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Virtual AI Painter

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Abstract: Writingisa cohesive form of communication that can effectively convey our thoughts. Typing and writing are the standard methods of recording information today. Characters or words are written in the free space with a marker or finger. It differs from traditional writing methods in that the pen does not move up and down. Gesture recognition is the process of recognizing and interpreting a continuous sequential gesture stream from a given set of input data. Gestures are nonverbal cues used to increase computer language comprehension. Vision perceives human motions, and computer vision is used to analyze different gestures.

Keywords:AI virtual Painter, Computer Vision, Deep Learning ,Virtual Painter

IIntroduction

In today's time when most of the classes, office meetings and webinars are conducted online, it is challenging to explain the topic to others. There are various mouse guided tools available but they are not convenient.
The initial motivation came when there was a need for a dustless class room for the students to study in. We know that there are many ways like touch screens and more but what about the schools which can't afford to buy such huge large screens and teach them like a T.V. OpenCV in python to draw on the screen using a virtual pen i.e., any marker (or finger) can be used to draw using the technique of contour detection based on the mask of the desired colored target marker.

IIProblem Formulation

An application that enables you to virtually paint in the air using fingers. It is developed in python using OpenCV and MediaPipe. Our main aim is to create an interface between man and machine like a virtual canvas where users can draw free hands. It tracks the hand gesture to draw freely.
This application helps people to draw in air with the help of finger movement in front of a web camera any time. It helps to make webinars, and explanations in online classes, meetings interactive and effortless in the real time. It can also be useful for making kids learn drawing in an interactive and fun way. It helps people with speaking and hearing impairment to communicate without any hassle. An effectivecommunication method that reduces mobile and laptop usage by eliminating the need to write. In the future, this application can also be used to control IoT devices. This system can also be an excellent software for smart wearables using which people could better interact with the digital world.

A. Subsection

The system proposed touse thedepth and colorinformation from the Kinect sensor to detect the hand shape. As for gesture recognition, evenwith the Kinect sensor. It is still a very challenging problem. The resolution of this Kinect sensor is only 640×480. It works well to track a large object, e.g., the human body. But following a tiny thing like a finger is complex.

B. Subsection

Authors suggested a method in which anLED is mounted on the user's finger, and the web camera is used to trackthe finger. The character drawn is compared with that present in the database. It returns the alphabet that matches the pattern drawn. It requires a red- coloured LED pointed light source to be attached to the finger. Also, it is assumed thatthere isno red-colored object other than the LED lightwithin the web camera's focus.

Augmented Desk Interface In Augmented segmented desk interface approach for interaction was proposed. This systemmakes use of a video projector and charge-coupled device (CCD) camera so that using the fingertip; users can operate desktop applications. In this system, each hand performs different tasks. The

left hand is used to select radial menus, whereas the right hand is used for selecting objects to be manipulated. It achieves this by using an infrared camera. Determining thefingertip is computationally expensive, so this system defines search windows for fingertips.

Virtual AI Painter Given the real time webcam data, this paint-like python application uses OpenCV library to track an object-of-interest (fingers in this case) and allows the user to draw by moving the object, which makes it both awesome and challenging to draw simple things.

IIILiterature Review

First question that arises in our mind regarding this system is why there is a need to build such a system and why there is a need to change or replace the current system . This can be easily understood by discussing the current system as written below :

Current System : The system proposed to use the depth and colour information from the Kinect sensor to detect the hand shape. As for gesture recognition, even with the Kinect sensor. It is still a very challenging problem. The resolution of this Kinect sensor is only 640×480. It works well to track a large object, e.g., the human body. But following a tiny thing like a finger is complex. Authors suggested a method in which an LED is mounted on the user's finger, and the web camera is used to track the finger. The character drawn is compared with that present in the database. It returns the alphabet that matches the pattern drawn. It requires a red- coloured LED pointed light source to be attached to the finger. Also, it is assumed that there is no red-coloured object other than the LED light within the web camera's focus.

Proposed System: In Augmented segmented desk interface approach for interaction was proposed. This system makes use of a video projector and charge-coupled device (CCD) camera so that using the fingertip; users can operate desktop applications. In this system, each hand performs different tasks. The left hand is used to select radial menus, whereas the right hand is used for selecting objects to be manipulated. It achieves this by using an infrared camera. Determining thefingertip is computationally expensive, so this system defines search windows for fingertips.

IV Methodology

A methodology study is an analysis of how successfully a system can be implemented, accounting for factors that affect it such as economic, technical, and operational factors to determine its potential positive and negative outcomes before investing a considerable amount of time and money into it. This application provides a user-friendly interface. As it helps children to learn drawing in a fun way, helps faculty and teachers to explain the topic effortlessly by using hand gestures. This application helps people with hearing impairments to communicate well. Painting helps anyone to explain their thoughts effortlessly and in a smooth way by using their free hand. With alumni, your Alumni data can be centralized and combined with a host of exciting front-end member modules and timesaving, back-end administration tools.

