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Survey on Real Time Hand Gesture Recognition Using Different Algorithms Based on Indian Sign Language

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ABSTRACT: Sign Language research field based on human interaction with computers or machines. In this system, we are working on the different sign data samples to be making our system more accurate with help of Artificial Neural Network (ANN). Today, lots of research has been going on the field of sign language recognition but existing study failed to invent noble technique. The purpose of this system is to represent a real time HGR system based on Indian Sign Language (ISL) recognition with higher accuracy. Indian Sign Language (ISL) used by Deaf peoples community in India, does have acceptable, meaningful essential and structural properties.

KEYWORDS: Artificial Neural Network, Indian Sign Language, Hand Gesture Recognition, Deaf community.

I. INTRODUCTION

There are so many languages in India calculating official as well all living languages. Such waste diversity in languages has its challenges when it comes to communicating over different villages, societies and states. Indian Sign Language (ISL) is one of the living languages in India used by the Deaf community peoples.

This system acquires gesture images of ISL with black background from mobile video camera for feature extraction. In the analysing phase, pre-processing unit the noise removal, grey scale conversion, binarization of images followed by feature extraction. In future extraction five steps followed in which fingertips searches by eccentricity. Next elongations of images, measured by considering pixel segmentation as well as rotation of images. In feature extraction, algorithmic study used to find the feature vectors of systematic results combines K curvature and convex hull algorithms. In present work "K convex hull" algorithm which is used to detect fingertip with greater accuracy. In our system, Artificial Neural Network (ANN) is used for future recognition in which we having the input unit of training data set of images. Next we have hidden unit which acts upon this training dataset to evaluate the output unit results data set. This entire ANN works by considering the factors namely textures of images, colours, shapes, spatial rotations.

In present work Sign language is the primary language of the people who are deaf or hard of hearing and also used by them who can hear but cannot physically speak. It is a complex but complete language which involves movement of hands, facial expressions and postures of the body. Sign language is not universal. Every country has its own native sign language. Each sign language has its own rule of grammar, word orders and pronunciation. The problem arises



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when deaf and dumb people try to communicate using this language with the people who are unaware of this language grammar. So it becomes necessary to develop an automatic and interactive interpreter to understand them. People want something more natural. Another one is based on computer vision based gesture recognition, which involves image processing techniques. Consequently, this category faces more complexity.

II. LITERATURE SURVEY

1. An American Sign Language Detection System using HSV Colour Model and Edge Detection.

This System is aimed to design an automatic vision based American Sign Language detection system and converting results in to text. The work introduced in this paper is meant to outline a programmed vision based American Sign Language recognition framework and interpretation to content. To distinguish the human skin shading from the picture, HSV shading model is utilized. At that point edge recognition is connected to distinguish the hand shape from the picture. An arrangement of morphological activity is connected to get a refined yield for the gesture based communication acknowledgment This work is mainly focussed on the colour model and edge detection phenomenon. Edge detection algorithm the hand gestures are detected successfully for the alphabets in American language. Some images are not detected successfully due to geometric variations, odd background and light conditions.

2. Human Computer Interaction Using Face and Gesture Recognition.

In this paper, we present a face and signal acknowledgment based human-PC communication (HCI) framework utilizing a solitary camcorder. Not the same as the traditional specialized strategies among clients and machines, we consolidate head posture and hand motion to control the hardware. We can recognize the situation of the eyes and mouth, and utilize the facial focus to assess the posture of the head. Two new techniques are displayed in this paper: programmed signal territory division what's more, introduction standardization of the hand signal. It isn't compulsory for the client to keep signals in upright position, the framework fragments and standardizes the signals consequently. The explore demonstrates this technique is extremely precise with motion acknowledgment rate of 93.6%. The client can control different gadgets, counting robots all the while through a remote system.

3. An Automated Bengali Sign Language Recognition System Based On Fingertip Finder Algorithm.

This paper exhibits another calculation to distinguish Bengali Sign Language (BdSL) for perceiving 46 hand signals, including 9 motions for 11 vowels, 28 motions for 39 consonants and 9 motions for 9 numerals as indicated by the similitude of elocution. The picture was first re-sized and after that changed over to double configuration to edit the locale of enthusiasm by utilizing just best most, left-most and right-most white pixels. The places of the fingertips were found by applying a fingertip discoverer calculation. Eleven highlights were extricated from each picture to prepare a multilayered feed-forward neural system with a back-spread preparing calculation. Separation between the centroid of the hand area and each fingertip was ascertained alongside the points between every fingertip and flat x pivot that crossed the centroid. A database of 2300 pictures of Bengali signs was developed to assess the viability of the proposed framework, where 70%, 15% and 15% pictures were utilized for preparing, testing, and approving, separately. Exploratory outcome demonstrated a normal of 88.69% exactness in perceiving BdSL which is particularly encouraging contrast with other existing techniques.

