

# HAND GESTURES AND VOICE CONVERSATION SYSTEM

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## ABSTRACT

Sign language plays a vital role for the mute people so this design aims to lower the communication gap between the mute community and also the standard world. The projected methodology interprets language into speech. The system overcomes the necessary time difficulties of dumb people and improves their manner. Compared with being system the projected arrangement is compact and is possible to carry to any places. This system converts the language in associate fleeting voice that is well soluble by eyeless and ancient people. The language interprets into some textbook kind displayed on the digital display screen, to grease the deaf people likewise. In world operations, this system is helpful for deaf and dumb of us those can not communicate with ancient person. The foremost specific of this design is that the gesture recognizer may be a standalone system, that is applied in cliché of living. It's in addition useful for speech disabled and paralysed case means those don't speak duly and in addition used for Intelligent Home Applications and artificial operations.

## KEYWORD

Accelerometer sensor, voice IC, Decoder Relay, Aurdino IDE.

## INTRODUCTION

Modern society is continuously discussing new technology that improves our way about life & makes our lives easier. way people live has been dramatically altered through technology. Technology has a gear that human race has assigned

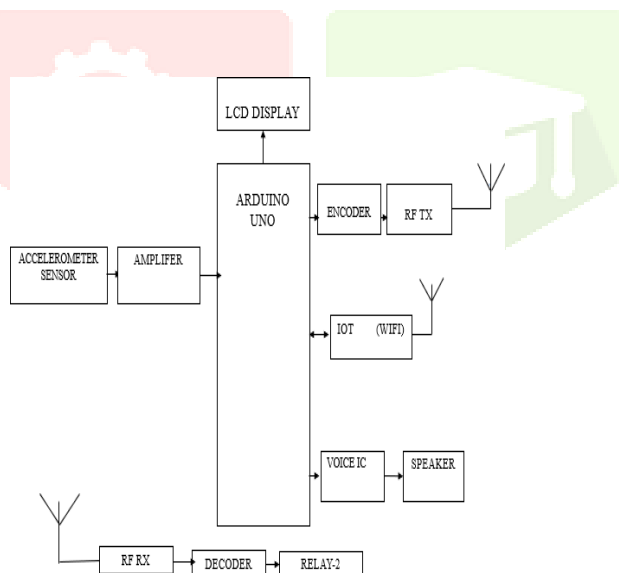
it, & they are not in mood to change that gear. There is a lot about research being done in several technology-related sectors, such as artificial intelligence, cellphones, & others. New insights from this research made everyone's lives easier. However, very little research has been done on Deaf & Dumb persons. This sector has gotten less attention than others, in my opinion. One about biggest difficulties for this exceptional person is communication gap between them & average person. Deaf & blind people frequently experience communication difficulties. They are uneasy due to widespread discrimination & strife in society. Due to their perceived inability to communicate, people who are deaf or dumb find it difficult to express their emotions. HGRVC (Hand Gesture Recognition & Voice Conversion) technology finds & tracks hand motions about dumb & deaf in order to maintain connection among general public. Hand gesture detection is achievable among a web camera. After that, preprocessing is used to make photos standard size.

Sign language is most widely used form about communication for persons who cannot speak. It's a language where hand gestures are used to convey letters & words. Sign language users have been noted in China alone. It reaches 80 million people in total, & communication will always be challenging, especially for those who are unable to understand sign language. use about visual approach for sign identification has grown in prominence over past few decades. It is a system that collects information using finger motions & detects it among help about a camera. It is most widely used visual method. It has taken a lot about effort to develop vision-based

sign recognition systems on a global basis. Systems for recognising gestures using vision can employ both direct & indirect methods. Previously, a method based on eyesight was used to identify hand movements. recognised image, however, is significantly impacted through this process on environment. Another disadvantage is that they have to show their hands to camera. Here, a flex sensor detects hand motion & converts it to voice.

The study covered in this paper intends to develop a system that aids people who are deaf-dumb through converting spoken language into sign language. American Sign Language is translated into spoken signals through this technique. A portable computer's monitor plays a prerecorded American sign language (ASL) demonstration about sign as words that go among it are read from lexicon about American sign language. If there is no sign for word in sign language, it is finger spelled. In actual world, deaf people use this technique for things like proper names that lack obvious signs. Hidden Markov Model (HMM) is used to convert user's spoken signal into cue symbols for those among vocal impairments. proposed job is an extension about previous study on "Boltay Haath," a speech signal used to recognise a vocally disabled person's finger movement. When used in conjunction among Boltay Haath system, proposed AISR system might bridge communication gap between people without speech issues & typical person.

## BLOCK DIAGRAM



## METHODS

### Hand Gesture Recognition Technique

Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it. It is a type of signal processing in which input is an image and output may be image or characteristics/features associated with that image. Nowadays, image processing is among rapidly growing technologies. It forms core research area within engineering and computer science disciplines too. There are two types of methods used for image processing namely, analogue and digital image processing. Analogue image processing can be used for the hard copies like printouts and photographs. Image analysts use various fundamentals of interpretation while using these visual techniques. Digital image processing techniques help in manipulation of the digital images by using computers. The three general phases that all types of data have to undergo while using digital technique are pre-processing, enhancement, and display, information extraction.

