

# Gesture Sensor Technology for Operating System Control

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**Abstract:** *This project describes a novel hand gesture recognition system that utilizes both multi-channel surface electromyogram(EMG) sensors and Web Camera to realize user-friendly interaction between human and computers. Human gesture recognition consists of identifying and interpreting automatically human gestures using a set of sensors (webcam). Therefore, cursor of mouse will move according to hand movements across the screen. The accuracy of the recognition will depend on time spent on user training for high accuracy specific user training is required. We used SVM algorithms and open CV library which sense the gesture by image processing and extraction and desired action performed.*

**Keywords:** Hand gesture, sensors, Web Camera, electromyogram(EMG), human, computers, natural interaction, human computer interface, OS.

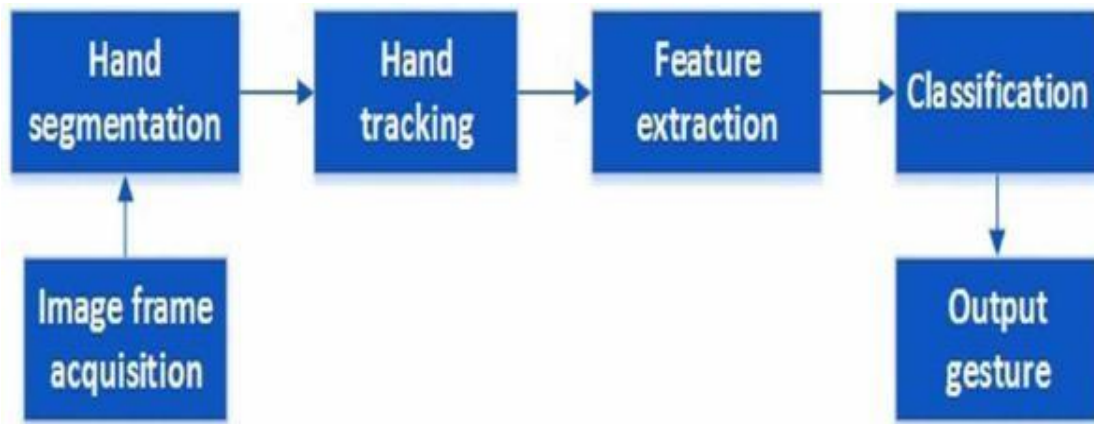
## I. INTRODUCTION

Human motion analysis is gaining more and more attention in the field of human machine interaction. On one side, such popularity is caused by the fact that, existing devices more sophisticated and combined with growing computational power has allowed to solve complicated and combined problems. On the other side recently appeared number of relatively inexpensive systems. Human gesture recognition consists of identifying and interpreting automatically human gestures using a set of sensors. The documentation presents an up to date review of the state of the art in human gesture sensor recognition which includes gesture representations, recognition techniques and applications. Several questions arise when tried to define the word "gesture". The work Web Camera as an image capture device, which is used to operate with system, motion sensor interaction between human and the computer.

## II. MOTIVATION

The motivation for gesture recognition researchers is to develop a system which can detect the gestures and these gestures are widely used for conveying the information or to control the devices. Camera based solutions for gesture recognition has been widely used in numerous applications and capability to communicate through Human Computer Interaction. A new device called Leap Motion Controller is discussed which provides the complete information of hands helps to track hand movements and gestures through API (Application Programming Interface). An idea of real time hand gesture recognition process through this device is explained along with insight of existing machine learning models. Finally an attempt is made to explain the complexities with the device and the models along with its features

