

Indian Sign Language Recognition System for Deaf People

Arti Thorat¹, Varsha Satpute², Arati Nehe³, Tejashri Atre⁴ Yogesh R Nargoje⁵

BE Student, CSE Department, Savitribai Phule Womens Engineering College, Sharanapur, Aurangabad, India^{1,2,3,4}

Assistant Professor, CSE Department, Savitribai Phule Womens Engineering College, Sharanapur, Aurangabad⁵

Abstract: Sign Language Recognition System is one of the most growing researches today. Many new Techniques are having been developed recently in the field of Sign Language Recognition. This system becomes popular because it is only one of the efficient way through which the deaf and dumb people can convey their message to other people. In this paper we proposed some methods, through which the recognition of the signs becomes easy. We use the different signs to convey the meanings. And the result of those signs will be converted into the text. We proposed a method for that is, Scale Invariance Fourier Transform (SIFT). By using the Webcam we capture the image of the hand gesture, after that by using SIFT algorithm, Feature Extraction will performed. That matches the key points of captured image with key points of previously stored images

Keywords: Indian Sign Language, Feature Extraction, Edge Detection, Sign recognition, Color, Texture.

I. INTRODUCTION

Loss of hearing can cause people to become isolated and lonely, having a tremendous affect on both their social and working life. Looking up the meaning of a sign is not a straightforward task. Sign Language is the well structured code gesture; every gesture has meaning assigned to it. Sign Language is the only means of communication for deaf people. With advancement of science and technology many techniques have been developed not only to minimize the problem of deaf people but also to implement it in different fields. It becomes difficult finding a well experienced and educated translator for the sign language every time and everywhere but human-computer interaction system for this can be installed anywhere possible. The motivation for developing such helpful application came from the fact that it would prove to be of utmost importance for socially aiding people and how it would help increasingly for social awareness as well. There are different categories of sign languages are there, Indian Sign Language, British Sign Language, American Sign Language etc[2]. In our approach, having encountered an unknown sign, the user can simply perform the sign in front of a webcam. Then, the system compares the input sign with videos of signs stored in the system database, and presents the most similar signs (and potentially also their English translations) to the user and also produce the audio of that specific character. The user can then view the results and decide which (if any) of those results is correct. It will not only benefit the deaf and dumb people of India but also could be used in various applications in the technology field.

II. LITERATURE REVIEW

Different approaches have been used by different researchers for recognition of various hand gestures which were implemented in different fields. Some of the approaches were vision based approaches, data glove based approaches, soft computing approaches like Artificial Neural Network, Fuzzy logic, Genetic Algorithm and others like PCA, Canonical Analysis, etc. The whole approaches could be divided into three broad categories-

Hand segmentation approaches, Feature extraction approaches and Gesture recognition approaches.

A simplification used in this project, which was not found in any recognition methods researched, is the use of a wrist band to remove several degrees of freedom. This enabled three new recognition methods to be devised. The recognition frame rate achieved is comparable to most of the systems in existence (after allowance for processor speed) but the number of different gestures recognized and the recognition accuracy are amongst the best found. The generated audio will be useful for dumb people. A different method had been developed by Archana S Ghotkar, Ruche Khatal, Sanjana Khupase, Surbhi Asati and Mithila Hadop through Hand Gesture Recognition for Indian Sign Language.

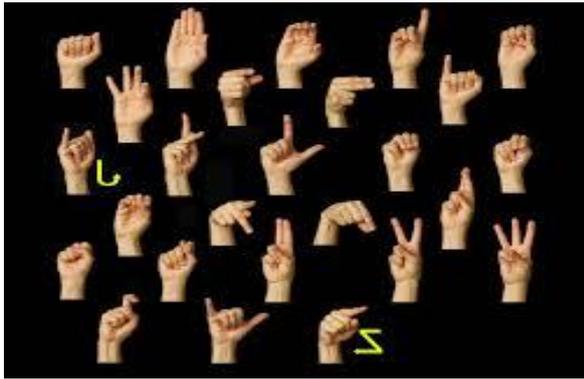
III. METHOD

1. Image Acquisition

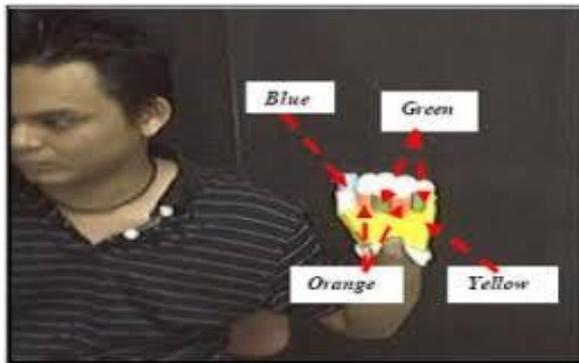


This method will capture the image through the imaging device such as webcam. And that image will be stored into the database for the purpose of matching the image. The images will be captured through basic code of opening a webcam through MATLAB and then capturing the image through frames per second which will be stored in another directory where all the inputs images are stored in another

directory and the recent captured image is picked up and the comparison with given set of images are made.

