

Gesture controlled fan speed

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Abstract— Gesture refers to expressive movement of human body parts having a particular message to be communicated to a receiver. Gesture recognition refers to understanding meaning of human body part movements, which involves the movements of hand, face, head, arms or body. Human hand gestures are a means of nonverbal interaction among people. They range from simple actions of using our hand to point at and move objects around to the more complex ones that express our feelings and allow us to communicate with others. Gestures have got deep roots in our communication. The remarkable ability of the human is the gesture recognition. On the other hand, the computers have played an incredible role in the development of Human being. Considerable effort has been put towards developing intelligent and natural interfaces between users and computer systems. One longterm attempt in HumanComputer Interaction (HCI) has beenmade by means of speech recognition and it has been a topic of research for decades.

Index Terms— Hand gesture controller.



Introduction

Gesture is a form of nonverbal communication or non-vocal communication in which visible bodily Movement communicate particular messages. This gesture includes of hands. A gesture is categorized into two distinct categories dynamic and static. Gesture are some forms of actions .we can observe few hands gesture frequently used for communication purpose like thumbs up, thumbs down, victory directions etc. The input image of the hand gesture is acquiesced by camera. Pre-processing includes noise filtering, RGB to gray scale conversion. features of extraction includes background separation, image enhancement, converting to binary image , edge detection . depending on the algorithm used for classification, features of image is extracted. Recognition or classification is a process of identifying the gesture, for which different algorithm like k-curvature Is used. Thus we can control any analog or digital device by making hand gesture. which will transmit an

appropriate command to the device so it will work according to whatever we want.

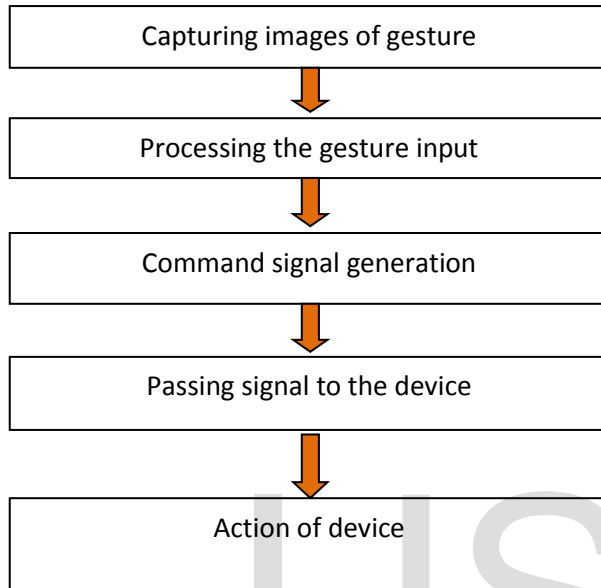
Literature survey

Static Hand Gesture Recognition System For Device Control. The primary goal of recognition is to create a system which can recognize specific human gesture and can be used to convey information or for device control. This paper aims at development of a hand gesture recognition (HGR) system captured from webcam in real time. This system includes of three stages image acquisition, extraction, and recognition. In the first stage input image of hand gesture acquiesced by digital camera in approximate frame rate. In second stage a rotation, scaling and orientation invariant feature extraction method has been introduced to extract the feature of the input image. Finally, edge detection is used and k-curvature algorithm is applied to recognize the hand gesture.

System architecture

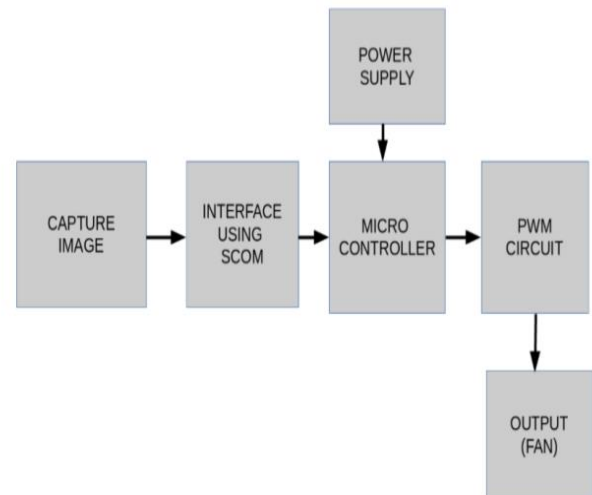
The proposed system in this paper is design to recognize hand gesture in real time. The technique used to determine the hand gesture is based on computer vision. The basic flow of the system is shown in the figure.

Flow chart



- Collect the picture of the gesture taken through the web camera.
- Image frame is process using image processing.
- Process image is used to extract features for gesture recognition.
- Counting the number of finger using the feature extracted.
- Command signal is generated and pass to the device.
- According to the command the device action take place.

Proposed system



The Open CV is a free and opensource library targeted on amount of your real time image method. It can detect and acknowledge an outsized variety of objects, but our focus currently can be to use techniques and methods to detect and acknowledge the gestures of human hand. We convert an image from RGB to gray scale and then to binary in order to find the ROI i.e. the portion of the image we are further interested for image processing. By doing this our decision becomes binary: yes the pixel is of interest or no the pixel is not of interest. By blurring, we have a bent to provide sleek transition from one colour to unique and cut back the edge content. We find the gaps between fingers and the convex hull of the fingers for image segmentation, to form binary images from gray scale images. unit typically, the tip of the fingers. But there are other convex points too. So, we have a bent to find convexity defects that is the deepest purpose of deviation on the contour.

