International Journal of Scientific Research in Science and Technology
Print ISSN: 2395-6011 | Online ISSN: 2395-602X (www.ijsrst.com)
doi : https://doi.org/10.32628/IJSRST523103122

Human Computer Interaction with detection of Hand Gesture to improve Artistic creativity

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ARTICLEINFO

Article History:
Accepted: 05 May 2023
Published: 30 May 2023

Publication Issue
Volume 10, Issue 3
May-June-2023

Page Number
571-575

ABSTRACT

This research purpose is to improve the interest of artistic creativity for school or college's students. Find new ways to use virtual reality technology to improve art professional education. Drawing using hand gestures is where we can draw by just capturing the motion of a colored marker with a camera. Discuss how computer vision can play an important role in art education. Using this we have created a simulation for art students or users which helps them to increase their interest to use modern technology which is going to help them to improve their artistic creativity. The Virtual Paint is where students or users can draw by just capturing the motion of a colored marker using a Camera.

Keywords: Artistic Creativity, Human Computer Interaction, Motion Acknowledgement, Hand Gesture and Color detection.

I. INTRODUCTION

Human Computer Interaction is done in various ways like speech, text and hand gesture. These types of interactions are user friendly. Generally, people have used many controlling devices to interact with machine like remote, joysticks etc but to operate those devices basic knowledge is required related to that device. On the other hand gesture based interface gives more user friendly environment because user has to operate a machine using only his hands in front of the camera. There are multiple applications which works on static hand gesture recognization like Sign language recognization, Robotics, Gaming, Smart home interactive control. Unlike above mention applications our research needs dynamic hand gesture detection using which students can implement their artistic creativity by operating our system using their hands only.

II. EXISTING SYSTEM

1. Real-Time Hand Gesture Recognition using Fine-Tuned Convolutional Neural Network

Jaya Prakash Sahoo[1], proposed Due to its tremendous flexibility and user-friendliness, hand gesture recognition is one of the most successful means of communication between people and computers. The development of a user-free interface with good recognition performance should be the goal of a real-time hand gesture recognition system. An end-to-end fine-tuning strategy of a pre-trained CNN

model with score-level fusion methodology is proposed to recognise hand gestures in a dataset with a small number of gesture images since convolutional neural networks (CNNs) exhibit high recognition rates in image classification challenges. On two benchmark datasets, leave-one-subject-out cross-validation (LOO CV) and conventional CV tests are used to gauge the success of the suggested method. Using the suggested method, a real-time American sign language (ASL) recognition system is developed and tested using the proposed technique.

2. Real-Time Hand Gesture Recognition using a Convolutional Neural Network

Julia Arnardottir[2], proposed Hand gestures are an intuitive way of communicating, independent of age and nationality. As robots of all sort become more frequent in our everyday lives, it is important to explore ways to communicate with them. They are using computer vision and neural networks to classify hand gestures and the results visualized on an animated robot that performs different movements based on the predicted hand gestures.

3. Real-time Hand Gesture Recognition and Human-Computer Interaction System

Pei Xu[3], proposed This project creates a real-time hand gesture-based human-computer interaction system. Three elements make up the system: hand detection, gesture recognition, and human-computer interaction (HCI) based on recognition. The system realises robust control of mouse and keyboard events with a greater level of gesture recognition accuracy. The method uses a convolutional neural network (CNN) to recognise movements and enables rather complex gestures to be recognised with just one inexpensive monocular camera. In order to realise steady and smooth mouse cursor control, the Kalman filter is employed to estimate the hand position. To prevent false recognition brought on by noises and increase the dependability of interaction, a straightforward technique is created. The technology is extremely expandable and useful in humanrobotic or other human-machine interaction scenarios with more complex command formats.

4. Real-time Hand Gesture Detection and Classification Using Convolutional Neural Networks

Okan Kopuklu[4], proposed a hierarchical structure enabling offline-working convolutional neural network architectures to operate online efficiently by using sliding window approach. The proposed architecture consists of two models: (1) A detector which is a lightweight CNN architecture to detect gesture and (2) A classifier which is a deep CNN to classify the detected gestures.