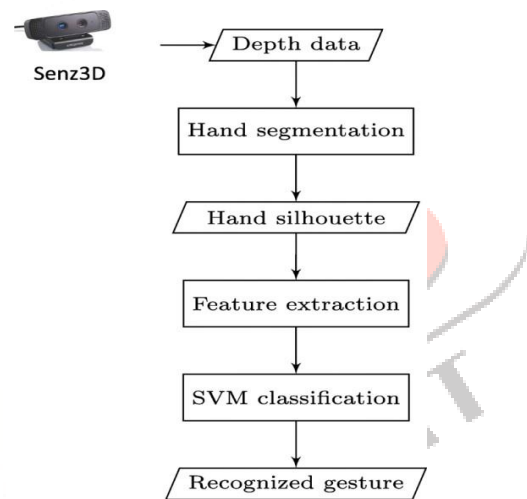


Fig 1: Work Flow of hand gesture and voice conversation system

Principal component analysis (PCA) is one of the statistical techniques frequently used in signal processing to the data dimension reduction or to the data decorrelation. Presented paper deals with two distinct applications of PCA in image processing. The first application consists in the image color reduction while the three color components are reduced into one containing a major part of information. The second use of PCA takes advantage of eigenvectors properties for

determination of selected object orientation. Various methods can be used for previous object detection. Quality of image segmentation implies to results of the following process of object orientation evaluation based on PCA as well. Presented paper briefly introduces the PCA theory and Results are documented for the selected real pictures.

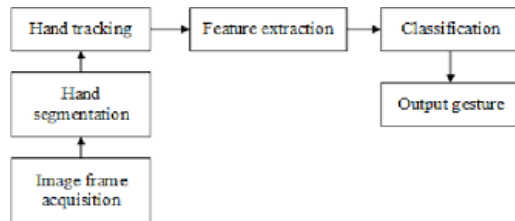


Fig 2: Process - Work flow

## CLASSIFICATION METHOD

K-Nearest Neighbor is a Learning algorithm that Defers in the decision to generalize beyond the training examples till a new query is encountered. Whenever we have a new point to classify, we find its K nearest neighbors from the training data. The distance is calculated using n Euclidean Distance. "Support Vector Machine" (SVM) is a supervised machine learning algorithm which can be used for both classification and regression challenges. However, it is mostly used in classification problems. In this algorithm, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiates the two classes very well. Support Vectors are simply the coordinates of individual observation. Support Vector Machine is a frontier which best segregates the two classes.

## RESULT

Here about this research is constructing a machine learning model that can predict hand gesture from a camera & then turn recognised gesture into voice so that non-Deaf & non-Dumb people may understand what Deaf & Dumb people are saying. We are using a deep learning Convolution Neural Network to train hand gesture images, & we are using that trained model to predict those learnt hand motions from

webcam. we used SVM technique in suggested investigation, although Python SVM is not reliable for distinguishing hand motion.

When power is ON, the position and orientation of hand is obtained from the data glove that consists of five Flex sensors on fingers (Thumb, index, middle, ring, and pinky) and one accelerometer of PIC microcontroller LM386 Speaker Speakjet TTS256 Three outputs (X, Y, and Z positions). Tilting of the palm can be captured by the accelerometer where Flex sensors can measure the bend of the five fingers when making a sign. When the user performs a gesture/letter and press a button, signals coming from the sensors are amplified via a dedicated amplification circuit to each signal, and then captured by the microcontroller which convert the analog signals to digital values through its 8-channel ADC These values are formatted into a simple state matrix: five values for the Flex sensors, one for each axis of the accelerometer. As a result, each letter in the ASL will have a specific digital level for the five fingers and the three axis of the accelerometer. Each level is represented by a value between 0 and 255; an interval of  $\pm 3$  levels should be taken into consideration in case the user could not keep his hand steady.

## CONCLUSION

Our country around 2.78% of peoples are not able to speak (dumb). Their communications with others are only using the motion of their hands and expressions. We proposed a new technique called artificial speaking mouth for dumb people. It will be very helpful to them for conveying their thoughts to others. Some peoples are easily able to get the information from their motions. The remaining is not able to understand their way of conveying the message. In order to overcome the complexity the artificial mouth is introduced for the dumb peoples. This system is based on the motion sensor. According to dumb people, for every motion they have a meaning. That message is kept in a database. Likewise all templates are kept in the database. In the real time the template database is fed into a microcontroller and the motion sensor is fixed in their hand. For every action the motion sensors get accelerated and give the signal to the microcontroller. The microcontroller matches the motion with the database and produces the speech signal. The output of the system is using the speaker. By properly updating the database the dumb will speak like a normal person using the artificial mouth. The system also includes a text to speech conversion (TTS) block that interprets the matched gestures.

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