

MICROCONTROLLER BASED HAND GESTURE RECOGNITION SYSTEM (REVIEW)

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ABSTRACT:

This paper is about making a gesture recognition using microcontroller for dumb and deaf people. The communication is more important in human life. Gesture based communication is a characteristic route for communication between impaired and normal people, however frequently they discover trouble in speaking with ordinary individuals as we don't understand their gesture based communication. Therefore, there always exists a language barrier. To minimize this barrier, we propose a device which can convert their hand gestures into voice which a normal person can understand. This device consists of flex sensors and accelerometer. These sensors converts these movements of hand into real time speech output and a display. So, this device gives productive service for communication between both people.

KEYWORD: Wireless Glove; Flex Sensor; Accelerometer.

INTRODUCTION

In the present years,in motion acknowledgment innovation, a camera peruses the developments of the human body and conveys the information to a PC that uses the motions as contribution to control gadgets or applications. For instance, a man applauding together before a camera can deliver the sound of cymbals being slammed together when the motion is encouraged through a PC.

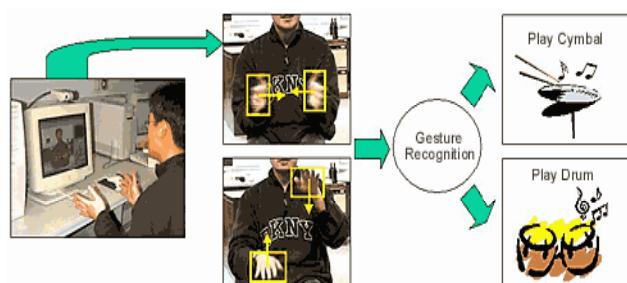


Figure 1: Gesture Recognition Technology

There has been a quick increment in the quantity of hearing weakened and discourse impaired person

Because of birth defects or accidents. The general population who can't talk or have lost their capacity to talk in accident, it ends up troublesome for them to pass on their message inside the general public. When the mute person speak to normal person in gesture language then the normal person get confused to understand the sign of deaf-dumb person. To beat this, we have less demanding venture thought called 'Gesture Recognition System' In this venture, Flex Sensor assumes the significant part. The flex sensor sense the signal and these signal output give to the ADC channels. In this segment the gesture is perceived by the microcontroller and the result is shown on LCD as well as speech output. The compactness of this venture is major advantage. Thus with the help of this project, the barrier faced by these people in communicate with the society can be reduced to a great extent.

LITERATURE SURVEY

By Author's paper description the sign language detection and recognition systems have mainly one of the two following methodologies viz. vision based or picture handling method and sensors and microcontroller based glove. In the picture preparing strategy, the camera is utilized to catch the gesture. These gestures are captured in terms of images and these images are analysed using different algorithms to recognize the meaning of a particular gesture. The disadvantage of image processing based technique is that it requires developing of complex computational algorithms in order to detect the gestures. Further this technique also requires proper lighting conditions, proper backgrounds and field of view limitations. The next approach is to use Accelerometers and Flex sensors to detect the movement of hands. The authors did not use advanced microcontrollers and thus a separate ADC design was required to measure sensor readings. Further exclusion of wireless transmitters makes the system complex because of wires and the logic levels of LCD did not match for interfacing purposes. Therefore, the authors used ATMEGA 16 for interfacing LCD. One more approach is discussed in other which uses SHAROJAN BRIDGE and several Arduino boards which makes the system little bulky and massive.

Camera Based Gesture Recognition

Once the sensor information is coordinated with the database then the aftereffect of that specific sign will show up as yield in the content frame. This content yield is given to the voice area. The discourse of every content is pre-recorded and will just play out through speaker if the sign is coordinated. It utilizes at least one camera to record pictures of human hand motions and lighting conditions that improve signal arrangement precision. There are diverse kinds of Vision-based Hand Gesture Recognition, for example,

- i. Infrared-camera Based
- ii. Mono-camera Based
- iii. Multi-camera Based Gesture Recognition

Hand gestures are methods for correspondence, like talked dialect. The generation and impression of motions would thus be able to be portrayed utilizing a model ordinarily found in the field of talked dialect acknowledgment. A translation of this model, connected to signals, is delineated in Figure-

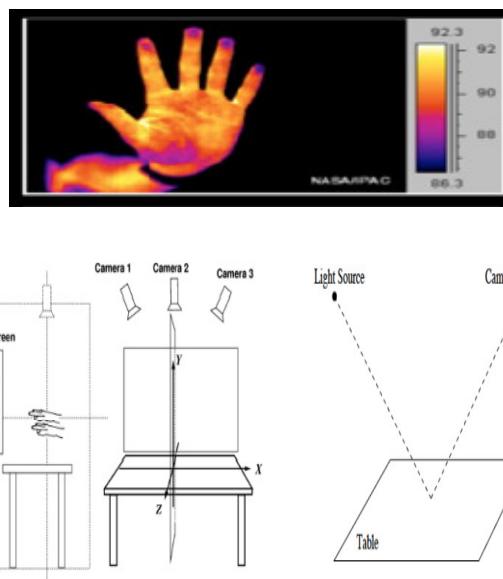


Figure 2: a) Multi-camera, b) Mono-camera and c) Infrared-camera based Gesture Recognition

Other than that, its variety to lighting condition changes also, undesirable items may cover with the hand signal. In the framework is variety to condition lighting changes which produces incorrect division of the hand district. Well devices are ideal for acknowledgment dynamic motions however it is computational expending.