4. Real Time Hand Gesture Recognition For Computer Interaction

Hand motion acknowledgment is a characteristic and natural way to connect with the PC, since cooperation's with the PC can be expanded through multidimensional utilization of hand motions as contrast with other information techniques. The reason for this paper is to investigate three unique strategies for HGR (hand signal acknowledgment) utilizing fingertips location. Another methodology called "Arch of Perimeter" is given its application as a virtual mouse. The framework exhibited, utilizes just a webcam and calculations which are created utilizing PC vision, picture and the video handling tool stash of Matlab.



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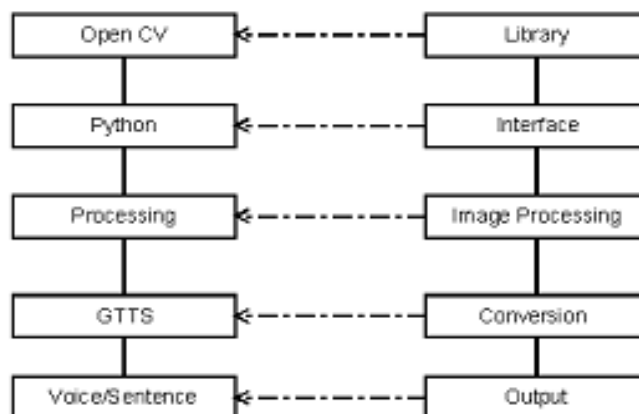
5. Static And Dynamic Hand Gesture Recognition in Depth Data Using Dynamic Time Warping.

This paper examines the advancement of a whiz signal UI that tracks and perceives progressively hand signals in light of profundity information gathered by a Kinect sensor. The intrigue space relating to the hands is first portioned based on the suspicion that the hand of the client is the nearest protest in the scene to the camera. A novel calculation is proposed to move forward the checking time with a specific end goal to recognize the main pixel on the hand form inside this space. Beginning from this pixel, a directional scan calculation takes into account the recognizable proof of the whole hand form. The k-arch calculation is then utilized to find the fingertips over the form, and dynamic time twisting is used to choose motion competitors and furthermore to perceive motions by contrasting a watched motion and a progression of pre-recorded reference motions. The examination of results with cutting edge approaches demonstrates that the proposed framework beats a large portion of the answers for the static acknowledgment of sign digits and is comparable regarding execution for the static and dynamic acknowledgment of well-known signs and for the communication through signing letter set. The arrangement at the same time manages static and dynamic motions also similarly as with various hands inside the intrigue space. A normal acknowledgment rate of 92.4% is accomplished more than 55 static and dynamic signals. Two conceivable utilizations of this work are talked about furthermore, assessed: one for elucidation of sign digits and signals for friendlier human-machine cooperation and the other one for the normal control of a product interface.

6. Nearest neighbor classification of Indian sign language gestures using kinect camera

Individuals with discourse incapacities convey in gesture based communication and accordingly experience difficulty in blending with the healthy. There is a requirement for a translation framework which could go about as a scaffold among them and the individuals who don't have the foggiest idea about their gesture based communication. An utilitarian unpretentious Indian gesture based communication acknowledgment framework was executed and tried on true information. A vocabulary of 140 images was gathered utilizing 18 subjects, totalling 5041 pictures. The vocabulary comprised for the most part of two-gave signs which were drawn from a wide collection of expressions of specialized and every day utilize starting points. The framework was executed utilizing Microsoft Kinect which empowers encompassing light conditions and question shading to have irrelevant impact on the effectiveness of the framework. The framework proposes a technique for a novel, minimal effort and simple to-utilize application, for Indian Sign Language acknowledgment, utilizing the Microsoft Kinect camera.

III. SYSTEM DESIGN





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1. OPEN-CV :

OpenCV (Open Source Computer Vision) is a library of programming functions mainly aimed at real-time computer vision. In easy language it is library used for Image Processing. It is mainly used to do all the operation related to Images.

