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Deaf Culture & Sign Language Recognition

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ABSTRACT: Deaf culture is the term applied to the social movement that regards deafness as a difference in human experience – rather than a deficiency. Sign Languages share a commonality with other oral languages from minority and indigenous groups that have their own cultural and traditional means of maintaining folk language art forms. Deaf culture is the set of social beliefs, behaviors, art, literary traditions, history, values, and shared institutions, of communities that are influenced by deafness and which use sign languages as the main means of communication. Gesture recognition is the process of recognizing and interpreting a stream continuous sequential gesture from the given set of input data. Gestures are physical positions or movements of a person's finger, hands, arms or body used to convey information. Hand gestures are gestures performed by hand. Gesture recognition is the process by which gestures formed by a user are made known to the system.

KEYWORDS: Gesture recognition; Neural Networks; Edge detection; Creation of matrix.

I. INTRODUCTION

Deaf people were once considered clinically deficient, and were subjected to procedures to “remove” deafness in order to become “normal”. The oral language became the *de facto* condition for social acceptance. However, the Deaf have the right to an identity, language and culture. They have the right to access the available human possibilities such as symbolic communication, social interaction, learning, etc. Sign Language, of visual-spatial manner, is the natural language of the Deaf, capable of providing complex linguistic functionalities[1].

Deaf culture is the term applied to the social movement that regards deafness as a difference in human experience – rather than a deficiency. Sign Languages share a commonality with other oral languages from minority and indigenous groups that have their own cultural and traditional means of maintaining folk language art forms. Deaf culture is the set of social beliefs, behaviors, art, literary traditions, history, values, and shared institutions, of communities that are influenced by deafness and which use sign languages as the main means of communication.

Since the introduction of the most common input computer devices not a lot have changed. This is probably because the existing devices are adequate. It is also now that computers have been so tightly integrated with everyday life, that new applications and hardware are constantly introduced. The means of communicating with computers at the moment are limited to keyboards, mice, light pen, trackball, keypads etc. These devices have grown to be familiar, but inherently limit the speed and naturalness with which we interact with the computer. In recent years there has been a great deal of studies aimed at the inconvenience of human computer intercommunication tools such as keyboard & mouse.

As one of the alternative gesture recognition methods have been developed by which a variety of commands can be used naturally. Since conventional input devices need a great deal of technical education, many researchers feel a great interest in & attach importance to hand gesture recognition. In the present day, framework of interactive, intelligent computing, an efficient human –computer interaction is assumed utmost importance in our daily life.

A gesture is scientifically categorized into two distinctive categories: dynamic and static. A dynamic gesture is intended to change over a period of time, whereas a static gesture is observed at the spurt of time. A waving hand means goodbye is an example of dynamic gesture and the stop sign is an example of static gesture. To understand a full message, it is necessary to interpret all the static and dynamic gestures over a period of time. This complex process is called gesture recognition.

Gesture recognition is the process of recognizing and interpreting a stream continuous sequential gesture from the given set of input data. Gestures are physical positions or movements of a person's finger, hands, arms or body used to convey information. Hand gestures, i.e., Gestures performed by hand. Gesture recognition is the process by which gestures formed by a user are made known to the system. A pattern recognition system will be using a transform that

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converts an image into a feature vector, which will then be compared with the feature vectors of a training set of gestures[2]. The final system will be implemented with a neural network.

This paper mainly contains five modules to achieve the goal which are capturing the static image of the gesture, Convert image to grayscale, find the edges of gesture, perform neural network, and display the result.

II. RELATED WORK

The current system has been used in a wide variety of real-world applications[5], Including digital prototype evaluation, virtual reality biomechanics, and animation. It is constructed with stretch fabric for comfort and a mesh palm for ventilation. Sometimes the sensors are attached to finger tips. In this sign language recognition system the gesture is captured without wearing sensitive hand gloves or sensors.

The normal people communicate directly. They are able to listen and speak, but the deaf people are unable to listen and because of that they can't speak. So to make their communication understandable by people who don't know their sign language, there is need interaction system. This inspires us to make such a system which can act as an interface between deaf people and normal people[7].

III. SYSTEM DESIGN

A. FLOW CHART:

The purpose of a flow chart is to provide people with a common language or reference point when dealing with a project or process. Flowcharts are used in designing and documenting simple processes or programs.

