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Online Digital Board using OpenCV

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ABSTRACT: Now days, Education system become online, teachers get lecture on online meetings and teach students. Most of the teacher can't explain concept properly and student also not understand that concept because of there is no board to teach. Basically most of the teacher teach by using some drawings, diagrams and by writing some point no board in offline education system because of that teachers visualization student understand the concept properly. So, Our team decided to make Digital Board (White Board) to make visualization of concept. In that project we add all necessary tools that needed to teach like multiple colour chocks and duster. I also add some new things to make visualization perfect like shapes (circles, squares, arrows), gif files etc.... This paper presents a real time video based pointing method which allows sketching of English text over air in front of camera. Proposed method track the coloured finger tip in the video frames and Here Colour Detection and tracking is used in order to achieve the objective. The colour marker in detector is detected and a mask is produced. It includes the further steps of morphological operations on the mask produced which are Erosion and Dilation. Erosion reduces the impurities present in the mask and dilation further restores the eroded main mask.

KEYWORDS:- Air Writing, Character Recognition, Object Detection, Real-Time Gesture Control System, Smart Wearables, Computer Vision.

I. INTRODUCTION

Digital Board helps to draw on a screen just by waving your finger fitted with a colourful point or a simple coloured cap. We will be using the computer vision techniques of OpenCV to build this project. The preferred language is python due to its exhaustive libraries and easy to use syntax but understanding the basics it can be implemented in any OpenCV supported language. The traditional way includes pen and paper, chalk and board method of writing. The essential aim of digital art is of building hand gesture recognition system to write digitally. Digital art includes many ways of writing like by using keyboard, touch-screen surface, digital pen, stylus, using electronic hand gloves, etc. But in this system, we are using hand gesture recognition with the use of machine learning algorithm by using python programming, which creates natural interaction between man and machine. With the advancement in technology, the need of development of natural 'human – computer interaction (HCI)' [10] systems to replace traditional systems is increasing rapidly. After detection of text, how text region is filled using an inpainting technique that is given in Section III. Section IV presents experimental results showing results of images tested. Finally, Section V presents conclusion.

II. RELATED WORK

In the era of digital world, traditional art of writing is being replaced by digital art. Digital art refers to forms of expression and transmission of art form with digital form. Relying on modern science and technology is the distinctive characteristics of the digital manifestation. Traditional art refers to the art form which is created before the digital art. From the recipient to analyse, it can simply be divided into visual art, audio art, audio-visual art and audio-visual imaginary art, which includes literature, painting, sculpture, architecture, music, dance, drama and other works of art. Digital art and traditional art are interrelated and interdependent. Social development is not a people's will, but the

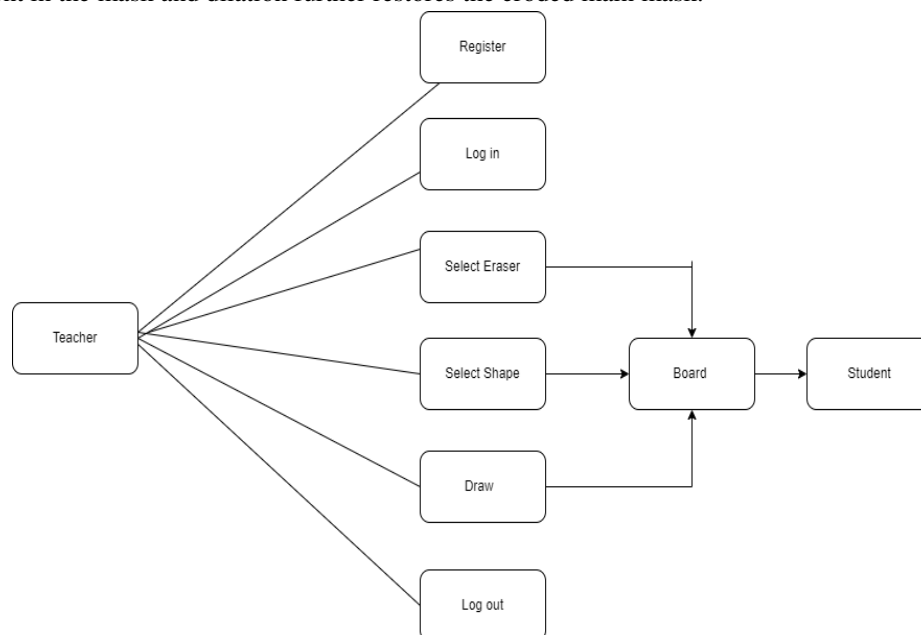
needs of human life are the main driving force anyway. The same situation happens in art. In the present circumstances, digital art and traditional art are inclusive of the symbiotic state, so we need to systematically understand the basic knowledge of the form between digital art and traditional art.

People hearing impairment: Although we take hearing and listening for granted, they communicate using sign languages. Most of the world can't understand their feeling, their emotions without a translator in between.

