ISSN: 2277-9655
Scientific Journal Impact Factor: 3.449
(ISRA), Impact Factor: 2.114

IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

REAL TIME INDIAN SIGN LANGUAGE RECOGNITION SYSTEM TO AID DEAF-DUMB PEOPLE USING COLOR EDGE DETECTION ALGORITHM

Prof S.M. Rokade*, Miss. Rani Dharne, Mr.Nikesh Kasar, Miss Saroja Ghogare, Mr. Umesh Kele

* H.O.D of Comp.dept.S.V.I.T Chincholi ,Nasik
Comp.dept.S.V.I.T Chincholi ,Nasik
Comp.dept.S.V.I.T Chincholi ,Nasik
Comp.dept.S.V.I.T Chincholi ,Nasik
Comp.dept.S.V.I.T Chincholi ,Nasik

ABSTRACT

The Sign Language is a method of communication for deaf dumb people. This paper proposes a method that provides a basis for the development of Sign Language Recognition system for one of the south Indian languages. In the proposed method, a set of 32 signs, each representing the binary UP DOWN positions of the five fingers is defined. The images are of the palm side of right hand and are loaded at runtime i.e. dynamic loading. The method has been developed with respect to single user both in training and testing phase. The static images have been pre-processed using feature point extraction method and are trained with 10 numbers of images for each sign. The images are converted into text by identifying the finger tip position of static images using image processing techniques. The proposed method is able to identify the images of the signer which are captured dynamically during testing phase. The results with test images are presented, which show that the proposed Sign Language Recognition System is able to recognize images with 98.125 percent accuracy when trained with 320 images and tested with 160 images The proposed method is applied over large database of color images both synthetic and real life images and performance of the algorithm is evident from the results and is comparable with other edge detection algorithms.

KEYWORDS: Indian sign language, Image processing, Pattern recognition, Edge detection

INTRODUCTION

We have come up with a system, Real time Indian sign language recognition system to aid Deaf-dumb people using color edge detection algorithm through which we can easily communicate with deaf and dumb peoples. The Sign Language is a method of communication for deaf dumb people. so in order to communicate with these peoples we have one option that we learn their sign language. But only one to one communication is possible. If these persons want to give a speech and wish to communicate with many peoples at a time is not possible. so we are introducing one technique which converts their gestures into speech. The gestures are mapped into camera. The camera is trained with different notations of their sign language.

The notations may be misinterpreted so to increase accuracy we use colors i.e. red , green and blue. We trained camera with these colors by using color edge detection algorithm. Color edge detection algorithm converts the color into binary language and map-ping of colors is done. We have to trained the system with colors. This algorithm enables the accurate detection of sign language

PROPOSED SYSTEM

The sign language is a method of communication for deaf and dumb peoples. It becomes a very important tool for people who have hearing and speaking difficulty. It is the only mode of communication for such people to convey their message. So it becomes very important for us to understand their language.

So in order to communicate with them we have one option that we learn their sign language. After learning, only one to one communication is possible. If these persons want to give speech then it becomes impossible for them. So we are making one system which would help to recognize the different signs called Indian sign language. And for recognizing the colors, color edge detection algorithm is used.

ISSN: 2277-9655
Scientific Journal Impact Factor: 3.449
(ISRA), Impact Factor: 2.114

SYSTEM FEATURES

Training of colors

Our proposed system is based on color edge detection algorithm. Using this algorithm we have to trained the system with different colors so that it will recognize the colors when we put fingers with rings in front of it. Mapping trained the colors to the system.

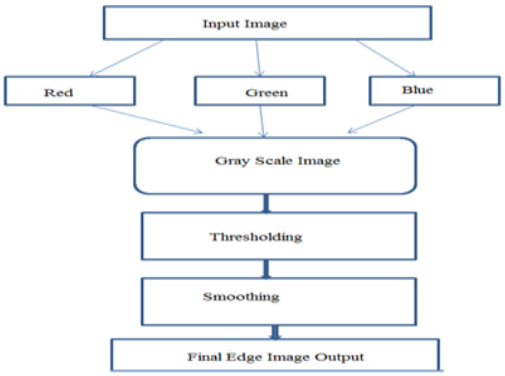


Figure 1: View and View Group Objects hierarchy

Training of Gestures

In our system we are using color rings on fingers. These colors are stored in binary form. In this method, a set of 32 signs, each representing the binary UP DOWN positions of the five fingers is defined. 32 combinations of binary number sign are developed by using right hand palm image. A frame captured at run time is scanned to identify finger tip positions and colors of the five fingers.

Identification of gestures

Identification of gestures is based on colors. We will adjust RGB co-ordinates to focus on only colored part. The binary(Black and White) image is formed. white portion is a portion on which camera is focused. focusing means only that part is visible to the camera. focused part becomes white and the noise becomes black. In this way, we get the six co-ordinates.it is given input to camera so whenever at next time we will use that specific color the camera will recognize the gesture.

Formation of sentence

After recognizing the gestures, the combination of alphabets forms the words and using these words system will forms the sentences.

Converting into speech

After formation of sentence this sentence is converting into speech using text to speech library.

SYSTEM ARCHITECTURE

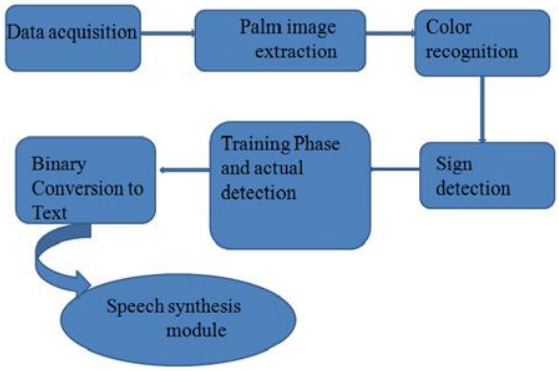


Figure 2: System Architecture

Data Acquisition:

This is the 1st phase of our project. Designing starts with this module. Data acquisition is the process of taking input from user. The process of data acquisition is done by camera. Camera play an important role of acquiring the
gesture. It should be of 16mp for effective proper acquisition of images. It send the captured images in the form of frames toward the system.

