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VIRTUAL MOUSE

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ABSTRACT

This paper proposes a unique camera vision-based indicator system, exploiting hand gestures captured from a digital camera through a color detection technique. The system can permit the user to navigate the pc indicator by exploiting their hand bearing color caps or tapes and left click and dragging are performed exploitation totally different hand gestures and conjointly, it performs file transfer between 2 systems during a single same network. The planned system uses nothing but a low- resolution digital camera that acts as a detector and it's ready to track the user's hand-bearing color caps in 2 dimensions. The system is enforced by the exploitation of python and OpenCV. The hand gesture is the most easy and natural means of communication. The output of the camera is displayed on the monitor. form and position info regarding the gesture are gathered exploitation detection of color. The file transferring theme is enforced by exploitation the python server programming

Keywords: Opencv, Numpy, Media Pipe, Python.

I. INTRODUCTION

The most economical and communicatory approach of human communication is through hand gesture, that may be a universally accepted language. it's just about communicatory such the dumb and deaf individuals might comprehend it. During this work, a real-time hand gesture system is proposed. In this project a good hand gesture segmentation technique has been proposed that supports the preprocessing, background subtraction and edge detection techniques. Optical Mouse consists of a junction rectifier detector to find the movement of the pointer. Years Later the optical device mouse was introduced to enhance the accuracy and to beat the drawbacks of the Optical Mouse. Later because the Technology has been raised drastically wireless mouse was introduced therefore to alter problem free movement of the mouse and to enhance the accuracy. despite what proportion the accuracy of the mouse will increase however there'll perpetually be limitations of the mouse because the mouse could be a hardware data input device and there is some issues like click not functioning properly and etc., because the mouse could be a hardware device like every different object even the mouse can have a sturdiness time at intervals that is purposeful and when its sturdiness time, we've to alter the mouse.

II. METHODOLOGY

This system is designed in a way where the whole display is resembled into a small screen box, this box now represents the whole screen. The translations are obtained based on coordinates.

Existing System:

- **Track Ball:**

The user rolls the ball with the thumb, fingers, or the palm of the hand to maneuver an indicator. Large hunter balls are common on CAD workstations for simple exactitude. Before the arrival of the touchpad, tiny trackballs were common on to move computers.

- **Mechanical Mouse**:

One ball that would rotate in any direction. As a part of the hardware package of the xerox Alto pc. Detection of the motion of the ball was lightweight primarily based with the assistance of chopper wheels.

Proposed System

- **Virtual Mouse:**

Any new product ought to either build human life more well-off , additional productive or additional fun. Provides larger flexibility than the present system. Can give additional functions looking at the selection of

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objects. Easy to switch and adapt. Less at risk of physical injury thanks to absence of fastened physical devices. Also, there's an exact degree of fun & recreation related to the full plan

Software and hardware requirements

- Windows XP x64 or higher(for x64 environment)
- EmguCv library (wrapper of OpenCV library for .NET framework)
- Python 3.6 or higher
- Webcam drivers (device specific)