Overuse of Smartphones: They cause accidents, depression, distractions, and other illnesses that we humans can still discover. Although its portability, ease to use is profoundly admired, the negatives include lifethreatening events. Paper wastage is not scarce news. We waste a lot of paper in scribbling, writing, drawing, etc.... Some basic facts include - 5 liters of water on average are required to make one A4 size paper, 93% of writing is from trees, 50% of business waste is paper, 25% landfill is paper, and the list goes on. Paper wastage is harming the environment by using water and trees and creates tons of garbage.

III. METHODOLOGY

The aim of proposed system is to develop a system of improved facilities. The proposed system can overcome all the limitations of the existing system. The system provides proper security and reduces the manual work. Air Writing can quickly solve these issues. It will act as a communication tool for people with hearing impairment. Their air-written text can be presented using AR or converted to speech. One can quickly write in the air and continue with your work without much distraction. Additionally, writing in the air does not require paper. Everything is stored electronically. Ever wanted to draw your imagination by just waiving your finger in air. Here we will learn to build an Digital board which can draw anything on it by just capturing the motion of a hand and tip of fingers marker with camera. Here a coloured object at hands and tip of fingers is used as the marker. We will be using the computer vision techniques of OpenCV to build this project. The preferred language is python due to its exhaustive libraries and easy to use syntax but understanding the basics it can be implemented in any OpenCV supported language. Here colour detection and tracking is used in order to achieve the objective. The colour marker is detected and a mask is produced. It includes the further steps of morphological operations on the mask produced which are Erosion and Dilation. Erosion reduces the impurities present in the mask and dilation further restores the eroded main mask.