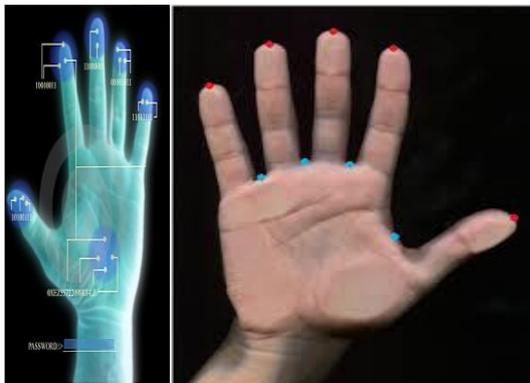


2. Feature Extraction-



For each and every object there are many features, interesting points on the object that can be extracted to provide a "feature" description of the object. SIFT image features provide a set of features of an object that are not affected by many of the complications experienced in other methods, such as object scaling and rotation. The SIFT approach, for image feature generation, takes an image and transforms it into a "large collection of local feature vectors". Each of these feature vectors is invariant to any scaling, rotation or translation of the image.

3. Orientation Detection-



In orientation detection we will take the input of hand movement in any form or any orientation the gesture will be detected through the described section of feature extraction as the SIFT algorithm [1].

4. Sign Recognition-



Finally when the whole process is complete the application will then convert the gesture into its recognized character or alphabet which might be helpful to be understood in layman's language. The following process includes passing out the single dimensional array of 26 character corresponding to alphabets has been passed where the image number stored in database [2].

5.SIFT- The Scale Invariant Feature Transform (SIFT) feature introduced by Lowe [1] consists of a histogram representing gradient orientation and magnitude information within a small image patch. SIFT is a rotation and scale invariant feature and is robust to some variations of illuminations, viewpoints and noise. Fig.1 shows the extracted SIFT features from five hand images. Fig.2 shows some examples of hand detection using the SIFT matching algorithm in which most of the pair images only contain less than five SIFT keypoint matches. However, this approach is not able to recognize a category of the objects.

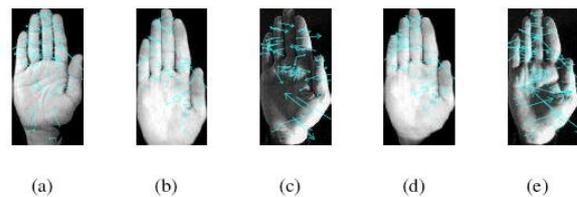


Fig.1. The SIFT features are extracted and shown.

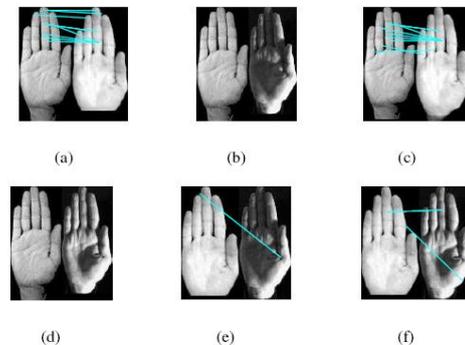


Fig.2. Hand Detection using the SIFT matching algorithm.

IV. CONCLUSION

The system provides an interface that can easily communicate with deaf people by Sign Language Recognition. The system is not only can apply in family environment, but also can apply in public. For the Social use these system is very helpful for deaf and dumb people.

The SIFT features described in our implementation are computed at the edges and they are invariant to image scaling, rotation and the generated text with Audio will be displayed accurately the helps to society.

ACKNOWLEDGMENT

We would like to thank our guide Prof.Y.R.Nagargoje,, their guidance and feedback during the course of the project. We would also like to thank our department for giving us the resources and the freedom to pursue this project.

REFERENCES

- [1] Pallavi Gurjal, Kiran Kunnur, "Real Time Hand Gesture Recognition using SIFT", International Journal for Electronics and Engineering, 2012,pp 19-33.
- [2] Ghotkar, Archana S., "Hand Gesture Recognition for Indian Sign Language", International Conference on Computer Communication and Informatics (ICCCI), 2012, pp 1-4.
- [3] Rajam, P. Subha and Dr G Balakrishnan , "RealTime Indian Sign Language Recognition System to aid Deaf and Dumb people", 13th International Conference on Communication Technology(ICCT), 2011,pp 737-742.

BIOGRAPHIES



Tejashri Atre. Currently she is doing B.E. degree in Computer Science & Engineering from Savitribai Phule Women's Engineering college Aurangabad. Her research area includes sign Language recognition system, ASP.net, MATLAB,DBMS .



Arti nehe Currently she is doing B.E. degree in Computer Science & Engineering from Savitribai Phule Women's Engineering college Aurangabad. Her research area includes sign Language recognition system, ASP.net, MATLAB, JAVA .



Varsha Satpute Currently she is doing B.E. degree in Computer Science & Engineering from Savitribai Phule Women's Engineering college Aurangabad. Her research area includes sign Language recognition system, ASP.net, MATLAB



Arti Thorat Currently she is doing B.E. degree in Computer Science & Engineering from Savitribai Phule Women's Engineering college Aurangabad. Her research area includes sign Language recognition system , ASP.net, MATLAB.



Yogesh Nagargoje is currently working as Assistant Professor in the Department of Computer science and engineering at Savitribai phule women's engineering College, Sharnapur, Aurangabad, Maharashtra, India. He has 2 years and 9 months of teaching experience. His research area includes Image Processing, Keystroke Biometrics and Mouse Dynamics.