

Sign Language Interpreter

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Abstract: In this normal community where we live and communicate with each other, some find it really difficult to communicate because of their hearing deficiency. The only way to communicate with deaf or dumb people is through sign language. Dumb or deaf people all over in the globe mostly use sign language to communicate with each other but this can be understood properly to those who have undergone special training like them in sign language. The current society really finds it difficult to communicate with deaf or dumb people. This normal community has a limited fluency in sign language and because of this a communication barrier persists between the normal and the hearing- impaired people. This Barrier is diminishing as projects of the past two decades have unfolded. These not only help in interpreting the signs but also ease the communication between deaf or and general communities. In today's world it has become difficult for the general communities to communicate with the hearing impaired individuals. There are very less medium for communicating with them. Through the use of artificial intelligence, researchers are striving to develop hardware and software that will impact the way deaf or dumb individuals communicate and learn. In an attempt towards the same, a converter has been proposed in this project. This converter would act as a medium by recognizing the signed images made by the signer and then convert those into text and subsequently into speech. The signed images are classified to increase the accuracy and efficiency of the algorithm.

IndexTerms – Data mining, Image Mining, Neural Networks, Sign Language.

I. INTRODUCTION

The Sign language (also signed language) is a language which chiefly uses manual communication to convey meaning, as opposed to spoken language. This can involve simultaneously combining hand shapes, orientation and movement of the hands, arms or body, and facial expressions to express a speakers thought. Wherever communities of deaf people exist, sign languages have developed, and are at the cores of local deaf cultures. Although signing is used primarily by the deaf, it is also used by others, such as people who can hear but cannot physically speak, or have trouble with spoken language due to some other disability (augmentative and alternative communication). It is not clear how many sign languages there are. A common misconception is that all sign languages are the same worldwide or that sign language is international. Aside from the pidgin International Sign, each country generally has its own, native sign language, and some have more than one(although there are also substantial similarities among all sign languages). ASL possesses a set of 26 signs known as the American manual alphabet, which can be used to spell out words from the English language. These signs make use of the 19 hand shapes of ASL.

The following chart lists the gestures used for each alphabet:-

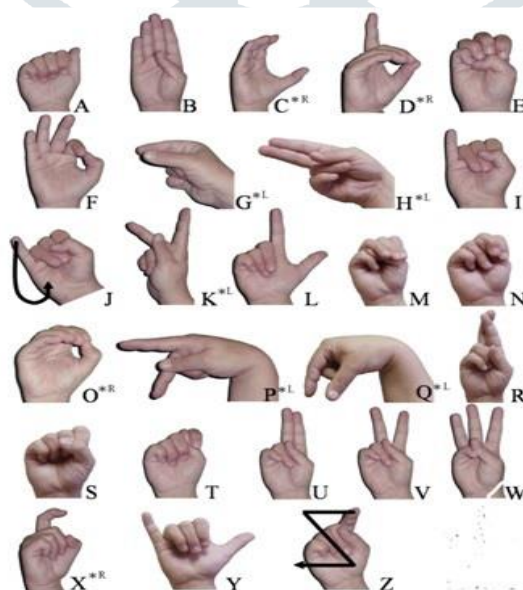


Fig 1: Sign Language Chart

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.

The system is to create a method to recognize hand gestures, based on a pattern recognition technique developed by McConnell; employing histograms of local orientation. The orientation histogram will be used as a feature vector for gesture classification and interpolation. Computer recognition of hand gestures may provide a more natural-computer interface. Hand gesture recognition is an important area of computer vision and pattern recognition field. Gestures are the way by which one can communicate non-verbally. Gesture recognition is a field, in which there is large number of innovations. Gestures can be defined as a physical action, which is used to convey the information.

There are various input output devices for interacting with the computer, but now days emphasis is given, how to make human computer interaction more easy going, and for that purpose hand gesture recognition comes in light. Hand can be used as an input device, by making its gesture understandable to computer, and for this purpose, this system aims at recognizing the various hand gestures using Neural Networking.

II. PROPOSED SYSTEM

The System proposed here recognizes the pattern and actions performed and detect its alphanumeric value equivalent to deduce a meaningful statement or a word out of sign or action performed. Then person who performs the action in front of system camera, which is then captured and stored as a data element in database for further usage in process of detecting the actions/signs more accurately. After matching the captured image with one in database if found a match the sign is detected and displayed as text and sound output, If not the system asks for a more optimized action sequence.