Palm Image Extraction

Camera acquires the image in the form of RGB color format. We have to convert it into gray scale image for proper identification of gesture. Because if the boundary image is identified it becomes easy to locate that object. The edge is nothing but the boundary between an object background. For making this edge image, the edge detection algorithm is used.

Color Edge Detection Algorithm

The color edge detection algorithm taken input form of RGB format for making gray scale image , it first thresholds the images. In thresholding, the process is done in order to differentiate between the object the background.

For example, if the color of also of red color then, adjusting the co-ordinate differentiates between them is done in thresholding process. This is very important task in edge detection algorithm. The accuracy of an algorithm is dependent on the choice of thresholding parameter. It is the foremost criteria for recognizing edges or to differentiate it from the outer or inner portion. The edges of object or always thick. But for accurate understanding of gesture, it should be as thin as possible Therefore the thinning technique is applied to create more thin edges which will be more accurate visibly soothing. By going through this process the final edge image is formed. Also the edge

ISSN: 2277-9655
Scientific Journal Impact Factor: 3.449
(ISRA), Impact Factor: 2.114

detection reduces the data to be processed means it keeps only the useful information by excluding the unwanted portion.

Color Recognition
The gray scale images formed after the images extraction is used to recognizes the finger tip position . Once the finger tip position are known , the color which it holds can be recognized using color recognition algorithm. Every color is stored in computer memory by its 6 co-ordinates . When system gets these 6 co-ordinate , it will recognize the particular color.

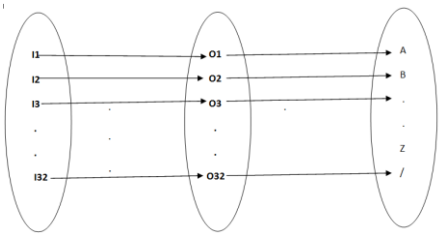
Sign Detection:
The user communicate with the system with the help of signs. The up down position of fingers makes particular signs used for communication . These signs are detected by identifying the active colors. Which of the colors are currently visible to camera, depending on that it will decide the sign each sign refers to a particular alphabet. The sign detection done by recognizing active colors.

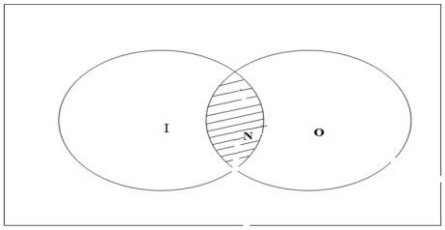
Training phase and actual detection:
This is the mapping phase of our system means, the training the colors to a system. We will adjust RGB co-ordinates so that it will focus on only this part. Binary image form i.e. the black white Image. White portion is the portion on which camera focus easily, focusing means the only part will be visible to the camera. So we will adjust the co-ordinates, focus part becomes white and the remaining noise become black. In this way we get six co-ordinates it is given as a input to the camera so whenever at next time we will use this green color the camera will recognize it as a green color. In this way you can train colors to camera. Depending on this training system recognizes the active colors and the corresponding sign.

Binary conversion to text:
The binary image formed after the training phase of system get converted into letters. Then it forms the words and then forms the sentences.

Speech Synthesis module:
The sentences form after the binary conversion converted into speech by using Text to Speech libraries.

MATHEMATICAL MODEL
Let S be a color edge detection recognition system that recognizes hand gesture.
S=I,O
Where I is a set of input hand gestures.
O represents output.
I=I1,I2,I3.I32
O=O1,O2,O3O32
Success of the system will be depend upon when
If Ii=Oj
Where iI and jO
Failure of the system when
If gesture will not be identified properly.
Means,
IiOj
Where iI and jO





CONCLUSION
A sign language recognition system proposed for human computer interaction using Image Processing Technique was implemented successfully with accuracy comparable with those of recent contributions. The results presented shows that those signs producing lesser percentage of recognition can be improved by using the proposed angular measurement. The proposed method is tested on different images. It produced stable and fairly good results.

REFERENCES
[1] P. Subha Rajam, Dr. G. Balakrishnan, Real time Indian Sign Language Recognition System to aid Deaf Dumb People,IEEE International Conference on Computing Communication and Networking Technologies (ICCCNT),2010, Pages(s):1-9.

ISSN: 2277-9655
Scientific Journal Impact Factor: 3.449
(ISRA), Impact Factor: 2.114

[2] Soumya Dutta , Bidyut B. Chaudhuri, "Color Edge Detection Algorithm in RGB Color Space",IEEE International Conference on Computing Communication and Networking Technologies(ICCCNT), 2013

[3] Aleem Khalid Alvi, M. Yousuf Bin Azhar, Mehmood Usman, Suleman Mumtaz, Sameer Ra_q, Razi Ur Rehman, Israr Ahmed T , Pakistan Sign Recognition Using Statistical Template Matching , World Academy of Science, Engineering and Technology, 2005.

[4] Byung-woo min, Ho-sub yoon, Jung soh, Takeshi ohashi and Toshiakijima, Visual Recognition of Static/Dynamic Gesture Gesture-Driven Editing System, Journal of Visual Languages Computing Volume10,Issue3,June 1999, Pages 291-309.

[5] T. Shanableh, K. Assaleh, Arabic sign language recognition in userindependent mode, IEEE International Conference on Intelligent and Advanced Systems 2007.