Hardware Requirements

- Processor: min core i3(intel) Ram: min 4gb
- Hard Disk: min 100Gb

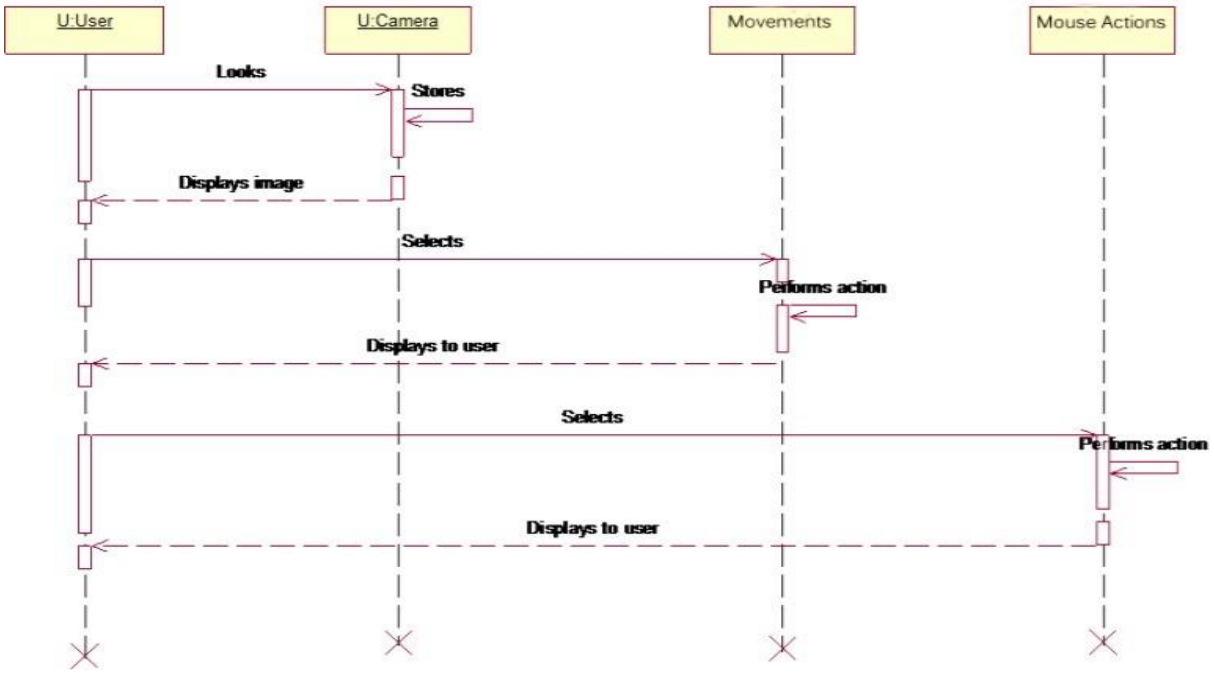

Figure 1: Sequence Diagram

III. MODELING AND ANALYSIS

This system is designed in a way where the whole display is resembled into a small screen box, this box now represents the whole screen. The translations are obtained based on coordinates.

- **Camera Settings**

The runtime operations units are managed by the digital camera connected to the laptop computer or desktop. To capture a video, we need to make a Video Capture object. Its argument may be either the device index or the name of a video file. Device index is just the number to specify which camera. Since we have a tendency to solely use one camera, we have a tendency to pass it as '0'. we can add any number of cameras to the system and pass it as one,2 and so on. After that, you'll capture it frame-by-frame. But at the end, don't forget to unleash the capture. we have a tendency to may additionally apply color detection techniques to any image by doing straightforward modifications within the code.

- **Capturing frames**

The infinite loop is employed in order that the camera captures the frames in each instance and is open throughout the complete course of the program. We capture the live feed stream, frame by frame. Then we tend to method every captured frame which is in RGB (default) color house to HSV color house. There are more than 150 color- space conversion methods available in OpenCV. however we are going to look into solely 2 that square measure most generally used ones, BGR to gray and BGR to HSV.

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- **Masking Technique**

The mask is created by using some specific image following rules based on region. The mask created is an object in red color. Next we calculate bitwise and operation between Input and Threshold image and the result is mainly highlighted of red color objects. The result of AND operation is stored in res then we display the frameres, mask using 3 separate windows using imshow() method.

- **Display the Frame**

The inShow() method is a high GUI method and it needs to call waitkey frequently. The processing of the inshow() function will be done after calling waitkey. The waitkey() method waits for a key event for "delay" (here, 5 milliseconds). High GUI processes events like redraw, resizing etc.., so we call the waitkey function even with a 1ms delay.

- **Mouse Movement**

We have to initially calculate the middle of each detected red object that we are able to simply handle taking the typical of the bounding boxes most and minimum points. currently we tend to got a pair of co- ordinates from the middle of the two objects can|we'll|we are going to} notice the typical of that and that we will get the red purpose shown within the image. we tend to square measure changing the detected coordinate from camera resolution to the particular screen resolution. subsequently we tend to set the placement because of the mouse position. however to maneuver the mouse pointer it'll take time. So, we've to attend until the mouse pointer reaches that time. So, we tend to started a loop {and we tend to|and that we} aren't doing something there we square measure simply waiting can this mouse location be the same as the assigned mouse location. that's for the open gesture.