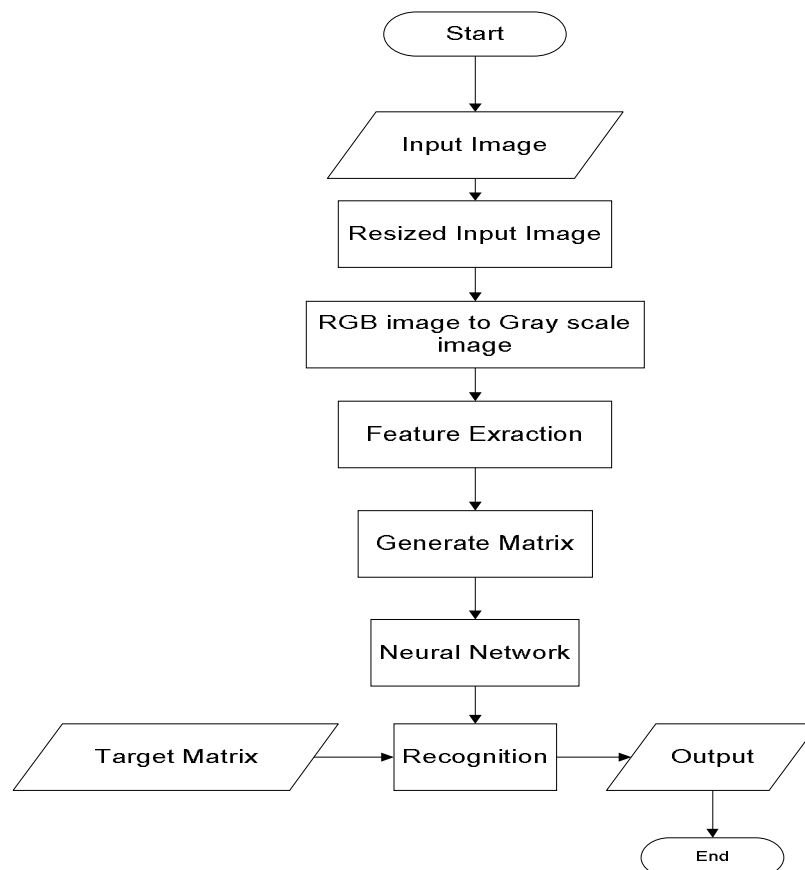


Fig 1: Flow Chart

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B. SYSTEM FLOW:

DFD shows the flow of the project. We collect the images from camera for training phase and send that image for further processing. In this processing noise reduction will be performed and matrices of all images are created and stored. In the testing phase, a random person will give an image to system through the camera. Again, this image will give to processing. On this image noise reduction will be performed and matrices of image will be created. Pattern recognition will be done using neural network. If gestures are matched the positive result will be displayed.

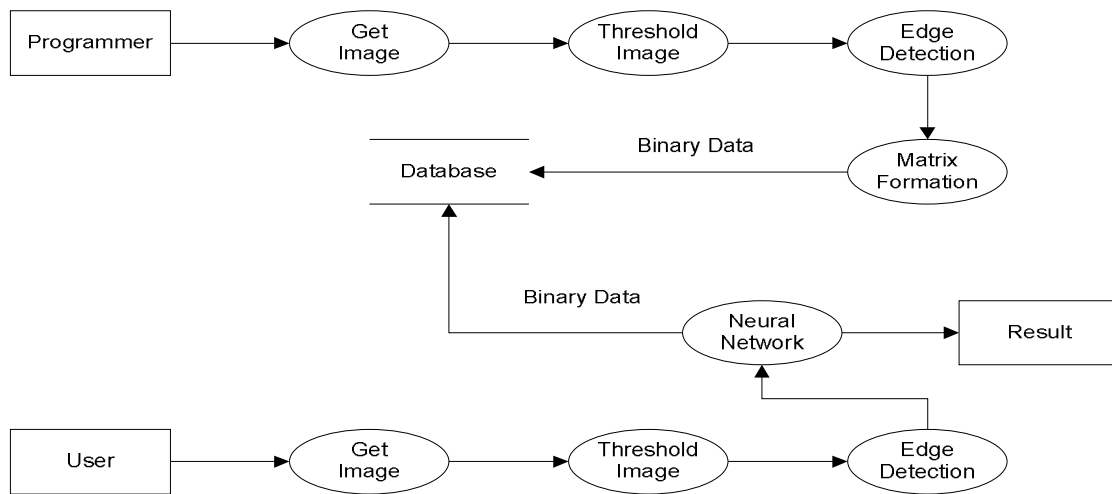
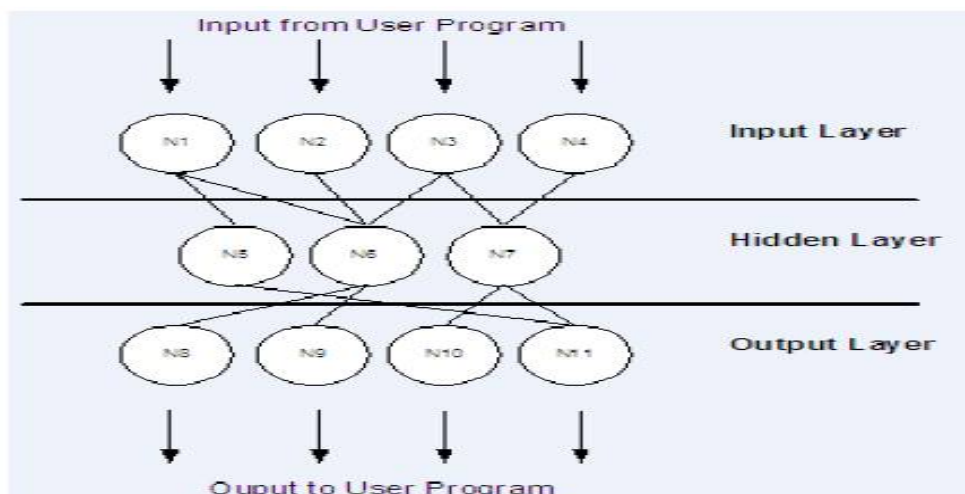


