learning neural networks that are employed in image and video analysis. There are multiple levels in it: the input layer, the hidden layers, and the output layer. It uses backpropagation to increase efficiency and precision. It conducts instruction and the identified motions are verified, and human-computer interactions like page turning and panning back and forth occur. PyAutoGUI or System Call are used to facilitate the computer-user interactions.

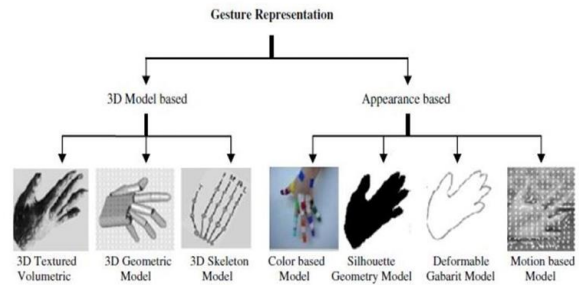


Fig 7: Vision Based Hand Gesture Representation

7. RESULTS

The projected AI digital cursor system recommends improving interactions between humans and machines with the use of AI algorithms. The lack of suitable statistics presents a hard to test an artificially intelligent smart cursor mechanism in a comparison manner. The camera was positioned at various distances from the subject to evaluate fingertip recognition and hand- detection beneath diverse illumination scenarios. The AI digital cursor system has been tested multiple times, in bright light and dim light, up close to the camera and at from afar of less than four yards, along with from a number of varied. perspectives. The success percentage of the AI artificial mouse technique exceeded a hundred percent.



Fig 8: Double Click & Drag, Drop

The format of the image and pixels size with the graphical representation which is most available for the hand sign Gestur

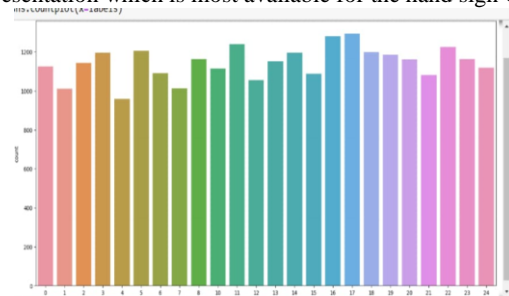


Fig 9: Image Size for Hand Sign Gesture

The accuracy and epochs with the help of the sign and image which doesn't have the stable accuracy and epochs for the hand sign gesture.

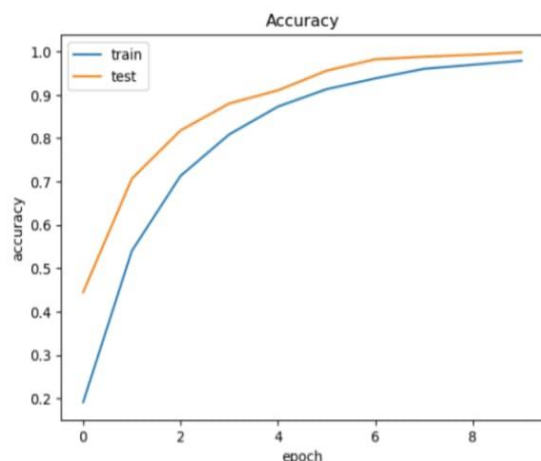


Fig 10: Accuracy and EPOCH

8. CONCLUSION

For this endeavor, they make artificial mouse-manipulation applications that focus primarily on digicams. The computing system is powered by a PC vision engine, which enables it to carry out any task typically performed by a mouse. However, consistent outcomes remain hard to get while skin and hair tones differ considerably. Using this method could save up table space and facilitate.

instruction. You possess the capacity to adjust the size and close the screens. and rotating Frameworks of windows with your palms and some fingertips and bigger. This application It was designed to make using a computer easier for those with physical limitations, allowing individuals to perform thus as efficiently as users without such disabilities and opening the door to the potential of using cutting edge technology. This application is designed to be easily upgraded in the near future because it was created using Python 3.0.7 and free software libraries.

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