- **DnD Frame**

First, we tend to produce the MyFileDropTarget category. within that we've got one overridden technique, OnDropFiles. This technique accepts the x/y position of the mouse along side the file methods that area unit born

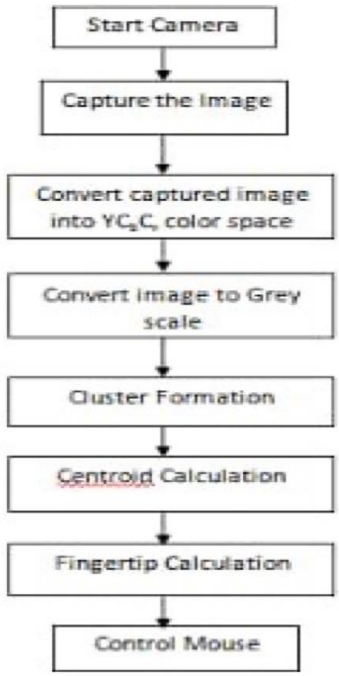

Figure 2: Data FLow

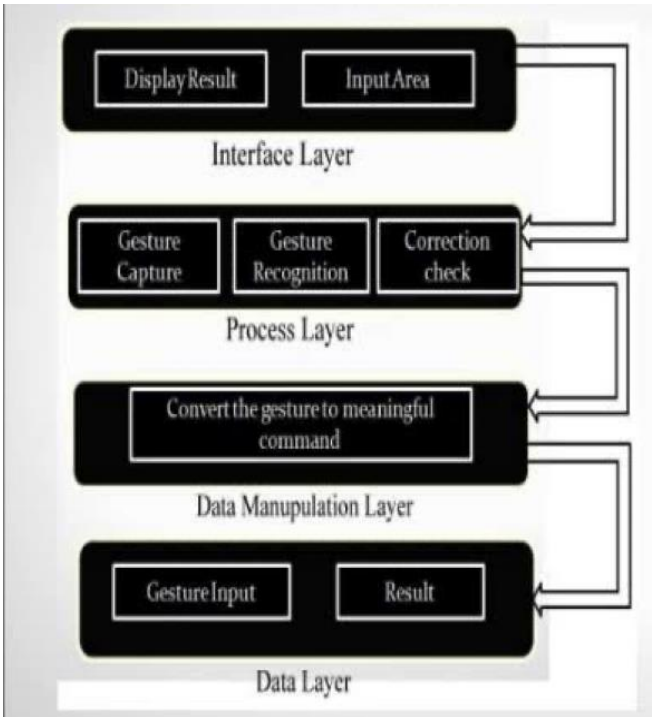

Figure 3: Architecture

IV. RESULTS AND DISCUSSION

This project is mainly focused to help patients who don't have control of their limbs and also improvise the interaction between the machine and humans. Our intent is to create this technology in the cheapest possible way with optimization under a systematized operating system. The proposed system controls the functions of