Extraction Method and image pre-processing

Division process is the principal procedure for perceiving hand motions. It is the procedure of isolating the info picture (for this situation hand signal picture) into districts isolated by limits. The division procedure relies upon the kind of signal, on the off chance that it is dynamic motion then the hand signal should be found and followed, on the off chance that it is static motion (act) the info picture must be divided as it were. The hand ought to be found right off the bat, by and large a bouncing box is utilized to determine the relying upon the skin shading and also, the hand must be followed, for following the hand there are two primary methodologies; either the video is separated into outlines and each outline must be prepared alone, for this situation the hand outline is dealt with as a stance and portioned, or utilizing some following data, for example, shape, skin shading utilizing a few apparatuses for example, Kalman filter

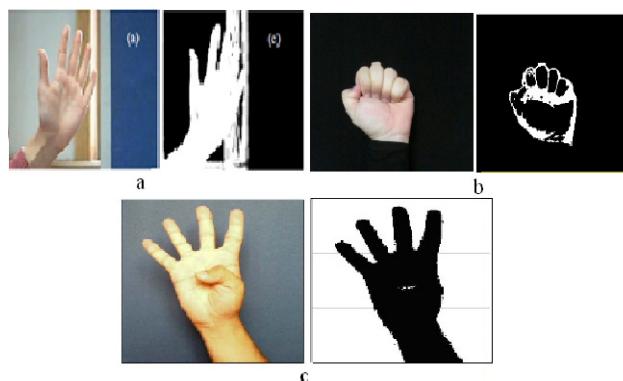


Figure 3: segmentation method.

In this segment, downsides of some talked about techniques are clarified: Orientation histogram strategy connected have a few issues which are; comparable motions may have unique introduction histograms and distinctive motions could have comparable introduction histograms, other than that, the proposed strategy accomplished well for any items that command the picture regardless of whether it isn't the hand motion. Neural Network classifier has been connected for

signals grouping yet it is tedious and when the quantity of preparing information increment, the time required for order are expanded excessively. In the NN required a few hours for learning 42 characters and four days to learn ten words. Fluffy c-implies grouping calculation connected in has a few burdens; wrong protest extraction issue raised if the items bigger than the hand. The execution of acknowledgment calculation diminishes when the separation more noteworthy than 1.5 meters between the client and the camera.

Flex Sensor Recognition

In this system the hand motions are perceived utilizing flex sensor. These sensors are connected to the gloves. Flex sensors are like potentiometer, i.e. variable resistor. The protection of the sensor differs as per the measure of its bowing, which assistant relies upon the development of finger. So as to definitely gauge the bowing flex sensor are utilized. At the point when the sensor are twisted the protection offered by them increments.

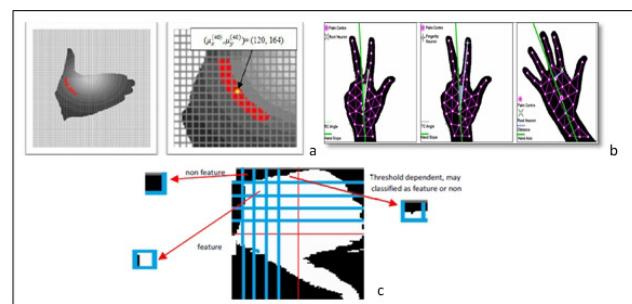


Figure 4: Features representation using flex

CONCLUSION

In this paper different techniques are talked about for motion acknowledgment, these strategies incorporate from Neural Network, HMM, fluffy c-implies bunching, other than utilizing introduction histogram for highlights portrayal. For dynamic signals HMM apparatuses are impeccable and have demonstrated its efficiency. This framework is

helpful for impaired of speech, hard of hearing and visually impaired individuals to speak with the ordinary person. The impaired of speech person utilize their standard communication via gestures which isn't effectively justifiable by everyday citizens and visually impaired individuals can't see their gesture. This framework changes over the communication via gestures into voice which is effortlessly justifiable by visually impaired and typical individuals. The communication through signing is converted into some content shape, to encourage the hard of hearing individuals too. This content is show on LCD. In order to improve and facilitate the more gesture recognition, motion processing unit can be installed which comprises of Gyroscope as well and with the help sensor fusion technique, we can accommodate a number of other gestures as well for better and efficient communication.

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