5. AR pen and hand gestures: a new tool for pen drawings

Hark-Joon Kim[5], proposed a new interactive AR based pen tool which can overlay virtual images onto a physical drawing in real time. This system allows artists to control the augmented images using gestures of a non-dominant hand while drawing. They have made standalone pen system integrated with a pico-projector and a camera, and suggest a set of useful scenarios for the conventional pen and paper drawing.

6. Based on VR Technology the Influence of School Organizational Innovation Atmos Phere Artistic Creativity of University Students: Mediating Role of Flow Experience

Wei-Ying Wang[6], proposed the impact of the school's organisational innovation environment on the artistic creativity of college students is examined in this article. The effectiveness of the environment and flow experience on creativity is confirmed by AMOS data analysis. Technology based on virtual reality can be utilised to enhance university art professional education, produce an artistic experience of flow, inspire creativity, and raise the standard of art professional education.

7. Real time object detection and tracking using Deep Learning and OpenCV

G Chandan[7], proposed that deep learning has had a significant impact on how the world is adjusting to artificial intelligence. Region-based Convolutional Neural Networks (RCNN), Faster-RCNN, Single Shot Detector (SSD), and You Only Look Once (YOLO) are a few of the well-known object detection techniques. When speed is prioritised over accuracy, YOLO outperforms the others, with Faster-RCNN and SSD having greater accuracy. In order to implement detection and tracking efficiently, deep learning blends SSD and Mobile Nets. This method detects objects effectively without sacrificing performance.

8. Multiple object detection using OpenCV on an embedded platform

S Guennouni[8], propsed that due to the vast range of applications it may be used in, object detection has been garnering a lot of attention. The advancement of object detection technologies has been fueled by the rising computing capacity of hardware and software. In this paper, we describe a developed multiple object detection application built on OpenCV libraries. The complexity-related factors that were taken into account when employing a cascade classifier to detect objects are described. We also go into profiling, application porting to an embedded platform, and comparing the outcomes to a standard platform. The results of the suggested application, which deals with the implementation of real-time systems, indicate where object detection application cases may be more complex and where they may be easier.

III.PROPOSED SYSTEM

The proposed system can be classified into two parts after acquiring the input image from camera or video i.e.

1) Image pre-processing called Extraction Method
2) Feature Estimation.

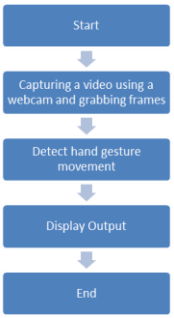


Fig 1. : Flow of Proposed System

Step 1: Detect hand gesture movement

We have used Hand Tracking Module to track hands on to screen. As this reseach we have use index fingure for drawing and index plus middle figure for the selection of color as well as shapes for creating any artistic piece. In the model we have total 20 points on the hands which it track. First we detect number of hands on the screen and finds its location on the screen after that we use to detect all the landmarks (points, tips of hand etc.) of the 20 marks on the hand.

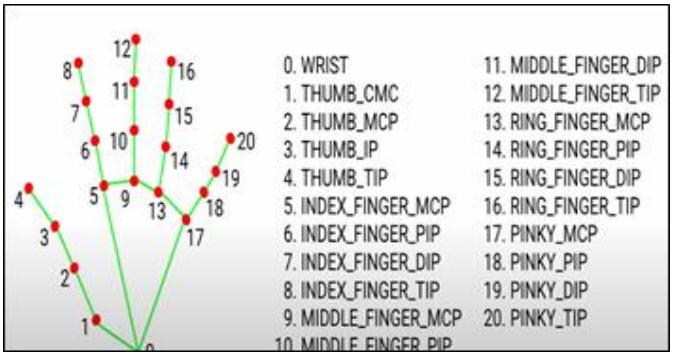


Fig 2. Identification of different points of Hand

Step 2: Video Capturing using Webcam

We have use index fingure for drawing and index + middle fingure for selection of color or shape so first we need to count how many and which fingures are up or down. We have used OpenCV for capturing video of hand movements and based on the gesture of hand picture will be created in given user interface.

