AIR WRITING USING PYTHON (2021-2022)

Ashutosh Kr. Pandey[1], Dheeraj[2], Manas Tripathi[3] and Vidyotma[4]

[1,2,3,4] Department of Computer Science & Engineering
Assistant Professor ,Dr. Deepak Kr. Verma , Dept. of Computer Science & Engineering , GNIOT College, UP , India

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Abstract-*Writing in air has been one of the most entrancing and challenging research regions in field of image processing and pattern recognition in the recent years . It contributes enormously to the progression of an automation process and can get to the next level the connection point among man and machine in various applications.*

Object following is considered as a significant task within the field of Computer Vision. The development of quicker PCs, accessibility of cheap and great quality camcorders and requests of computerized video investigation has given prevalence to object tracking strategies. Generally , video investigation system has three significant stages: first and foremost, identifying of the Object, furthermore following its movement from frame to frame and lastly analyzing the behaviour of that object. For object tracking , four unique issues are considered; determination of suitable article representation , feature selection for tracking, object recognition and object tracking.

Key Words : Augmented Reality(AR), Virtual Reality (VR), Human Computer Interaction (HCI) , Computer Vision (CV)

1.INTRODUCTION

All we want in this undertaking is a PC with a web camera introduced in it. We will prepare our PC or our screen to peruse anything that the client will compose Infront of the screen. We have involved Open CV for object identification that is with which the client will be writing on air and we have used Python language for coding. First and foremost, after code is executed, we get a white screen shown in the screen and anything we write on air Infront of camera it tracks the article whose properties we have proclaimed in the code. After that tracked points are connected and projected on the screen .

In the period of digital world, traditional art of composing is being supplanted by advanced digital art . Digital art refers to forms of expression of art form with digital form. Depending on present day science and innovation is the distinctive characteristics of the digital manifestation. Digital Art incorporates numerous methods of writing like by utilizing Keyboard, touch screen surface, Digital pen, pointer, utilizing electronic hand gloves and so forth.

Traditional Art refers to the fine art which is made before the digital Art. The Traditional way incorporates pen and paper, chalk also, board for writing.

Digital Art and Traditional art are interrelated and interdependent .Social improvement is certainly not a people's will, yet at the same the At any rate, requirements of human existence are the vitally main impetus. The same circumstance occurs in Art. In the current conditions, digital Art and traditional art are comprehensive of the advantageous state, so we really want to efficiently comprehend the essential knowledge on the structure between digital art and traditional art .The fundamental point of advanced workmanship is of building hand signal acknowledgment framework to write digitally.

1.1 OpenCV

OpenCV (Open-Source Computer Library) is a programming featured library explicitly focused on at computer vision in real time. This is an open-source stage and free for use. Its essential connection point is in C++, it still preserves an older c interface that is less detailed but vast. In the Python interface, all the most recent progressions and algorithms show up. It is significant open-source computer vision, machine learning and image processing library and now it plays an important part in real time activity in today's systems. We will utilize this to process photos and recordings to perceive individuals, faces or even in handwriting . Python can deal with the OpenCV cluster array for review as it is joined with various libraries like NumPy. We use vector space to perceive the picture design and its unique qualities and perform arithmetic calculations on these attributes. It is available on Windows, Linux, iOS and so on, with Python, C++, C and Java as the interfaces.

1.2 PYTHON

Python is an high-level programming language. It is basically renowned for code reusability and simplicity. Despite the fact that it is more slow it has a significant attribute of python that it very well may be handily reached out inside c. Due to this trademark we can write computationally intrinsic codes in C++/C. Python upholds various types of programming patterns , for example,

procedural programming, object-oriented programming, functional programming and so forth. It comprises of NumPy library. NumPy is exceptionally strong and upgraded for numerical tasks. To take benefits of multi-core figuring, all things are written in upgraded C or C++ .

2 . Literature Survey

[1] S.V.Ashwin Kumar et al.

An Implementation of virtual white board using Open CV for virtual Classes.

The Author Kanakaraja , S.V. Ashwin Kumar and all , "An Implementation of virtual white board using Open CV for virtual Classes," , 10th march 2021 , In this the author expresses that they have involved open CV for Object Detection that is with which the client will write on air and we have utilized Python language for coding since python is a simple language and easily understandable . After code is executed, we get a white screen shown in the Monitor and anything that we write on air Infront of camera it tracks the article whose properties we have declared in the code. After the tracked points are associated and anticipated on the screen .

[2] Priyanshu Mishra et al.

Virtual Ink Using Python .

Creators in Akash Uniyal and all, '' Virtual Ink Using Python (No. 5707). Easychair , 2021" , We use python as our essential language and its packages OpenCV and NumPy. Basically, OpenCV is a library of programming functions mainly aimed at PC vision. Initially created by Intel, it was later upheld by Willow Garage. And NumPy is basically, a library for the Python programming language, adding support for enormous, multi-dimensional arrays and lattices, along with an enormous collection of high-level numerical capacities to work on these arrays. The Project was fundamentally a PC vision application which utilizes the webcam of your gadget. By opening the webcam of your gadget all you want is to simply hold the pencil or some pen in our grasp, then, at that point, drag the pen or pencil in air if front of your gadget camera (approx.1530 cm).

[3] Akash Kumar Chaudhary et al.

AIR CANVAS APPLICATION USING OPENCV AND NUMPY IN PYTHON

In Akash Kumar Chaudhary , Bharat Phogat ," Air Canvas Application Using OpenCV and Numpy In Python", International Journal of Research in Engineering and Innovation. 8. 2395-0056. This Project focuses around change of Motion to Art . This framework utilizes A camera Device also, Computer Vision Software to follow the way of our Finger Tip . A powerful specialized technique decreases mobile and PC usage by taking out the need to write.

[4] Pranavi Srungavarapu et all .

VIRTUAL SKETCH USING OPENCV

Srungavarapu, Pranavi and Maganti, Eswar Srilekkha (2021). "Virtual Sketch utilizing Open CV." International Journal of Inventive Technology and Exploring Engineering.10.107108.10.35940/ijitee.H9262.0610821.
In this task we are playing out the morphological tasks are a bunch of tasks that processes pictures based on shapes. These apply a structuring component to an info picture and produce a output Image. Developing a connection point between human hand and the framework utilizing open cv strategies and python language to pick the colour and draw utilizing hand on the created drawing region.

[5] Harneet Kaur et all .

A COMPREHENSIVE OVERVIEW OF AR/VR BY WRITING IN AIR

Sai, Guna and Raj, Akula. (2021) "A Comprehensive overview of AR/VR by Writing in Air" , International Journal of Logical Research in Computer Science, Engineering and Data Technology. 477-482. 10.32628/CSEIT217294. In this they expressed that Every stroke is comprised of series of points from which the machine programming chooses the primary focuses that will mirror the stroke. They performed three preliminaries to survey the satisfactory tolerance for slope n in getting the significant points to be viewed as in the study . The slope equation is then applied to the two back to back central points, which are comprised of x and y co-ordinates. The worth of progress in x co-ordinates and change in y-co-ordinates decides the slope of a Line .

3. Purpose of Study

Our project aim is to utilize a combination of PC vision and drawing recognition to make a framework that goes about as a virtual whiteboard. Our model perceives motions written in the air and converts it into text. Clients would have the option to express "air words" confronting a web-camera either constant or ahead of time and have those signals converted art .

Air-writing acknowledgment is an interesting point to make an answer, since it tends itself to a wide range of

future purposes. Most naturally, it takes into consideration clients with explicit requirements an elective type of communication . Virtual Reality frameworks like the HTC Vive give a virtual whiteboard experience for an extreme price that requires a extensive tracking system .Our system requires only a PC and camera, and in this manner gives more affordability and accessibility.

4. Problem Definition

The undertaking centers around tackling a few significant cultural issues –

1. Individuals hearing impairment: Although we take hearing and listening for granted , they communicates utilizing sign languages. The majority of the world can't grasp their emotions, their feelings without a translator in the middle .

2. Paper wastage isn't scare information. We waste a lot of paper in scribbling, composing, drawing, and so on. A few essential realities incorporate - 5 liters of water on normal are expected to make one A4 size paper, 93% of composing is from trees, half of business waste is paper, 25% landfill is paper, and the rundown goes on. Paper wastage is hurting the climate by utilizing water and trees furthermore, makes lots of trash.