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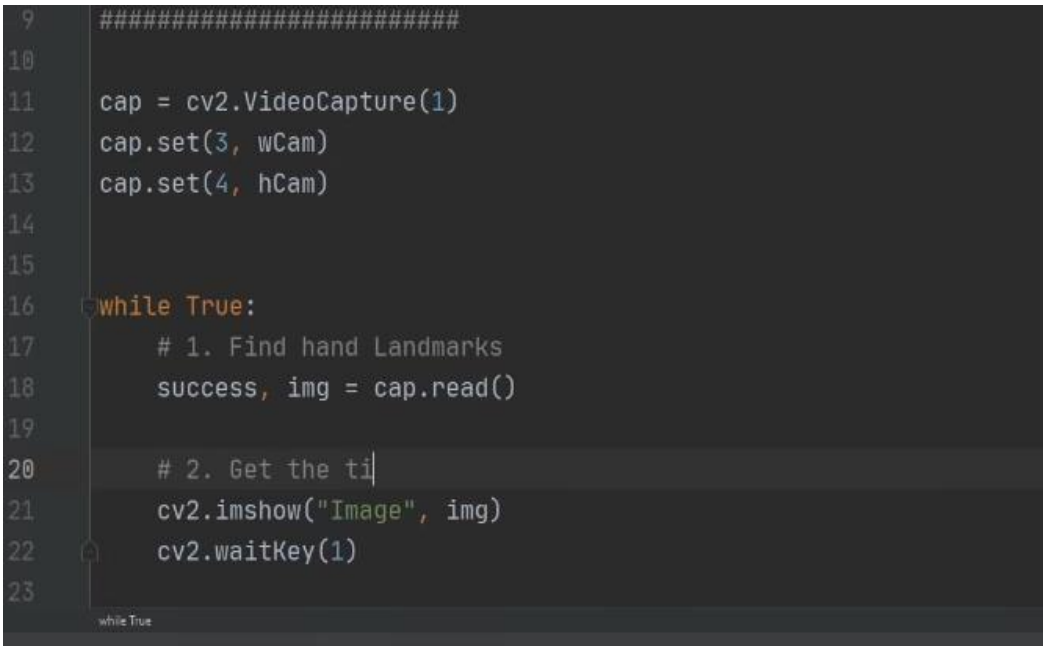
the mouse pointer by detecting the point on finger, and performs the mouse functions such as left click, dragging, cursor movement, and the file transfer between two systems in the same network. This method detects the color point objects for the mouse control. The user uses the color point objects on their finger-tip for better performance. When the number of contours is two, then it performs the simple mouse movement action. Otherwise, when the number of contours is one then it performs the left click. This system also supports the simple file transfer between two or more systems in the same network connection. The left side of the computer's screen acts as a communication channel between the systems. i.eThe file which is to be copied should drag and drop on the left side of the computer's screen. Then the dropped file will be copied to the destination or the receiver system. This system is mainly aimed to reduce the use of hardware components attached with the computer. Although the application can be run in an ordinary computer having a web camera, ideally it requires having at least 2MP front camera with at least Pentium processor and at least 256 MB RAM. We can see these all operations on the following images