2. PYTHON :

Python interface is being actively developed right now. There are many algorithms and many functions that compose or support those algorithms. OpenCV is written natively in C++ and has a templated interface that works seamlessly with STL containers.

3. IMAGE PROCESSING :

Read and Write Images. Detection of images and its features. Detection of shapes like Circle, rectangle etc in a image, Detection of coin in images. Text recognition in images. e.g. Reading Number Plates. Modifying image quality and colours.
e.g. Cam-Scanner.

4. GTTS :

It is a Python library and CLI tool to interface with Google Translates text-to-speech API. Writes spoken mp3 data to a file, a file-like object (byte string) for further audio manipulation, or studio.

IV.EXISTING SYSTEM APPROACH

There are different approaches for image acquisition. The gloved based approach uses electromechanical devices to provide exact hand configuration, and position. But it is expensive and not user friendly. The next approach is the vision based approach. One type of vision based approach uses colour gloves for gesture recognition. The next approach uses bare hand as input which is user friendly, but has challenges like complex background, environment variations and presence of other skin colour objects with the hand object.

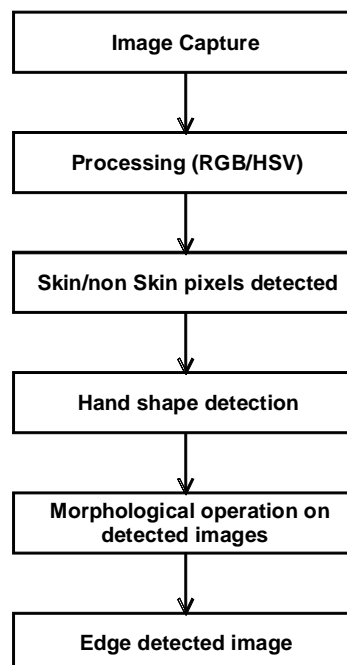


Fig. Existing System Architecture

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V.PROPOSED SYSTEM APPROACH

In this system Sign language is the primary language of the people who are deaf or hard of hearing and also used by them who can hear but cannot physically speak. It is a complex but complete language which involves movement of hands, facial expressions and postures of the body. Sign language is not universal. Every country has its own native sign language. Each sign language has its own rule of grammar, word orders and pronunciation. The problem arises when deaf and dumb people try to communicate using this language with the people who are unaware of this language grammar. So it becomes necessary to develop an automatic and interactive interpreter to understand them.

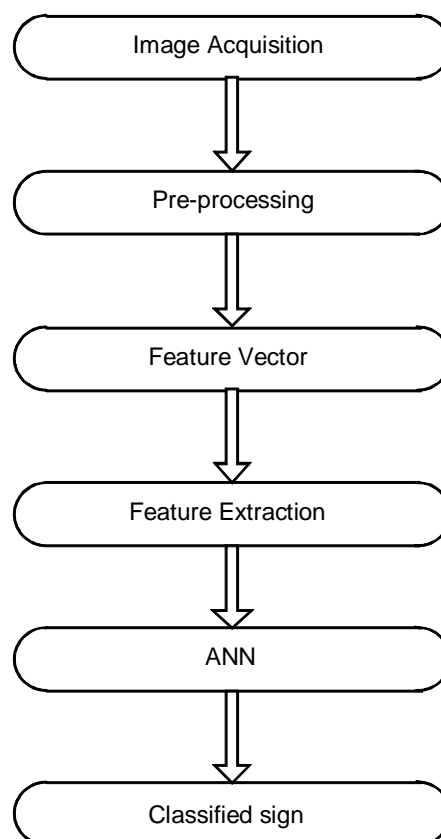


Fig. Proposed system architecture

VI.CONCLUSION

The experimental results show that Indian Sign Language is automatic and interactive interpreter to understand deaf and dumb community. Many algorithms are applied to achieve greater accuracy in recognition system. Image samples taken by camera vision with the computer are tested by our trained ANN. In present work focused scope on deaf and dumb people try to communicate. Generally, these systems can be work on the different phases. Firstly it collects images called image acquisition then preprocess that images using algorithmic study after all we get classified result in the form of voice.



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FUTURE WORK

Our future research will be extended for further improvement in recognition accuracy and also for movement detection of hand for word recognition.

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