Scope of Present Work

Present work aims the following:

- To save time.
- To reduce human efforts and interface.

Detecting Background

Given the feed from the camera the 1st thing to do is to remove the background. We use runing average over a sequence of images to get the average image which will be the background to. This equation works because of the assumption that the background is mostly static. Hence for t hose stationary item, those pixels aren't

Hence those pixel that are constantly changing are not a part of the background hence those pixel will get weighted down. Hence the stationary pixels or the background gets more and more prominent with every iteration while those moving gets weighed out .

Contour Extraction

Contour extraction is performed using Open CV s inbuilt edge extraction function. It uses a cann y filter. You can tweak parameters to get better edge detection .Tracking and Finger Detection thus the defect points are most likely to be the center of the finger valleys as pointed out by the picture. No we find the average of all these defects which is definitely bound to be in the center of the palm but its a very rough estimat. So we average out and find this rough palm center. Now we assume that the palm is angled in such a way that its roughly a circle. So to find the palm center we take 3 points that closes to the rough palm center and find the circle center and radius of the circle passing though these 3 points. Hence using these properties we get th e list of maximal defect points that satisfy the above conditions and thus we find the no of fingers using this. If no. of fingers is 0, it means the user is showing a fist.

Tracking and Finger Detection

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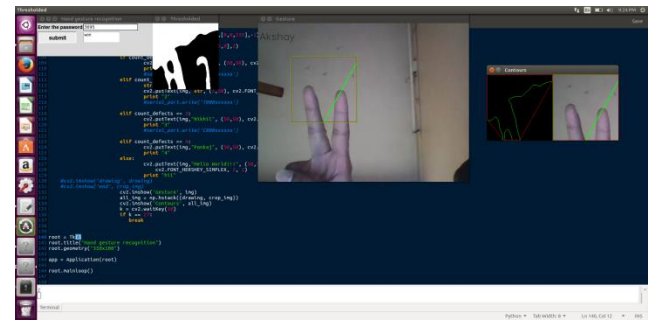
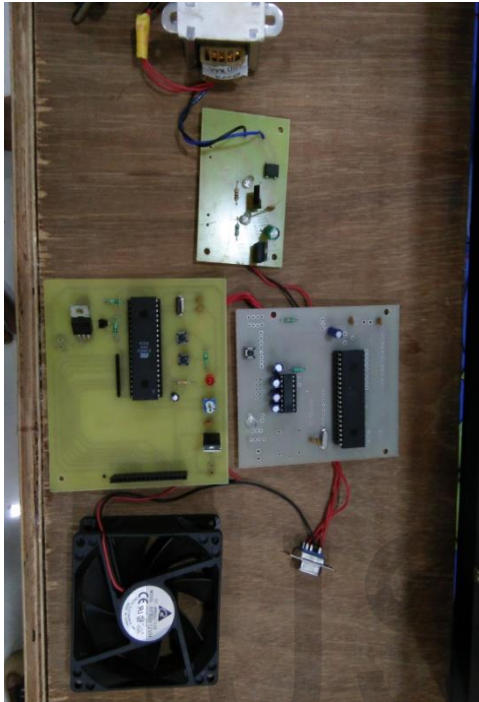
Hardware implementation

In this the hardware is used to control the speed of fan by making various hand gesture.

1. Microcontroller
It is an 8051 family microcontroller. It controls all the processes .basic functions performed to make serial communication between laptop.
2. Ic max 232
Ic max 232 is used to make microcontroller logic levels to compatible with serial port of personal computer. Because microcontroller is working at logic 0 v. and logic 1-5 v. While for serial port logic 0 (3v to 13v) And for logic 1v (-3v to -13v).
3. SCOM module
Microcontroller, crystal, capacitor for reset are present in the SCOM module. MAX 232 is interfaced with the microcontroller .4 capacitor are used for clipping and clamping if the IC.

4. PWM module

The PWM module is used at output side.
This PWM module is used to give the speed of our fan according to our hand gestures.



Advantage and application

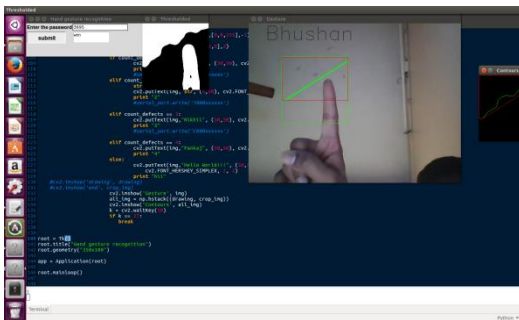
- 1) Industrial automation.
- 2) Increase production.
- 3) High accuracy in production.
- 4) Less Product cost.

Reference

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3. Jean-Francois Collmeau, Elyse Nespoulous, Helene Laurent and Benoit Magnanain "simulation interface for gesture based remote control of a surgical lighting arm" IEEE international conference on system, man, and cybernetics 2013.
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Software implementation

1. Eagle
It is used for PCB designing.
2. PYTHON
Python is a language which is used to recognize the hand gesture.



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