### III. BLOCK DIAGRAM



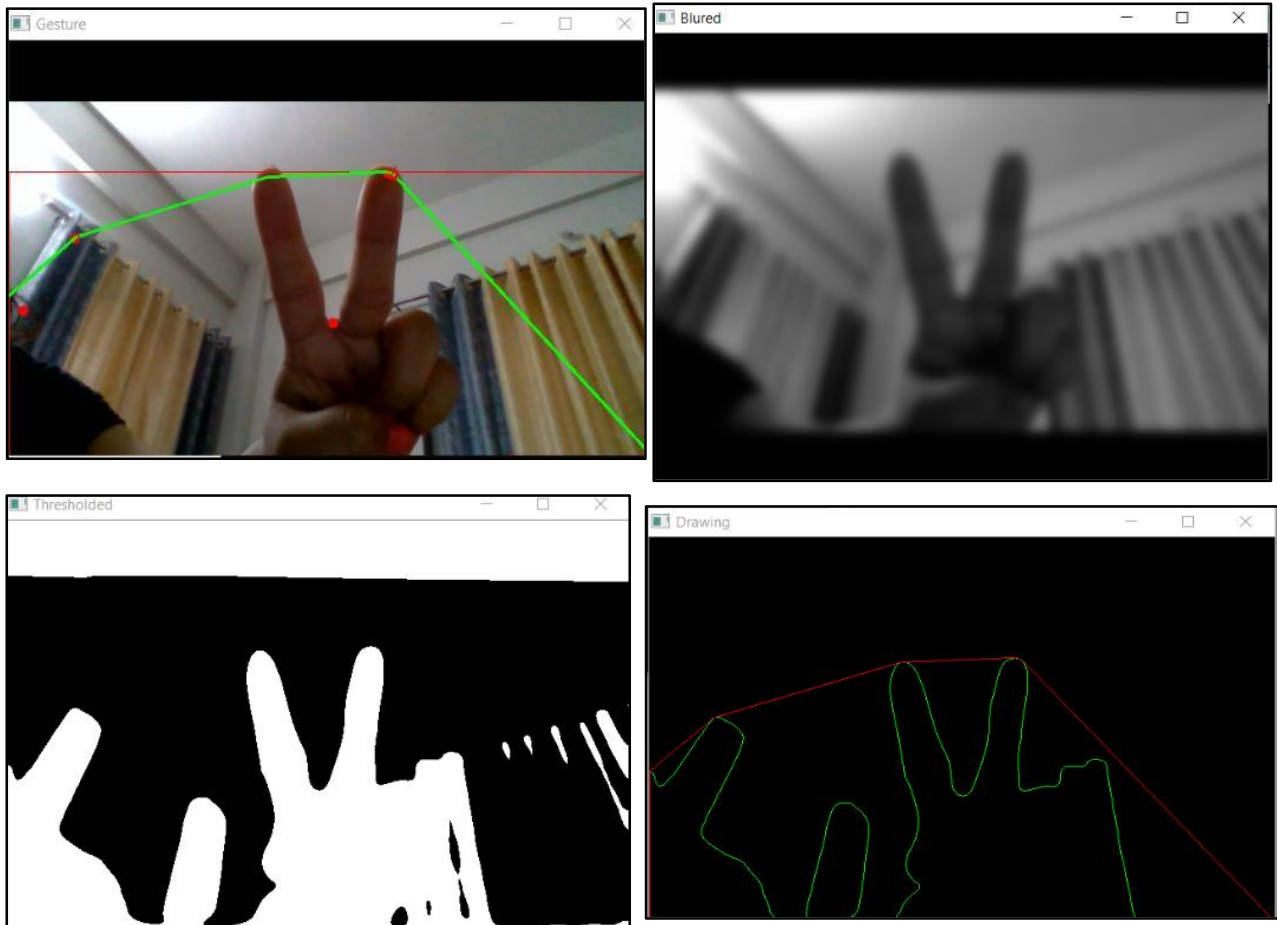
#### Block Diagram Description

- Camera captures the image i.e. Image frame acquisition.
- Then the hand gesture is identified using hand segmentation and hand tracking.
- Extracted Features are compared with the stored database to exactly check what action to perform.
- When all the parameters are mate then the final action will be performed accordingly, that is the final output

### IV. DETAILED WORKING

- Camera captures a still image and start processing it. Processing involves converting captured image into grayscale and in outlined images. As soon as any object comes under vision of a camera it detects that object shape byconverting captured image into above formats. Camera captures the image after some milliseconds of interval, and tracking happens live time.
- When any gesture made in front of camera is matched highest with any available gestures in database the action associated with that gesture is performed.
- Focus of GST is kept on the detected gesture until it goes out of viewing angel of camera. After losing focus on current gesture GST software again start detecting whole frame to detect gestures.
- There are numerous methods for implementing a Hand gesture System. Two methods have been considered for the theoretical perception.
- One is to build a three-dimensional model of the human hand. The model is matched to images of the hand by one or more cameras, and parameters corresponding to palm orientation and joint angles are estimated. These parameters are then used to perform gesture classification.
- Second one is to capture the image using a camera then extract some feature and those features are used as input for classification and control. In this project we have used second method for modeling the system. In hand gesture recognition system, we have taken database from standard hand gesture database, Segmentation and filtering techniques are applied on images in pre-processing phase then using detection method we will obtain our prime feature and use it to classify a command. We have used linear classifiers. The main components are power supply, web camera and the personal computer or laptop. The power supply connection is given to the PC. The camera is connected to PC through USB cable. The camera capture images of hand moments continuously and they are given as input to the PC. These images are taken as gestures to control the mouse pointer. The system first creates a template as reference. The reference template matches with the camera acquired images.
- According to the number of patterns matched with the reference template, its corresponding operations are performed in windows screen as per to mouse operation defined by the gesture saved in the data base.

### V. SIMULATION



### VI. ADVANTAGES

- More rapid response.
- Less complexity.
- Low-cost module.
- Easy installation.

### VII. APPLICATIONS

- Complex data navigation
- Video Games
- Automation Systems
- Medical applications

### VIII. CONCLUSION

This application program would ensure user authentication by the windows password login further authentication to most private files employing their Bluetooth enabled mobile phones. This can lead to less frequent password changes or have less stringent policies that the users are resistant to and they can and furnish an extra feature that would permit for an automated environment employing the proximity sensor to assert if your mobile token is in range or not.

**IX. ACKNOWLEDGMENT**

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