IV. EXPERIMENTAL RESULTS

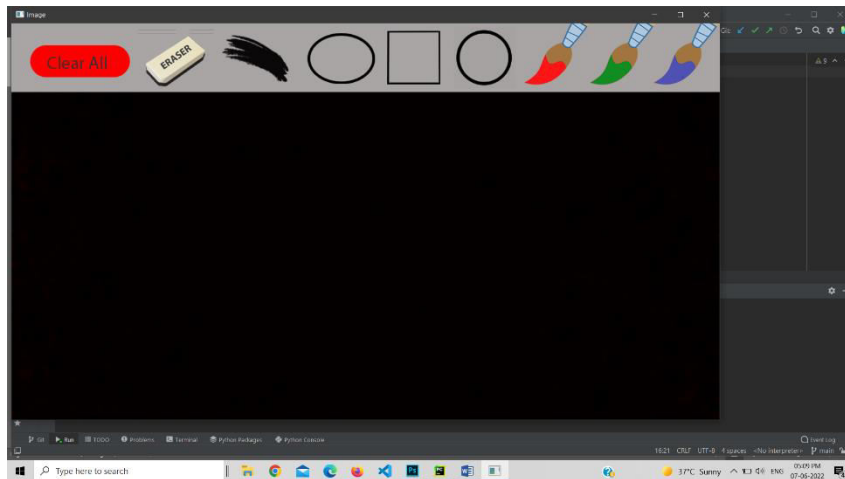


Fig.1 Shows eraser selection

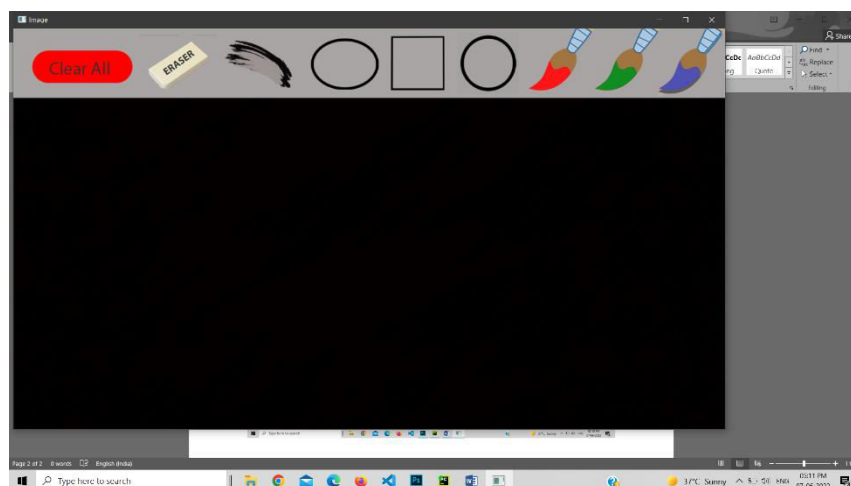


Fig 2. Shows selection of blue colour with Free style

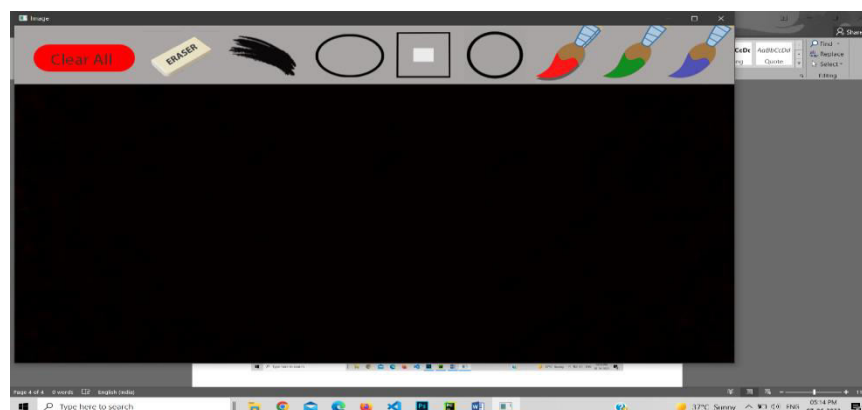


Fig 3. Shows selection of Red colour with square

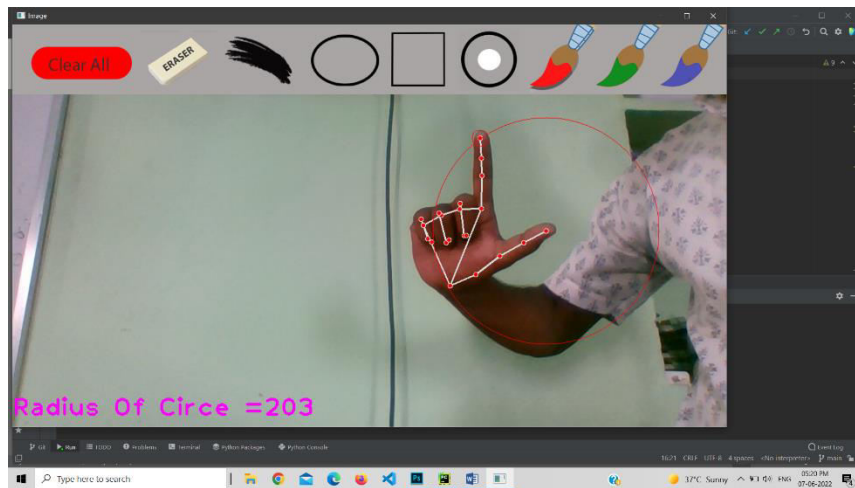


Fig 4. Shows selection mode

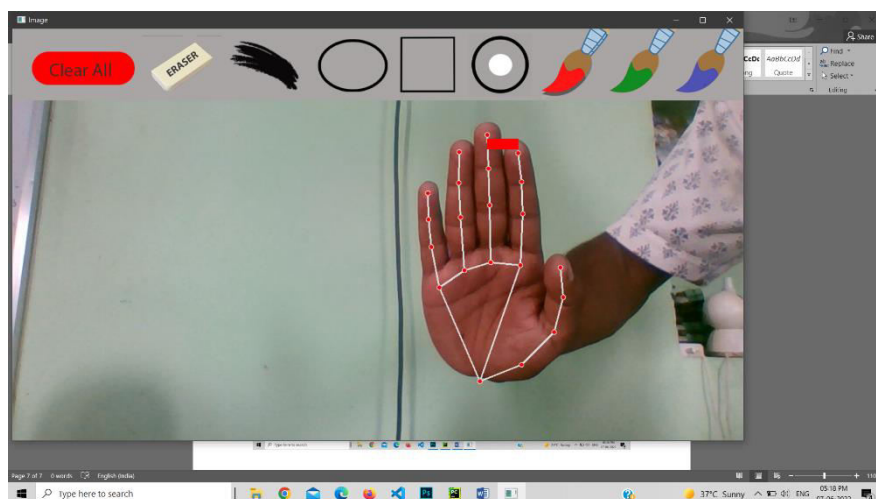


Fig 5. Shows Selection of size of shape

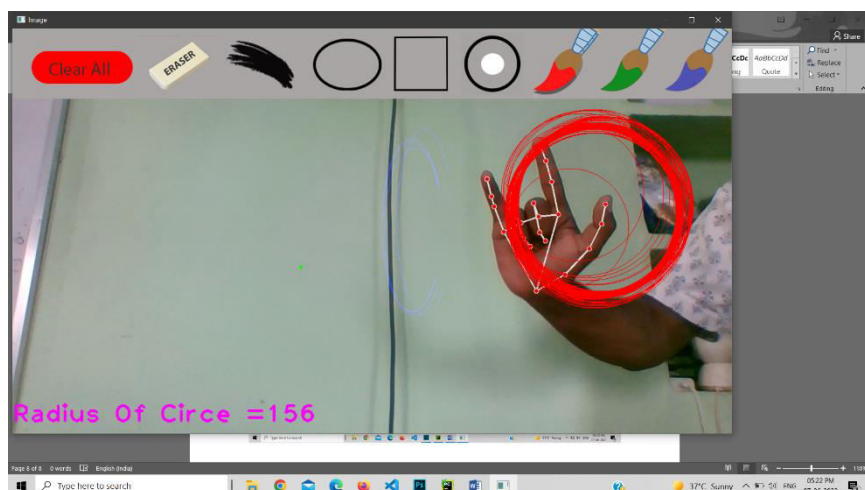


Fig 6. Shows selection of draw mode



V. CONCLUSION

In this research, we have studied online and offline education mode or system. Understand both system advantages and disadvantages. Get what teachers face difficulty to teach. To overcome that some of the difficulty we decided to make tool that help to teacher and students to easy teach and learn.

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