

## HAND GESTURE RECOGNITION USING PYTHON AND OPEN CV

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### ABSTRACT

Hand gesture recognition is one of the system that can detect the gesture of hand in a real time video. The gesture of hand is classify within a certain area of interest. In this study, designing of the hand gesture recognition is one of the complicated job that involves two major problem. Firstly is the detection of hand. Another problem is to create the sign that is suitable to be used for one hand in a time. This project concentrates on how a system could detect, recognize and interpret the hand gesture recognition through computer vision with the challenging factors which variability in pose, orientation, location and scale. To perform well for developing this project, different types of gestures such as numbers and sign languages need to be created in this system. The image taken from the real time video is analysed via Haar-cascaded Classifier to the gesture of hand before the image processing is done or in the other word to detect the

appearance of hand in a frame. In this project, the detection of hand will be done using the theories of Region of Interest (ROI) via Python programming. The explanation of the results will be focused on the simulation part since the different for the hardware implementation is the source code to read the real-time input video. The developing of hand gesture recognition using Python and OpenCV can be implemented by applying the theories of hand segmentation and the hand detection system which use the Haar-cascade classifier.

### INTRODUCTION

In a day-to-day life, hand gesture recognition is one of the system that can detect the gesture of hand in a real time video. The gesture of hand is classify within a certain area of interest. Designing a system for hand gesture recognition is one of the goal of achieving the objectives of

this project. The task of recognizing hand gestures is one of the main and important issues in computer vision.

With the latest advances in information and media technology, human computer interaction (HCI) systems that involve hand processing tasks such as hand detection and hand gesture recognition.

The first step in any hand processing system is to detect and locate the hand in the real-time video from the webcam. In the process of detection of hand, according to hand gesture recognition generally involves multiple levels such as image acquisition, pre-processing, feature extraction and gesture recognition. Image acquisition involve capturing image in the video frame by frame using a webcam. This study comprises on how to implement a complete system that can detect, recognizing and interpreting the hand by using Python and OpenCV in any intensity of light, pose or orientation of hand.

## REQUIREMENTS

Python – 3.x (we used Python 3.8.8 in this project)

2. OpenCV – 4.5

Run “pip install opencv-python” to install OpenCV.

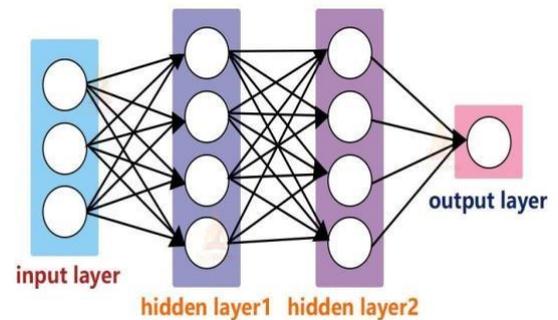
3. MediaPipe – 0.8.5

Run “pip install mediapipe” to install MediaPipe.

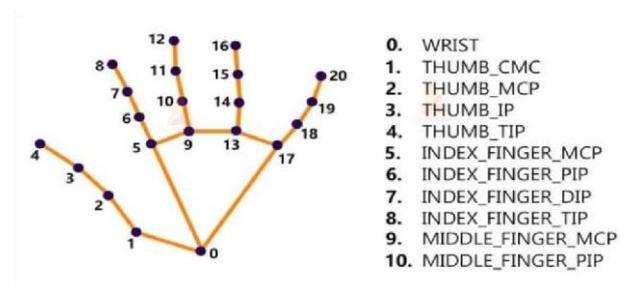
4. Tensorflow – 2.5.0

Run “pip install tensorflow” to install the tensorflow module.

5. Numpy – 1.19.3



We’ll first use MediaPipe to recognize the hand and the hand key points. MediaPipe returns a total of 21 key points for each detected hand.



Steps to solve the project:

- Import necessary packages.
- Initialize models.
- Read frames from a webcam.
- Detect hand keypoints.
- Recognize hand gestures.

## ACKNOWLEDGEMENT

Perseverance, Inspiration &

Motivation have always played a key role in the success of any venture.

At this level of understanding it is difficult to understand the wide spectrum of knowledge without proper guidance and advice, Hence we take this o to express our sincere gratitude to our respected Project Guide who as a guide evolved an interest in us to work and select an entirely new idea for project work. He has been keenly co-operative and helpful to us in sorting out all the difficulties.

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I would also thank my Institution and my faculty members without whom this project would have been a distant reality.

## CONCLUSION

As a conclusion based on the result of the project, it can be seen that developing the hand gesture recognition using Python and OpenCV can be implemented by applying the theories of hand segmentation and the hand detection system which use the Haar-cascade classifier. To summarize it, this system has accomplished several objective in this project manage to establish a complete system for detecting, recognizing

and interpreting hand gesture recognition through computer vision using Python and OpenCV, and able to create the numbers and sign languages of hand gesture shown in the system that will meets the name of the project.

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