Fig 2: System Flow.

IV. THE TECHNOLOGY

A. NEURAL NETWORKS:

Artificial Intelligence (AI) is the field of Computer Science that attempts to give computers human like abilities. One of the primary means by which computers are endowed with human like abilities is through the use of a neural network. The human brain is the ultimate example of a neural network[4]. The human brain consists of a network of over a billion interconnected neurons. Neurons are individual cells that can process small amounts of information and then activate other neurons to continue the process.



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B. CAPTURING THE IMAGE:



The first step is capturing images. The image is given as an input to the system. The assumption while capturing the image is background should be black.

C. SELECTING THE IMAGE:



The captured image is selected from the file. For this the browse button is created. When user click on browse button the system hard disk is opened by their user can select any image. After selecting the image user should click on Recognize button. Then further steps are carried out.

D. GRAY SCALE IMAGE:



The second step is captured image is converted into a gray scale image. The background is converted into white color and gesture is converted into black color. By doing this we can set the values for background and foreground.

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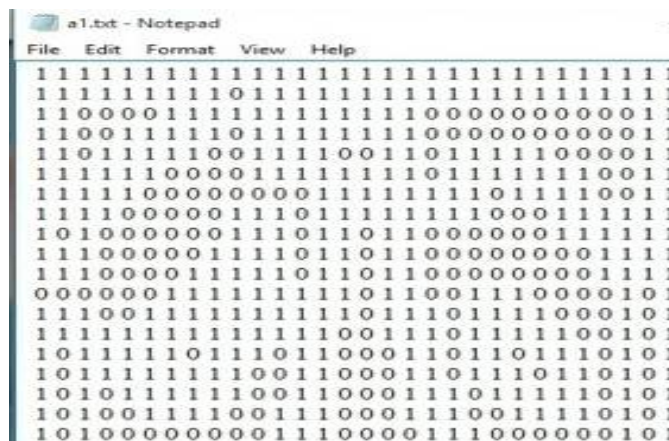
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E. EDGE DETECTION:



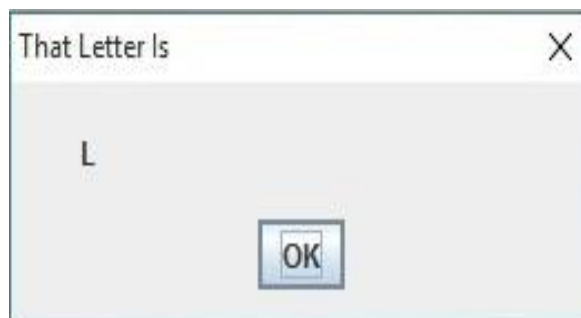
After the conversion of grayscale image the converted image is sent to the next step is Edge detection. After edge detection we get above image. The edges of image are generated. And image is saved in database.

F. CREATION OF MATRIX:



For the creation of this matrix the edge detected image is taken as input. As shown in the above snapshot for black color we have set the value 0 and for white color the 1 value.

V. SIMULATION AND RESULTS



The above fig. Gives better idea about the result, which will we get after the sequential execution of the each step. The final result is displayed on Java form. For this image the result is “L”.



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VI. FUTURE ENHANCEMENTS

Collection of additional gesture information

The final system developed will recognize 26 alphabets. For instance, it will possible to recognize the additional gestures.

Multi-stage gestures

It would be possible to represent a much larger number of labels if each label consisted of two or more gestures combined with hand position changes. For instance, the “wave hello” label could correspond to the open hand gesture with an alternating increase and decrease of hand yaw angle and the “thumbs-up” label could correspond to the letter ‘m’ followed by the space gesture.

Videos of gestures

It would be possible to capture the videos of gestures and convert it into paragraphs. This will become very easy to communicate with the deaf people.

VII. CONCLUSION

This project report on Deaf culture and sign language recognition system provides a useful system for deaf people to express their views and feelings. Also, this system is useful for the people who want to communicate with deaf people. And as this application is user friendly so anyone can use this. This application can be used in various areas like deaf schools and any the areas where hand gesture recognition is needed.

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BIOGRAPHY

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