iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 2 **Issue:** XII **Month of publication:** December 2014

DOI:

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Sign Language Recognition for Deaf Sign User

Mr.Amitkumar Shinde[1], Prof.Mr.Ramesh Kagalkar[2]
[1]Student, [2]Assistant Professor, Department of Computer Engineering Pune University

Abstract*— Sign language recognition is one of the most growing fields of research today and it is the most natural way of communication for the people with hearing problems. A hand gesture recognition system can provide an opportunity for deaf persons to communicate with normal people without the need of an interpreter or intermediate. We are going to build a systems and methods for the automatic recognition of Marathi sign language. Through that we are providing teaching classes for the purpose of training the deaf sign user in Marathi. The system does require hand to be properly aligned to the camera and does not need any special colour markers, glove or wearable sensors. A large set of samples has been used in proposed system to recognize isolated words from the standard Marathi sign language which are taken in front of camera by different deaf sign user. In our proposed system, we intend to recognize some very basic elements of sign language and to translate them to text and vice versa.

***Keywords*— Sign Language, Deaf Sign User, Sign and Text Database, Canny's Algorithm.**

I. INTRODUCTION

Sign Language is a structured language where each gesture has some meaning assigned to it used by deaf sign user. Sign language is only the way of communication for deaf sign user. With the help of advanced science and technology many techniques are developed by the researcher to make the deaf people communicate very fluently. Humans know each other by sharing their ideas , knowledge and their thoughts with peoples that have always around them. Conveying their ideas, thoughts , and experiences to the people around them. Through speech everyone can very convincingly transfer their thoughts and understand each other. The only means of communication available to the vocally disabled is the use of "Sign Language". Using sign language they are limited to their own world. This limitation prevents them from interacting with the outer world to share their feelings, creative ideas and Potentials. Very few people who are not themselves deaf ever learn to Sign language. These limitation increases the isolation of deaf and dumb people from the common society. Technology is one way to remove this hindrance and benefit these people. Several researchers have explored these possibilities and have successfully achieved finger spelling recognition with high levels of accuracy. But progress in the recognition of sign language, as a whole has various limitations in today's applications. Various systems were proposed for the automatic recognition of sign language.

Deaf people face some challenges that the hearing world does not face and may find difficult to understand deaf people face challenges. Deaf drivers must focus on their attention, when driving an automobile because they are not able to hear traffic noise. Even the deaf persons have support of family and friends; it is likely that they are the only deaf person in the family one group of friends. This can lead some deaf people to feel alone in the world. There is some other problem that the deaf people facing. They are in the education field and even though, the deaf people have the talent but he is not given preference. It also one of the drawback for the deaf people. As deaf people don't get tired to explain, the implication of deafness is as linguistic and cultural difference between deaf and hearing persons: deafness implies a particular way of people developing their communication functions, and with that come other differences.

A. Product Review

In the proposed system the sign image is taken from the input device (camera) and processed that image to find the correct text for that sign which is assigned to that sign. This identification of sign image is the challenging task in the proposed system. Also the correct sign image will be displayed to user when he is entering the particular text as a input. The display of sign image from text is done with the ASCII values assigned to that text. That ASCII value is matched with the particular image stored in the database. The proposed system will identify the correct output from input for which the system is trained. For unknown and wrong input to the system will not give the output to end user. So user has to enter the valid input.

II. LITERATURE SURVEY

For the recognition of the sign language a touch screen based approach is developed in [1]. The author tries to recognize the character generated from the screen sensor and transform to speech signal based on a recognition algorithm. In an approach [2] the author suggests in recognizing the hand gesture based on the finger boundary tracing and finger tip detection. The author suggested to Identify the American Sign Language based on the hand gesture passed. In [3] a computing approach to hand gesture recognition is developed for hearing and speech impaired. Don Pearson in his approach "Visual Communication

Systems for the Deaf" [8], presented a two way communication approach, where he proposed the practicality of switched television for both deaf-to hearing and deaf-to-deaf Communication. In his approach, attention is given to the requirements of picture communication systems, which enable the deaf to communicate over distances using telephone lines.

