MINI PROJECT
(2019-20)

Hand Gesture Recognition

SYNOPSIS

Department of Computer Engineering & Applications

Institute of Engineering & Technology

Submitted To:

Mr. Mandeep Singh
(Technical Trainer)

Submitted By:

Harshit Rai
171500127
Keshavi Aggarwal
171500160
Vanshika Shivani
171500373

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Harshit Rai

171500127

Keshavi Aggarwal

171500160

Vanshika Shivani

171500373

Contents

Introduction

What is Gesture Recognition?

Gesture recognition refers to the mathematical interpretation of human motions using a computing device. It is a component of perceptual user interface (PUI). Other popular PUI components are voice recognition, facial recognition, lip movement recognition and eye tracking. Gestures could possibly come from any state or bodily motion; however, they usually originate from the hands or face. At present, gesture recognition is mainly centered on hand-gesture recognition and facial emotion recognition.

In gesture recognition, the human body's motions are read by a camera and the captured data is sent to a computer. The computer then makes use of this data as input to handle applications or devices.

Gesture recognition may also be referred to as gesture control.

About the Project

The project which is Hand Gesture Recognition, It can recognize different types of hand gestures with the help of the laptop/desktop webcam and take action associated with that gesture to control the laptop/desktop functions.
In this project there are some modules for do different types of task,
some of the modules are explained below.

Video Capture Module:

In this module it will capture the frames with the help of the system webcam.

Image Pre-processing Module:

In this module the captured frames will be processed before the recognition like removing the noise of the image with the help of Gaussian Blur method.

Convexity Defect Module:

In this module with the help of convexity defect method it will calculate the number of angle defects of the hand for recognizing the gesture.

Control module:

In this module after recognizing certain gesture it will do some action associated with that gesture.

Motivation

In this century where most of the things are automatic and the systems are getting intelligent day by day, no one wants to do any effort for something like the laptop/desktop. Earlier, Some people who didn’t want to use mouse, got the touchpad invented but now in the age of Artificial Intelligence and computer vision we can also use hand gesture to control the system, where we have to just move our hand and do some gesture for operating our system .

Future Prospects

Future Prospect of this project can be the use of different equipment like arduino board or raspberry pi for making it more fuzzy and using more gesture for complex action on computers or on another system like smart room where everything will be controlled by your gesture only.

Requirements:

a) Hardware Requirements(Minimum):

i3 processor based computer

4GB Ram

Webcam

5 GB Hard Disk Space

b) Software Requirements (Minimum):

Windows 7

Python 3.7

Python Modules

1. OpenCV2
2. Pandas
3. Numpy
4. Tensorflow
5. Keras

Technology Used:

A. Open Computer Vision

B. Python & Machine Learning

C. Classification

D. Convolution Neural Network (CNN/ CovNets)

References:

Convexity Defect report by University of Birmingham

Blog on Hand Gesture Recognition on
https://iopscience.iop.org/article/10.1088/1757-899X/99/1/012012

"HAND GESTURE RECOGNITION: A LITERATURE REVIEW" by
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