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AIR CANVAS

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Abstract: Drawing is fundamental to all other arts. It is how artists structure, plan and negotiate space. Many years back the natural artist used to draw on stone by using charcoal or branches of trees. Cave paintings are used by them to communicate with other about the animals in the forest. From this to now we have many options available for drawing. Drawing can be done by using computer, smartphones even other devices are there for drawing. Now we have many options for drawing. Air canvas is one of the ideas based on drawing in air. It made of system that can catch movements of artists and can draw even without touching keyboard, mouse or touchpad. Air canvas uses python programming language along with useful libraries like OpenCV and MediaPipe which are more helpful in work of identification or recognition.

Index term- Opencv, Mediapipe, Air Canvas, Hand Tracking.

I. INTRODUCTION

Based on idea of drawing in air the air canvas is made. Air canvas work using function of movements tracking where user must do movements in front of the input devices as like camera. This idea of performing drawing function in front of camera just like waving in air makes air canvas extraordinary way of drawing using AI. System is smart enough to capture and calculated every movement of user in front of it and can perform drawing function. The key requirements of air canvas is only that the user must be on distance where it can be clearly visible to camera so that camera can take proper input. Air canvas can perform drawing various shapes of drawing including circle and rectangle. It is very well carried out by using python libraries named as OpenCV and MediaPipe which has ready to used ML solutions for recognition and tracking.

II.EXISTING SYSTEM

Keyboard and mouse are the traditional and widely used input devices to provide input to your computer, laptop, or other smart devices. Keyboard has number of buttons that contains numbers, alphabets, symbols, and other functions keys whereas mouse has two buttons and it used for moving your cursor. There are other smart ways for inputs are scanning and dictation. Nowadays one of the widely used method is touchscreen. Which is best for devices like smartphones. Touchscreen is the sensitive screen that allow you to move your fingers or stylish pen on it to provide input to the system. Touchscreen is work as replacement to the keyboard and mouse. The major disadvantage is it not that much accurate and selection of details in object is not that efficient with it also touchscreen is expansive than the keyboard or mouse.

Many smart devices come up with the features of voice recognition. It allows you to speak and can recognize the word you are speaking and will display it on the screen. It is nothing but the computer software working in background but it does not give you guarantee that the word will be always accurate

III. PROBLEM STATEMENT

Smartphones overuse-The increasing used of smartphones in children draw their attention from education to the social media or games. Sometimes excessive used of smartphones lead to depression, causes accident or many times mental conditions. There can be probability of life danger due to keeping smartphones very closed.

Paper wastage- Using paper for writing unnecessary things, drawing small things and throwing entire paper led to conditions of wastage of paper. The fact is many trees need to cut down for making single notebook.

Writing or drawing using air canvas can solve this problem. Also new technology can draw children's attention to education as it can be used for education. Air canvas uses no paper it requires only some part of memory. A papers wastage can be not increasing anymore. Safe distance needed while make use of air canvas so it will not affect your eyes also.

IV. LITERATURE SURVEY.

Movement recognition using LED

System with camera to detect the movement of LED fitted on the tip of the finger. System can recognize the pattern drawn on the screen by the LED. It comes with advantage of fast movement tracking and results are much accurate but the disadvantage is the LED must be red LED only and no other things like red LED present in front of camera rather than red LED.

System with Air mouse

Device with some sensor that can be wear in finger act as Air mouse. The Air mouse do can work as mouse for providing various inputs to the system with only difference of Air mouse work in air in front of the screen. It contains sensors that help to provide desired input to system. Some hand movements like grabbing, keeping hand vertical are used to perform action like select, drag, or scroll same as real mouse.