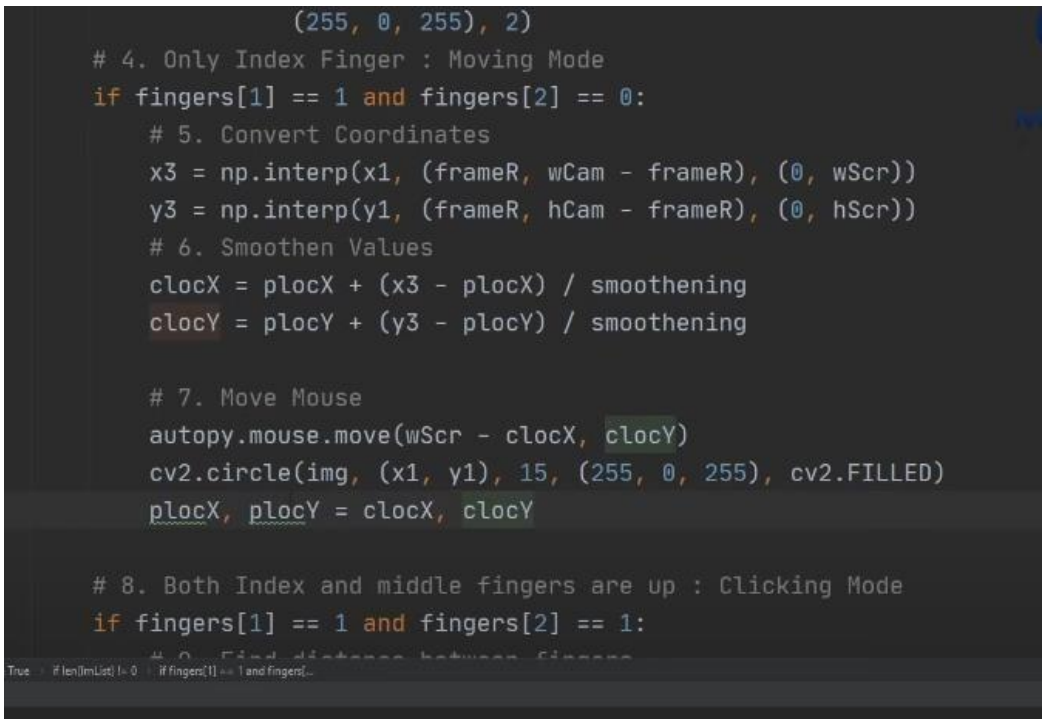


Figure 4&5: code implementation

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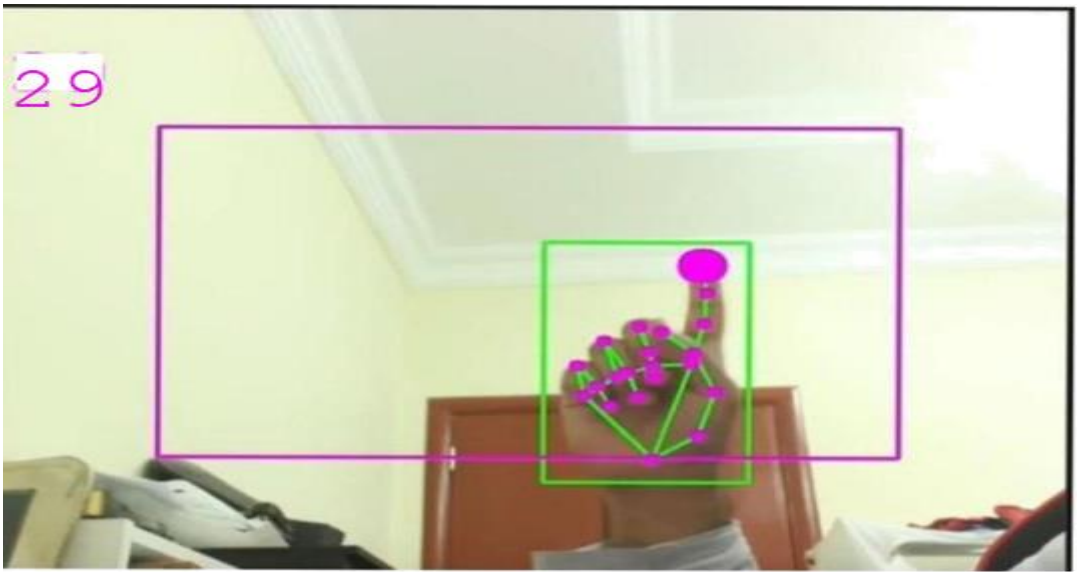

Figure 6: Test Case

Figure 7: Validation

V. CONCLUSION

Gesture recognition offers the simplest interaction between human and machine. Gesture recognition is additionally necessary for developing different human computer interaction modalities. It allows humans to interface with machines in an exceedingly natural method. Gesture recognition is used for several applications like language recognition for deaf and dumb folks, mechanism management etc. This technology has wide applications within the fields of increased reality, tricks, laptop gaming, medicine, and medicine instrumentation. Digital Canvas is an associate degree extension of our system that is gaining quality among artists, by which the creator may produce second or 3D pictures exploiting the Virtual Mouse technology exploiting the hand as brush and a video game kit or a monitor as a show set. This technology is accustomed to facilitate patients who don't have management of their limbs. Just in case of tricks and gambling this technology has been applied in fashionable gaming consoles to make interactive games wherever a person's actions are tracked and understood as commands. The most important extension to the current work is done to create a system able to work on abundant advanced backgrounds and compatible with completely different lightweight conditions. It is created as a good program which might embrace all mouse functionalities. It'd be ideal to analyze advanced mathematical materials for image processing and investigate completely different hardware solutions that may end in a lot of correct hand detections. Not solely did this project show the various gesture operations that might be done by the users however it additionally incontestable the potential in simplifying user interactions with personal computers and hardware systems.

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