Finger Recognition and Gesture Based Augmented Keyboard and Related Applications

SYNOPSIS

My project which utilizes finger recognition is a topic which comes under two major computer science fields like augmented reality and human-computer interaction and we have developed a virtual system with the goal of interpreting human gestures via mathematical algorithms. In this project, I tried to reduce the gap between the real world and the augmented environment to produce a mixed reality system. For that purpose, I created a virtually controllable keyboard system, pong game, virtual painter and calculator which is created and implemented using OpenCV libraries and python3.2.1. To provide an easy immersive augmented experience which is also gesture enabled, I employ a web camera which is integrated with OpenCV libraries through a compiler. Using the concept of gesture recognition, it is possible to point a finger at the computer screen or web camera so that the keypad will be pressed accordingly to form meaningful sentences or word.

Gesture recognition is an active research field in Human-Computer Interaction technology. It has many applications in virtual environment control and sign language translation, robot control, or music creation. In this machine learning project on Hand Gesture Recognition, we are going to make a real-time Hand Gesture Recognizer using the MediaPipe framework. OpenCV is a real-time Computer vision and image-processing framework built on C/C++. But I'll use it on python via the OpenCV-python package.

Depending on the type of the input data or source, the approach for interpreting a fingertip could be done in different ways,most of the techniques rely on key pointers represented in a 3D coordinate system. Based on the relative motion of these, the gesture can be detected with a high accuracy, depending on the quality of the input and the algorithm's approach.

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, Pong Game and Calculator virtually.