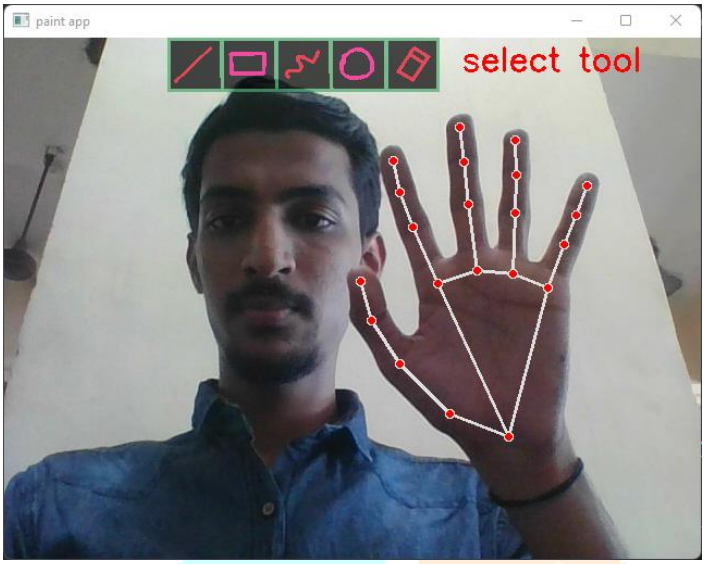
Hand Recognition with Kinect Sensor

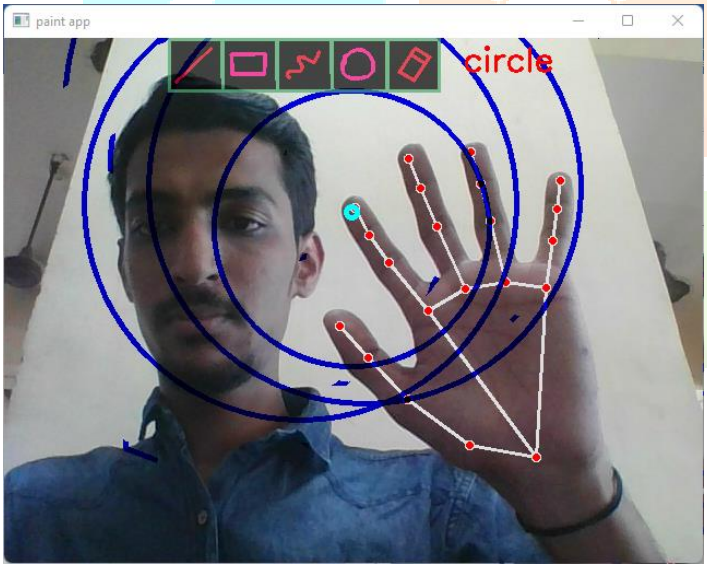
Kinect sensor used for getting depth and color information to detect hand movements. It is still a challenging problem to gesture recognition. Kinect sensor work efficiently with the large object but for tiny little object it may failed to work.

IV. PROPOSED SYSYTEM

In this proposed framework, we are going to utilize camera and the screen for the reading inputs and displaying outputs. We are using our hand fingers to drawing required shapes on the output screen. We have to be on safe distance where our hand can be fully visible in camera hence it is reading our input by recognizing movements of our fingers tip. Some other hand sign for selecting shapes and draw going to use as per given in used modules and libraries.

V. RESULTS/SNAPSHOTS





VI. DESIGN DETAILS

6.1 Hardware Requirement

1. Camera:

A camera is an optical instrument that records images that can be stored directly, transmitted to another location, or both. These images may be still photographs or moving images such as videos or movies. The term camera comes from the word “Camera Obscura” (Latin for "dark chamber). The modern camera evolved from the camera Obscura & functioning of the camera is very similar to the functioning of the human eye.
Camera which is used to capturing the hand movements. Any camera can be used but it should clearly focus on your hand movements also you should maintain proper distance while working in front on camera. As your hand movements recognition can only be captured by camera it become the important hardware of the system.

2. Screen:

Screen will display the hand actions and output. Whatever view the camera is recording will get displayed on the screen. With the screen you can easily perform your drawing action by seeing on screen. Your output also gets displayed only on screen hence the screen is essential.

6.2 Software Requirement

1. Python

Python is a widely used general-purpose, high level programming language. It was created by Guido van Rossum in 1991 and further developed by the Python Software Foundation. It was designed with an emphasis on code readability, and its syntax allows programmers to express their concepts in fewer lines of code. Python is a programming language that lets you work quickly and integrate systems more efficiently.
There are two major Python versions: Python 2 and Python 3. Both are quite different.

2. MediaPipe:

MediaPipe is the Google Framework which helps solve the problems in hand tracking MediaPipe has ready to use machine learning solutions that can be used in various machine learning projects also it contains other modules like movement recognition, gestures recognition and some others. The user experience can be significantly enhanced across a range of technological domains and platforms by being able to recognize the shape and motion of hands. For instance, it can provide as the foundation for hand gesture control and sign language comprehension. It can also make it possible for digital information and material to be superimposed on top of the real world in augmented reality. Although it comes effortlessly to individuals, robust real-time hand perception is an extremely difficult computer vision problem due to the fact that hands frequently occlude themselves or each other and lack high contrast patterns. A high-fidelity hand and finger tracking solution is MediaPipe Hands. It uses machine learning (ML) to deduce 21 3D hand landmarks from a single image. Our solution delivers real-time performance on a cell phone, and even scales to several hands, unlike existing state -of-the-art systems, which mostly rely on powerful desktop environments for inference. We anticipate that making this hand perception functionality available to a larger research and development audien ce will lead to the creation of innovative use cases, igniting new research directions.

3. OpenCV:

OpenCV is a library which is used for image recognize. It will identify our hand tracking and Drawing. It is library basically design to work on image processing and image recognition. Object detection image processing methods are included in the OpenCV computer vision library. Real-time computer vision applications can be created by utilising the OpenCV library forthe Python programming language. The processing of images and videos as well as analytical techniques like face and object detection use the OpenCV library.

4. NumPy:

The N-dimensional array type known as ndarray is the most significant object defined in NumPy. The collection of identically categorized thing is described. A zero-based index can be used to access items in the collection. A ndarray's items all take up the same amount of space as a memory block. Every item in ndarray is a data-type object objects called dtype. A Python object of one of the array scalar types represents each item that is retrieved from a ndarray object (via slicing). The relationship between ndarray, data -type object (dtype), and array scalar type is depicted in the picture below.

VII. STEPS FOR USE

Step 1: Start the application on portable device having good camera or attached external camera in need case.
Step 2: Be on the distance from the camera where your hand along with your fingers can be easily detected by the camera attached to your device.
Step 3: learn sign for the hand movements required to perform action like selecting tools or changing tool or draw the required shape.
Step 4: select the required shape given on the device screen and start drawing.

VIII. FUTURE SCOPE

The scope of this project is:
It will produce an effective communication between peoples that will reduce the uses of laptops and mobile phones by abolishing the writing need. The major scope is in the teaching field while teaching online or teaching on screen. Without the mouse or any markers we can easily implement on the screen. It will use in the designing purposes to create the immersive or interactive designs.

IX. CONCLUSION

This project has the potential to challenge traditional writing methods. Cancel out the need to carry a cell phone in hand to take notes. It will again work towards a greater purpose in helping especially those who know them to communicate easily. Expanding functionality, this program can also be used to control IoT devices soon. Air painting can also be made happen. In the future, progress on Artificial Intelligence will improve the efficiency of writing in the air.

X. ACKNOWLEDGMENTS

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