The first stage of our software is the login stage. In this stage the system requests the user for a login name. A Folder is created of the same login name in which all the images from the training stage are stored. The second stage of the software is the training stage. In this stage the user give a character to be trained and gives the respective hand gesture.

These images are then saved by the given character name in the created folder. The user can stored many number of images for a particular character. The next stage is the most important stage i.e. the testing (comparison) stage. In this stage the system requests the user for input and collects the input and checks the user created formality for a similar image. The image retrieval using only single feature such as color moment or color histogram may be inefficient. It may either retrieve images not similar to query image or may fail to retrieve images similar to query image. To produce efficient results, we use combination of color and texture features.

The ultimate objective of software engineering is to produce good quality maintainable software within reasonable time frame and at affordable cost. This is achievable only if we have matured processes to produce it. For a mature process, it should be possible to determine in advance how much time, cost and effort will be required to produce the final product. This can only be done using data from past experience, which requires that we must measure the software process. A key component of any software development process is the life cycle model on which the process is based. Life cycle of the software starts from concept exploration and ends at the retirement of the software.

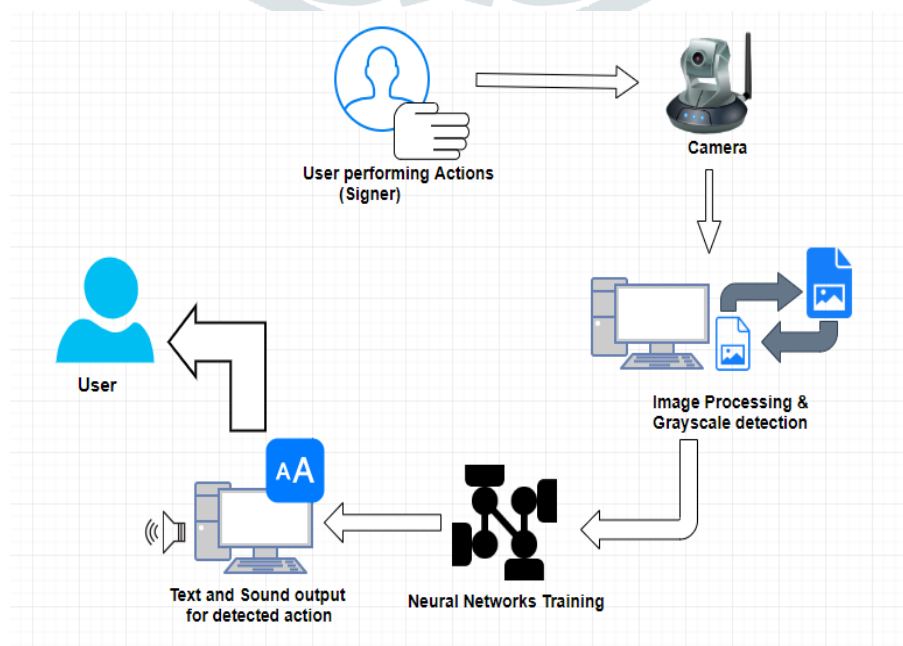


Fig 2: Block Diagram

III. IMPLEMENTATION

Now-a-days there are plenty of software available which does some of the functions of our project. Most of the software they usually collect the images and give a text output. This makes difficult for the people to use it or communicate with the deaf or mute people. Thus, our aim was to create software in such that it will be usable to each and every one. This was challenging task to make it usable to all types of user. To overcome this challenge we have converted the text from the output into speech using Google API.

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The distance between the query image and the image in the database is calculated as follow:

$$d = w1*d1 + w2*d2.$$

Here, w1 is the weight of the color features, w2 is the weight of the texture features and d1 and d2 are the distances calculated using color features and texture features respectively. The distance d is calculated for each query image with all images in the database

IV. CONCLUSION

This project demonstrates the idea of a sign language converter for hearing impaired and mute people so that they can easily communicate in the society. Sign language recognition and translation is an active area of research. People with limited fluency in sign language can easily communicate with hearing impaired people with this converter. As this converter recognizes the signed images made by the signer and converts them into text as well as speech without any use of data gloves or other equipment. This Software uses Neural Networking which itself makes it very efficient. This application can also be used to communicate with blind people. In today's world people prefer efficiency and this provides efficiency by getting the text converted into speech. The interaction gets simplified between people with or without hearing or speech impairments.

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