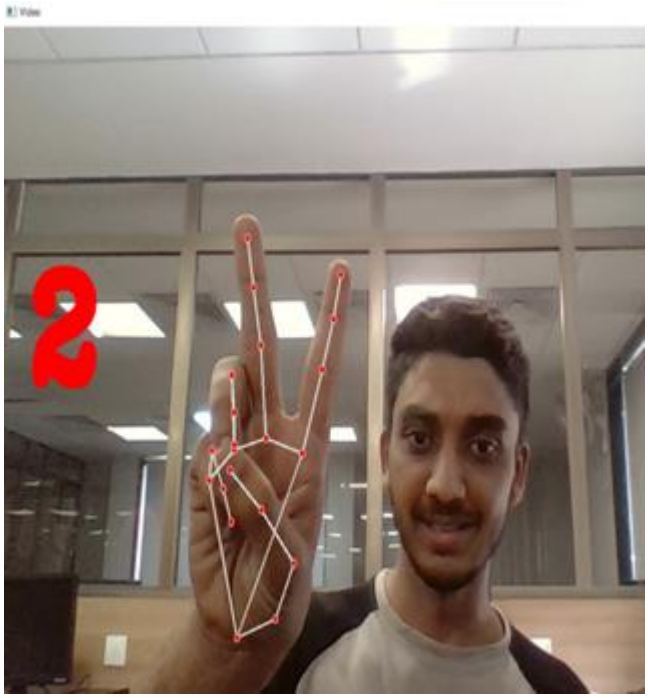
Step 3: Display the Result.

IV.RESULT AND DISCUSSION

Step 1: Couting figures to finalized the mode of the system. System can be in Selection mode or Drawing mode.

i. Index fingure: Drawing Mode
ii. Index+Middle fingure: Selection Mode

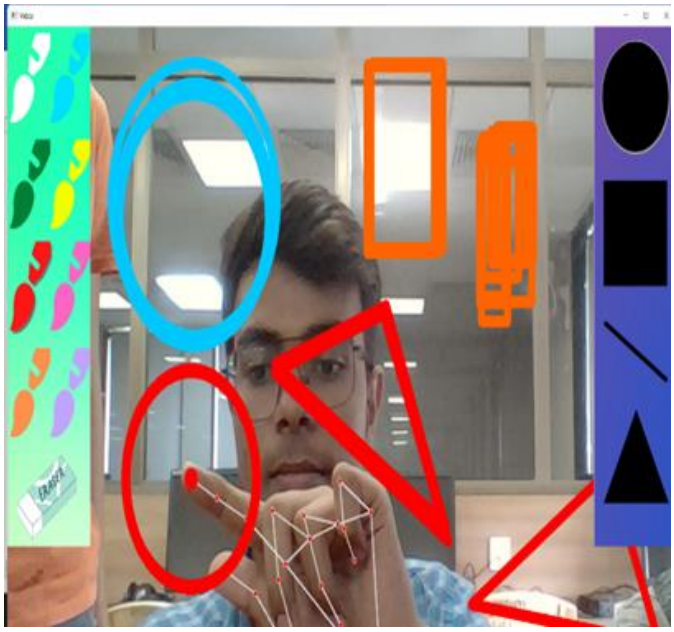
(a)



(b)

Fig. 3 (a) and (b) Output of testing screen of Couting Fingure

Step 2: After finalising color and shapes user can start drawing. It can be shape based drawing or freehand drawing also.



(a)

(b)

Fig. 4 Sample Drawing Output (a) Using pre-defined Shapes (b) Using Freehand

V. CONCLUSION

This research work makes the user to have interactive environment where user can create whatever artistic peace he wants to create by chossing colors which are

provided in user interface. The ultimate goal is to create a computer vision machine learning research that promotes human computer interaction (HCI) refers to the relation between the human and the computer or more precisely the machine.

VI.FUTURE SCOPE

More sophisticated ways of Gesture recognition from various other human actions will take place instead of just hand gestures. Voice recognition system will be coupled with gesture recognition system which will then completely remove the requirement of hardware like keyboard and mouse.

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Cite this Article

Ms. Megha S. Patel, Vedant Rajpurohit, Manan Patel, Rinkesh Patel, "Human Computer Interaction with detection of Hand Gesture to improve Artistic creativity", International Journal of Scientific Research in Science and Technology (IJSRST), Online ISSN : 2395-602X, Print ISSN : 2395-6011, Volume 10 Issue 3, pp. 571-575, May-June 2023. Available at doi : https://doi.org/10.32628/IJSRST523103122

Journal URL : https://ijsrst.com/IJSRST523103122