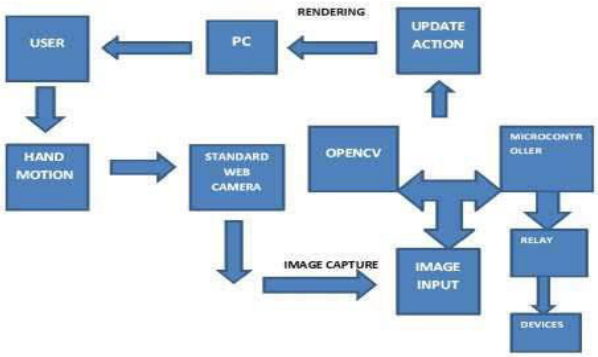
This section illustrates the detailed working of the proposed application. In this a webcam is used to capture and track the hand movements made by the user with the help of computer vision interface

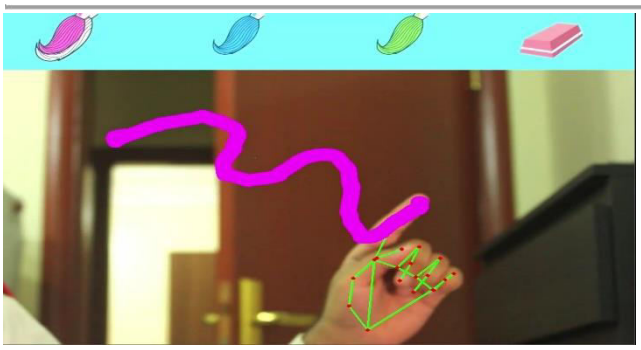
This project will be developed using following modules:

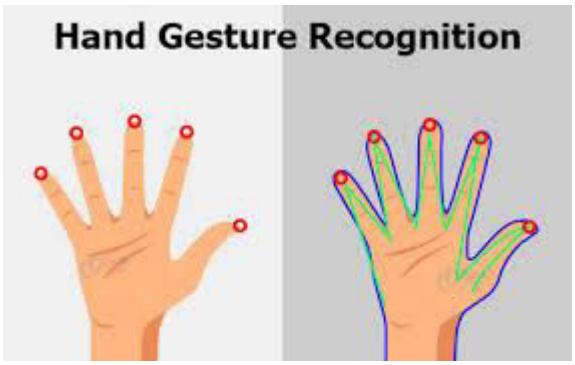
We have proposed a vision - based approach to accomplish the task of hand gesture recognition detection. The task of the hand gesture recognition with any machine learning technique suffers from the variability problem. To reduce the variability in hand recognition task we assume the following assumptions:

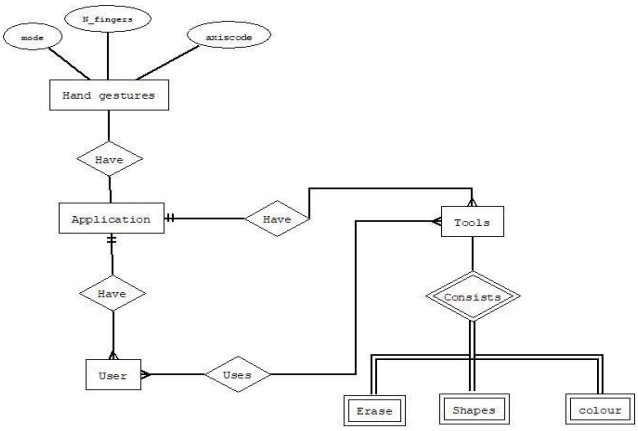
- User will interact by gesturing in the view of the camera
- Training is must

V Figures and Diagrams









VI Result Discussions

The most important outcome we will get while working on this project is that we would also learn a lot about object recognition, tracking.

This Project will help in advancement and progress in various areas such as communication, teaching, presentations etc. By incorporating this mode of presenting messages or information in day to day life, many processes can not only be simplified but also their effectiveness can be increased tremendously. Presentations, online or offline can be made more compelling. Imparting Knowledge can be made more enjoyable for teachers and students as well. Drawings and illustrations can be made more fun and interesting. Even this model can be used in future to control some IOT devices. The potential usage of this project is enormous.

VIIConclusion

- The system's overall performance also depends on the quality of the camera or web-cam being used. As output from cam will be used to plot the drawings on the screen. And hence, this system can't be run on a system where there is no camera available.
- Generally, the algorithms in OpenCV library have heavy RAM requirements for processing information. And also in most of the machines, processing for a single application happens on a single core, so until advanced coding routines are followed, it would not be possible to parallelize tasks on multiple cores for a single application on those machines.
- Air-drawing however cool, is not able to beat pen-paper based or stylus-based drawings or tracings. The simple reasons are poor accuracy and width of a finger (or any similar object used to air-draw) is many folds more than that of conventional pen-pencil or modern stylus like apple pencil.

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