The visual language of the deaf is made up of signs [4], which are gestures made primarily with the hands and arms, and also with the face and other parts of the body. Signs can convey complicated ideas for which a normal person uses sentences. Sentences are at a rate, which is about the same as for a Speech. The rate at which sentences are delivered using finger-spelling slows down, as more words have to be spelled in this way. Signing, finger spelling, and lip-reading are commonly used for communication between deaf People and common people. Finger-spelling is used for technical words, place names, people's names, etc., where each letter has to be communicated using fingers. Jesus F. Guitarte Perez, Alejandro F. Frangi, Eduardo Lleida Solano, and Klaus Lukas in their paper presented a lip reading technique to improve the recognition rate on embedded environment [8]. They compare the performance of Lip Reading and the conventional Noise Reduction systems in degraded scenarios. They presented an approach to use the enhanced speech recognition algorithm for deaf and dumb application.

Towards the development of automated speech recognition for vocally disabled people a system called "BoltayHaath" [4] is developed to recognize "Pakistan Sign Language"(PSL) at Sir Syed university of Engineering and Technology. The BoltayHaath project aims to produce sound matching the accent and pronunciation of the people from the sign symbol passed. A wearing data Glove for vocally disabled is designed, to transform the signed symbols to audible speech signals using gesture recognition. They use the movements of the hand and fingers with sensors to interface with the computer. The system able to eliminate a major communication gap between the vocally disabled with common community, But BoltayHaath has the limitation of reading only the hand or finger movements neglecting the body action, which is also used to convey message. This gives a limitation to only transform the finger and palm movements for speech transformation. The other limitation that can be seen with BoltayHaath system is the signer could be able to communicate with a normal person but the vice versa is not possible with it. This gives the limitation of one-way communication between the listeners and vocally disabled. A system is proposed to overcome the limitation of BoltayHaath system, and provide a communication link from normal person to physically disabled person.

III.METHODOLOGY AND WORKING TECHNIQUES

The Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images. It was developed by John F. Canny in 1986. Canny also produced a computational theory of edge detection explaining why the technique works. Edge detection is the name for a set of mathematical methods which aim at identifying points in a digital image at which the image brightness changes sharply or, more formally, has discontinuities. The points at which image brightness changes sharply are typically organized into a set of curved line segments termed edges. The same problem of finding discontinuities in 1D signal is known as step detection and the problem of finding signal discontinuities over time is known as change detection. Edge detection is a fundamental tool in image processing, machine vision and computer vision, particularly in the areas of feature detection and feature extraction.

The solution to this problem was a rather complex exponential function, but Canny found several ways to approximate and optimize the edge-searching problem.

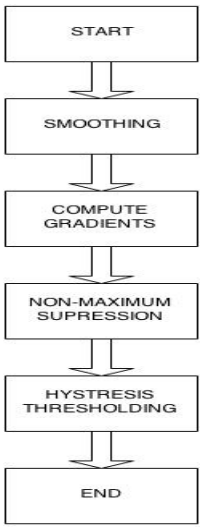


Figure 3.1 Flow of Canny's Algorithm

The steps in the canny edge detector are as follows:

1. Smooth the image with a two dimensional Gaussian. In most cases the computation of a two dimensional Gaussian is costly, so it is approximated by two one dimensional Gaussians, one in the x direction and the other in the y direction.
2. Take the gradient of the image. This shows changes in intensity, which indicates the presence of edges. This actually gives two results, the gradient in the x direction and the gradient in the y direction.
3. Non-maximal suppression. Edges will occur at points the where the gradient is at a maximum. Therefore, all points not at a maximum should be suppressed. In order to do this, the magnitude and direction of the gradient is computed at each pixel. Then for each pixel check if the magnitude of the gradient is greater at one pixel's distance away in either the positive or the negative direction perpendicular to the gradient. If the pixel is not greater than both, suppress it.
4. Edge Thresholding is the method of thresholding used by the Canny Edge Detector is referred to as "hysteresis". It makes use of both a high threshold and a low threshold. If a pixel has a value above the high threshold, it is set as an edge pixel. If a pixel has a value above the low threshold and is the neighbor of an edge pixel, it is set as an edge pixel as well. If a pixel has a value above the low threshold but is not the neighbor of an edge pixel, it is not set as an edge pixel. If a pixel has a value below the low threshold, it is never set as an edge pixel.