Air Writing can rapidly settle these issues. It will go about as a specialized device for individuals with hearing debilitation. Their air-composed message can be introduced utilizing AR or switched over speech. One can rapidly write in the air and go on with your work absent a lot of interruption. Also, writing in the air doesn't need paper. Everything is put away electronically

5. Methodology

There are a few stages which determine the work process of the whole project :-

The First step ie; Start starts the beginning of the task . It demonstrates the running of the whole program .

The Second step ie; Image Collection expresses that the catching of picture by means of web camera in PC gadget .

The Third step ie ; Image Processing states that getting to the datapoints Of the Images from the camera .

The Final advance is the Projection of Output on the screen which is finished by associating the followed focuses and extending it on the screen .
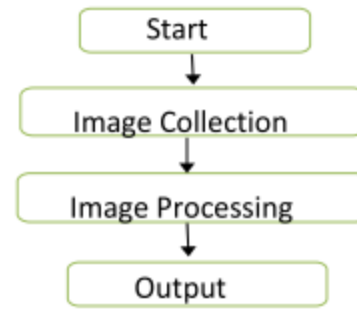
(Fig. 1. Work stream of proposed system.)

This framework needs a dataset for the Fingertip Detection Model. The Fingertip Model's main role is utilized to record the movement, i.e., the air character.

5.1 FINGERTIP DETECTION MODEL :

We accept individuals ought to have the option to write in the air without the pain of conveying a pointer. Tracking the article by means of the OpenCV library through every video outline is done through pre handling the frame picture, covering the objective item with a colour range to distinguish it from the background, and viewing as the forms in the mask. The program keeps on circling the following strides until it stops.

5.2 TECHNIQUES OF FINGERTIP RECOGNITION DATASET CREATION:

Utilizes strategies of dataset preparing, examining and displaying.

5.3 TRACING TRAJECTORY:

Tracked points are associated and projected on the screen .

6 . Algorithms for the Workflow

This is the most intriguing piece of our framework. Writing includes a part of functionalities. In this way, the quantity of gestures utilized for controlling the framework is equivalent to these number of activities involved. The fundamental functionalities we remembered for our framework are
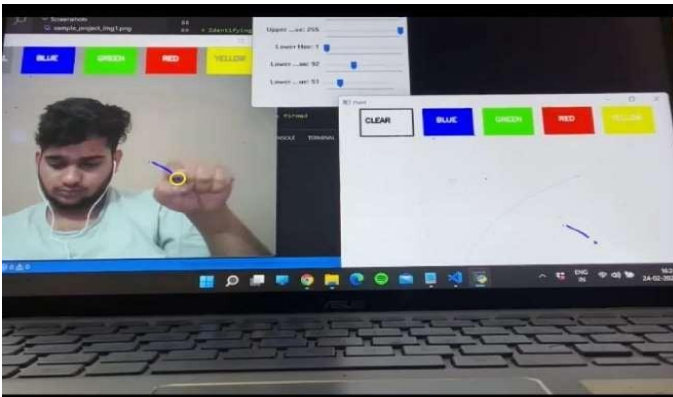
6.1 WRITING MODE -

In this express, the framework will follow the fingertip co-ordinates and stores them.

6.2 COLOUR MODE -

The client can change the shade of the text among the different accessible tones.

6.3 BACKSPACE-

Say in the event that the client turns out badly, we really want a signal to add a backspace.

(Fig. 2 Expected Output)

7. Conclusion

The framework can possibly challenge traditional writing methods . It denies the need to convey a cell phone in Hand to record notes , giving the straightforward method for doing the same . It will also fill an extraordinary need in aiding particularly abled individuals communicate effectively . Indeed, even Senior resident or individuals who find it hard to utilize consoles will actually want to utilize the framework easily . Expanding magnificent usefulness , framework can likewise be utilized to control IOT gadgets shortly . Attracting the air can likewise be made conceivable . The framework will be a fantastic programming for smart wearables utilizing which individuals could more readily interface with the Digital world .

Augmented Reality can make text wake up. There are some constraints of the framework which can be worked on from now on. First and foremost, utilizing a handwriting recognizer instead of a character recognizer will permit the client to compose quicker. Also , our framework in some cases perceives fingertips behind the scenes and alters their state. Air-composing frameworks ought to just obey their expert's control motions and ought not be deceived by individuals around. Later on, progresses in Artificial Intelligence will improve the productivity of air writing .

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