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ijirset@gmail.com

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Air Canvas

Saniya Shaikh¹, Prof. Shital Bagal², Dr. Prachi Deshpande³

¹U.G. Student, Department of Computer Science & Engineering, Shreeyash College of Engineering and Technology, Aurangabad, India

²Assistant Professor, Department of Computer Science & Engineering, Shreeyash College of Engineering and Technology, Aurangabad, India

³Head of Department, Department of Computer Science & Engineering, Shreeyash College of Engineering and Technology, Aurangabad, Aurangabad, India

ABSTRACT: Air Canvas is an innovative project that redefines traditional drawing methods by introducing a gesture-based interactive drawing system. The project leverages motion sensing technology to create a virtual canvas in the air, enabling users to draw, sketch, and express their creativity without the need for physical tools or surfaces. The system employs a combination of advanced sensors and computer vision algorithms to track hand movements, translating them into digital strokes on a virtual canvas.

The primary goal of Air Canvas is to provide a seamless and intuitive drawing experience that transcends the limitations of traditional mediums. Users can control various aspects of the drawing process, such as stroke thickness, color selection, and erasing, by employing natural hand gestures. This approach not only enhances the creative process but also promotes a more immersive and engaging interaction with digital art.

KEYWORDS: Air Canvas, Drawing, Hand Gestures, Motion Sensing Technology, Computer Vision Algorithms.

I. INTRODUCTION

In an era defined by technological innovation, the convergence of art and technology continues to reshape the boundaries of creative expression. The "Air Canvas" project emerges as a pioneering venture at the intersection of digital art and human-computer interaction, seeking to revolutionize the traditional canvas by rendering it ethereal – existing not on physical surfaces, but in the vast expanse of the air itself. Air Canvas represents a paradigm shift in the way we approach drawing and sketching, transcending the limitations imposed by physical mediums. The project is rooted in the concept of gesture-based interaction, leveraging cutting-edge motion sensing technology and computer vision algorithms to transform hand movements into strokes on a virtual canvas suspended in the air. Gone are the days of brushes and pencils; in this innovative landscape, creativity is liberated from the constraints of tangible tools. At its core, Air Canvas aims to democratize artistic expression, providing a platform where individuals can seamlessly translate their imagination into digital art through intuitive hand gestures. The system responds to the subtleties of these gestures, offering users control over stroke dynamics, color palettes, and erasing functions, thereby fostering a natural and immersive creative experience. This introduction sets the stage for a journey into the realms of interactive and responsive digital artistry. As we delve deeper into the workings of Air Canvas, we explore not just a project but a transformative medium that challenges conventional notions of art creation. The marriage of technology and artistic endeavor unfolds, promising a canvas that is not confined by physical boundaries but is as boundless as the human imagination itself.

In hardware we required different tools like camera, screen, RAM (minimum 4GB), Processor for developing this project and software requirements includes an Operating system, Programming language which is python and different libraries of python like MediaPipe, OpenCV and NumPy.

II. METHODOLOGY

In this project we are making a project in that we are using some python libraries like OpenCV, MediaPipe and Numpy. In this we can draw anything by using only our hands or using only finger tips. We are using the camera and by using the hands motion of coloured marker that are provided by python libraries we can write anything in air. In this first we are going to run the program then start the webcam and by camera hand gestures are captured so accordingly we can

write anything in air by choosing the colour which we want. Then it will be going to be draw on the whiteboard. After all this process lastly, we exit from application.

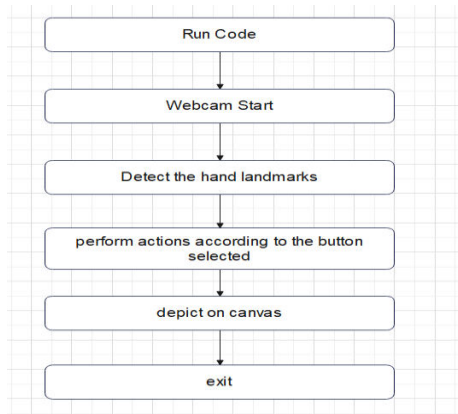


Fig. a: Running the program

First run the application on your system then start the web camera of your system. Then by using hands movement the camera detect the hand gestures then according to the options we perform the different actions using the given buttons. Then what your write in the air depict on canvas. After that exit the program.

III. LITERATURE SURVEY

a) An Economical Air Writing System Converting Finger Movements To Text Using Web Camera: [1]
System is developed by movement of finger tips in air. By capturing the movements of hands we draw or write the text on to the white board.

b) Air Canvas Application Using MediaPipe, OpenCV and Numpy python:
The system is developed using the libraries of python like OpenCV and Numpy and MediaPipe.

c) Hand Recognition with Kinect Sensor:
In [3], the system proposed used 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.

d) System with Air mouse:[3]
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.

e) Movement recognition using LED:[12]
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.

IV. EXPERIMENTAL RESULTS



Fig.b:Output1



Fig.c:Output2

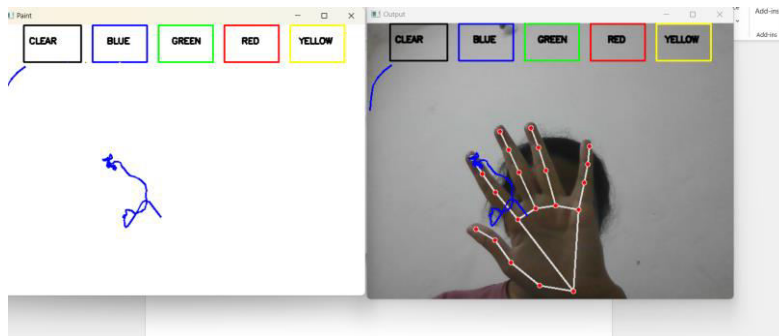


Fig. d: Hand's gestures

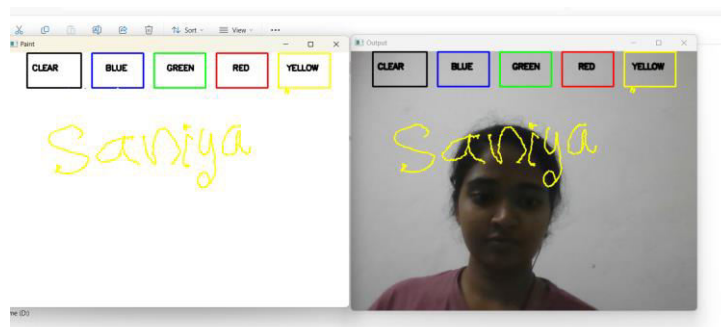


Fig. e: Working with whiteboard

V. CONCLUSION

The air canvas project represents a combination of technology and artistic expression, providing a novel approach to digital drawing through hands gestures. In this we have used different python libraries like OpenCV, NumPy, and MediaPipe. Through the integration of MediaPipe's hand tracking capabilities, we've enabled users to interact with a virtual canvas suspended in the air, converting hand movements into digital strokes. In conclusion, Air Canvas not only showcases the capabilities of modern computer vision and gesture recognition technologies but also underscores the endless possibilities that arise when technology is harnessed to amplify human creativity. This project stands as a testament to the boundless innovation achievable at the intersection of art and technology, inviting users to draw freely and imaginatively in the air.

REFERENCES

- [1] Saira Beg , M. Khan Fahad, Faisal Baig "Text Writing in Air" Journal of Information Display Volume 14, Issue 4, 2013
- [2] <http://ai.googleblog.com/2019/08/on-device-real-time-hand-tracking-with.html>
- [3] Sandbhor, A., Rane, P., Shirole, P., & Phapale, p. (2023). AIR CANVAS. *IJCRT*.
- [4] <https://mediapipe.dev/>
- [5] <https://ieeexplore.ieee.org/abstract/document/9753939>
- [6] A Practical Introduction to Computer Vision with OpenCV-WILEY
- [7] <https://opencv.org/>
- [8] <https://ieeexplore.ieee.org/abstract/document/9731873>
- [9] Nikhil Pandey, Aayushi Saxena, Amany Verma "COLOUR DETECTION USING OPENCV", International Journal of New Technology and Research (IJNTR) ISSN: 2454-4116, Volume-7, Issue5, May 2021
- [10] Plataniotis, Konstantinos N., and Anastasios N. Venetsanopoulos. Color image processing and applications. Springer, 2000
- [11] Google AI Blog: On-Device, Real-Time Hand Tracking with MediaPipe (googleblog.com)
- [12] N, R., V , R., Singh, P., Prahalad, A., & Katkeri, A. (2022). A Survey on Virtual Air Sketching Using *.International Journal of Advances in Engineering and Management (IJAEM)*.



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