IV. CONCLUSIONS

In proposed system we have applied a simple and fast method which works suitably for recognize Image-Based hand gesture. It is low time-consumption approach, so that the real time recognition ratio is achieved easily. In the proposed system Canny's edge detection algorithm is used which will recognize the input sign image by detecting the edges of hand gesture. It is capable of handling the different input sign images and translates them into text and vice versa. The proposed system is designed to translate Marathi sign language-to-text and vice versa. The dataset contains the number of hand gesture images that are taken from multiple user of different size which helps to recognize the correct output to any user using the system. The proposed system is trained on predefined dataset.

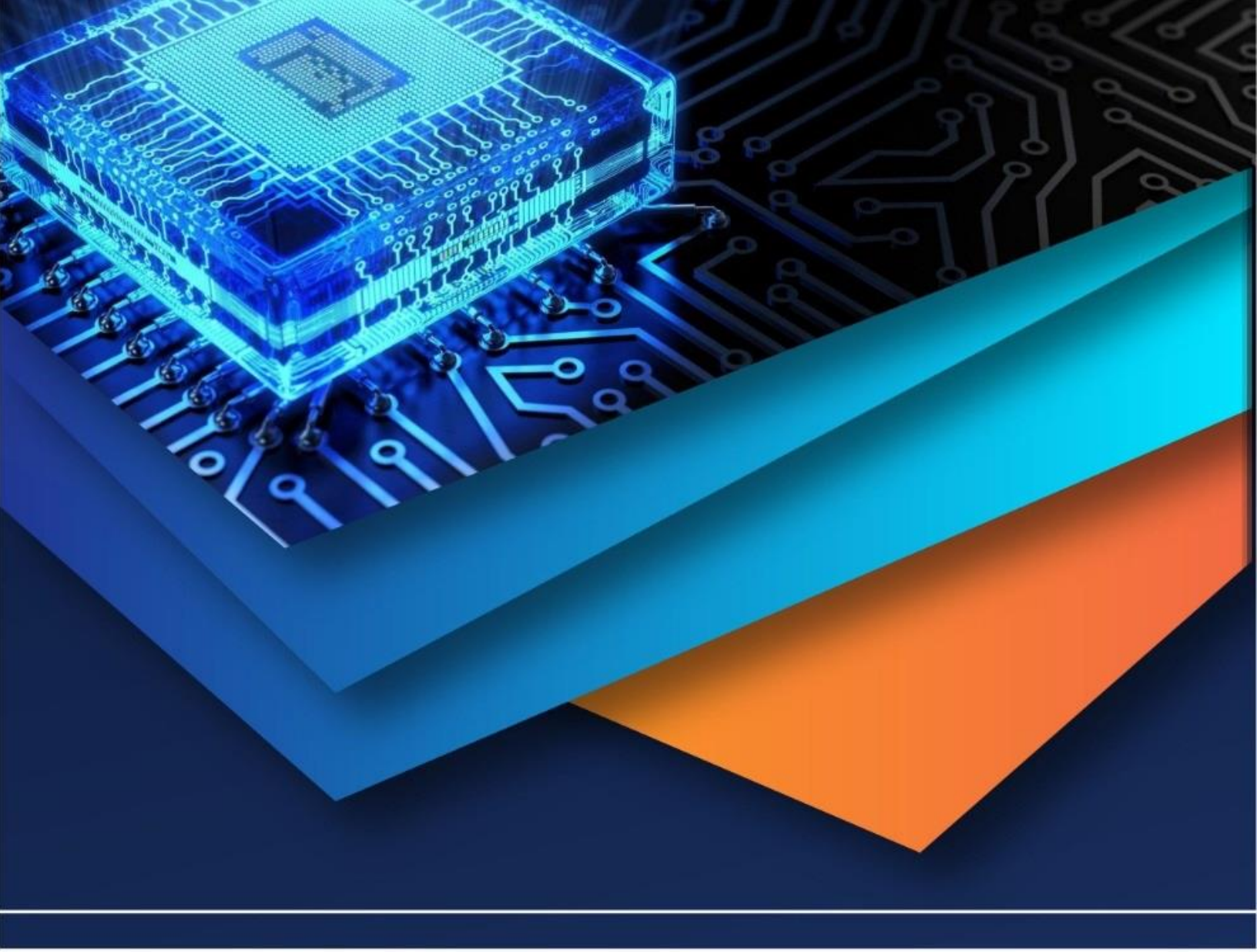
In Future work we are looking for the dynamic hand gesture recognition system which will identify the dynamic actions or signs done by the deaf sign user. The dynamic gesture recognition system contains not only hand shapes but also the whole body of user and its facial expression. So the system will continuously recognize the gesture done by deaf sign user. Also in future work we are trying to have the advanced technology such as video conferencing, and try to make android application.

