

PRO FORMA FOR THE APPROVAL OF THE FOURTH SEMESTER MAIN PROJECT

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FINGER RECOGNITION AND GESTURE BASED AUGMENTED KEYBOARD AND RELATED APPLICATIONS

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Introduction:

In this project, we have tried to reduce the gap between the real world and the augmented environment to produce a mixed reality system. For that purpose, we created a virtually controllable keyboard system which is created and implemented using OpenCV libraries and python3.2.1. To provide an easy immersive augmented experience which is also gesture enabled, we employ a web camera which is integrated with OpenCV libraries through a compiler. Using our system, users can control a virtual keyboard using their finger movements and finger tips. Further, users can communicate with people who are viewing the screen, the user selects an alphabet with their fingertip and can move the keyboard with the help of hand gesture. Our model can be utilized by people who are specially-abled and people who cannot talk properly or communicate as they can communicate with others using our proposed system. This paper describes the way of implementing a virtual keyboard without any additional hardware but by using the webcam available in the system. The webcam simply captures the consecutive frames and compares them to recognize it as a click if there is a difference in the contour. By using virtual Keyboard we are accessing AI virtual painter and Pong Game Virtually.

Objectives:

1.Virtual Keyboard Using OpenCV

In this project, we have tried to reduce the gap between the real world and the augmented environment to produce a mixed reality system. For that purpose, we created a virtually controllable keyboard system which is created and implemented using OpenCV libraries and python3.2.1. To provide an easy immersive augmented experience which is also gesture enabled, we employ a web camera which is integrated with OpenCV libraries through a compiler. Using our system, users can control a virtual keyboard using their finger movements and finger tips. Further, users can communicate with people who are viewing the screen, the user selects an alphabet with their fingertip and can move the keyboard with the help of hand gesture. Our model can be utilized by people who are specially-abled and people who cannot talk properly or communicate as they can communicate with others using our proposed system. This paper describes the way of implementing a virtual keyboard without any additional hardware but by using the webcam available in the system. The webcam simply captures the consecutive frames and compares them to recognize it as a click if there is a difference in the contour.

2.Virtual Sketch Using OpenCV

Virtual Sketch is in where we can draw by just capturing the motion of a colored marker with a camera. One colored object at the tip of the finger is mainly used as the marker. We are here now, using the techniques of computer vision in open cv to build this project. The required language for this project is

python due to its more exhaustive libraries and easy to make use of the syntax and but understanding the basics as well as it can be implemented in any open cv supported languages The colour tracking and detection processes are used to achieve the goal of this project.

3.Pong Game Using OpenCV

Pong is one of the earliest arcade video games. It is a table-tennis inspired game featuring simple two-dimensional graphics. In it, the player controls the paddle by moving it vertically across the left or the right side of the screen. The objective is to reach 21 points before the opponent; each player earns points when the opponent fails to return the ball. The aim of this project is to create a python-based application for Pong using the Pygame library. It also involves creating a few AI models which the user can play against. Here we can control the game by using the finger movements.

Problem Definition:

OpenCV is the most popular library for the task of computer vision, it is a cross-platform open-source library for machine learning, image processing, etc. using which real-time computer vision applications are developed. CVzone is a computer vision package, where it uses OpenCV and MediaPipe libraries as its core that makes us easy to run like hand tracking, face detection, facial landmark detection, pose estimation, etc., and also image processing and other computer vision-related applications.

The Camera Used in the AI Virtual Keyboard System

The proposed AI virtual keyboard system is based on the frames that have been captured by the webcam in a laptop or PC. By using the Python computer vision library OpenCV, the videocapture object is created and the web camera will start capturing video. The web camera captures and passes the frames to the AI virtual system.

Capturing the Video and Processing

The AI virtual keyboard, sketch and pong game uses the webcam where each frame is captured till the termination of the program. The video frames are processed from BGR to RGB color space to find the hands in the video frame by frame. Virtual Screen Matching Rectangular Region for Moving Through the Window. The AI virtual keyboard, sketch and pong game system makes use of the transformational algorithm, and it converts the co-ordinates of fingertips from the webcam screen to the computer window full screen for controlling the pointer. When the hands are detected and when detect the finger it performs the specific function.

Detecting Which Finger Is Up and Performing the Particular Mouse Function.

In this stage, we are detecting which finger is up using the tip Id of the respective finger that we found using the MediaPipe and the respective co-ordinates of the fingers that are up, and according to that, the particular function is performed

Basic functionalities:

Tools / Platform, Hardware and Software Requirements:

Hardware specification:

The selection of hardware is very important in the existence and proper working of any software. Then selection hardware, the size and capacity requirements are also important.

- Processor : Intel Pentium Core i5 and above
- Primary Memory : 4 GB RAM and above
- Storage : 500 GB hard disk and above
- Display : VGA Colour Monitor
- Key Board : Windows compatible
- Mouse : Windows compatible

Software specification:

One of the most difficult tasks is selecting software for the system, once the system requirements is found out then we have to determine whether a particular software package fits for those system requirements.

The application requirements:

- Front end : Python
- Operating system : windows 7 and above
- IDE : PyCharm