V. ACKNOWLEDGMENT

The authors would like to thank Dr. D.Y. Patil School of Engineering and Technology and the Director/Principal Dr.Uttam Kalawane, Colleague of the Department of Computer Engineering and Colleagues of the varies Department the D.Y.Patil School of Engineering and Technology, Pune Dist. Pune Maharashtra, India, for their support, suggestions and encouragement..

REFERENCES

[1] M. Mohandes, M. Deriche, J. Liu, "Image-Based and Sensor-Based Approaches to Arabic Sign Language Recognition ," in *Proc. IEEE Transaction on Human Machine System*, 2014, pp. 2168–2291.
[2] Z. Ren, J. Yuan, and Z. Zhang, "Robust Part-Based hand gesture recognition using Kinect Sensor," in *Proc.IEEE Transaction on Multimedia*, 2013, pp. 1520–9210.
[3] Jung-BaeKim,Kwang-Hyun Park,Won_Chul Bang and Z.Zenn Bien Div.OfEE,Dept of EECS,KAIST,Daejeon, Republic of Korea.Continuous Korean sign language recognition using gesture segmentation and HMM. IEEE-2010.
[4] Venkatraman.S and T.V. Padmavathi, " Speech For The Disabled" , Proceedings of the International MultiConference of Engineers and Computer Scientists 2009 Vol I IMECS 2009,March 18 - 20, 2009.
[5] Gaurav N. Pradhan, Chuanjun Li, Balakrishnan Prabhakaran, "Hand Gesture-based Computing for Hearing and Speech Impaired", IEEE Multimedia Magazine, Vol. 15, No. 2, pp. 20-27, April-June 2008.
[6] Aleemkhalid ,Ali M, M. Usman, S. Mumtaz, Yousuf "BolthayHaath – Paskistan sign Language Recgnition" CSIDC 2005.
[7] Kadous, Waleed "GRASP: Recognition of Australian sign language using Instrumented gloves", Australia, October 1995,pp. 1-2,4-8.
[8] D. E. Pearson and J. P. Sumner, "An experimental visual telephone system for the deaf," J . Roy. Television Society vol. 16, no. 2.pp. 6-10, 1976.
[9] Guitarte Perez, J.F.; Frangi, A.F.; Lleida Solano, E.; Lukas, K. "Lip Reading for Robust Speech Recognition on Embedded Devices" Volume 1, March 18-23, 2005 PP473 – 476.
[10] DONPEARSON "Visual Communication Systems for the Deaf" IEEE transactions on communications, vol. com-29, no. 12, December 1981.
[11] Y. Fang, K. Wang, J. Cheng, and H. Lu, "A Real-Time Hand Gesture Recognition Method", IEEE ICME, 2007, pp. 995-99.
[12] J. H. Kim, N. D. Thang, and T. S. Kim, "3-D Hand Motion Tracking and Gesture Recognition Using a Data Glove", IEEE International Symposium on Industrial Electro nics (ISIE), July 5-8, 2009, Seoul Olympic Parktel, Seoul , Korea, pp. 1013-1018.
[13] Venkatraman.S and T.V. Padmavathi,"Speech For The Disabled", Proceedings of the International MultiConferenceof Engineers and Computer Scientists 2009 Vol I IMECS 2009,March 18 - 20, 2009.
[14] Sanjay Meena,(2011), "A Study on Hand Gesture Recognition Technique", National Institute Of Technology, 2011 India(thesis-M.Tech).
[15] Aleem khalid ,Ali M, M. Usman, S. Mumtaz, Yousuf "Bolthay Haath – Paskistan sign Language Recgnition" CSIDC2005.



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY