VOICE BASED SIGN LANGUAGE DETECTION FOR DUMB PEOPLE COMMUNICATION

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Abstract: Mostly in the world wide 2.78% of people are not able to speak (dump). Communication is basic form of interaction between two individual. Human has been using speech to communicate with each other since in ancient times. The scientifically development technology made human life addition to comfort but still there exists a deprived group of people who are fighting for finding a different way that can make the process of communication easier for them. People with speech disability use sign language based on hand gestures. In order to overcome the complexity this application helps the blind and voice acting person to communicate with normal people .In this project proposed a new technique of FFNN(Feed Forward Neural Network) prototype that is able to automatically recognize sign language to help normal people to communicate more effectively with the hearing or speech or blind impaired people. With the help of a Feed Forward neural network, this system was able to identify the hand signal feature point extraction. The purpose of the Hand Gesture Recognition with Speech Process system employing HMM (Hidden Markov model) is to facilitate communication between blind individuals and their interactions with sighted individuals.

Keyword: Gaussian feature extractor, FFNN, Neural Detection, HMM, Video acquisition, Hand Detection

I. INTRODUTION

Humans communicate with each other by conveying their ideas, thought, and experiences to the people around them. The communication between a dumb and person poses to be an important disadvantage compared to communication between blind

and ancient visual people. In order to convey a speaker's thoughts clearly through gestures, sign language combines the forms, direction, and movement of the hands, arms, and body with facial emotions.. The people who cannot speak makes use of the sign languages to communicate with other fellow vocally impaired person and even with other normal people who knows the meaning of sign

language or an interpreter is needed to translate the meanings of sign languages to other people who can speak and do not know the meaning of the sign languages. However, it is not always possible for an individual to be around all the time to interpret the sign languages.

Combining artificial intelligence (AI) and computer science, machine learning uses data and algorithms to mimic how people learn, thereby improving its accuracy. Machine learning plays a vital role and efficient management on image recognition. It can identify an object as a digital image, based on the intensity of the pixels in black and white images or color image. There are many types in machine learning like Virtual personal assistants, predictions while commuting, video surveillance, social media services, online customer support, etc. In this project using the supervised learning technology.

Supervised machine learning is another name for supervised learning. A division of machine learning and artificial intelligence is supervised learning. Supervised tries to inter a function or relationship based on labeled training data. Supervised techniques predict the value of the output variable based on a set of input variables.

Artificial Intelligence technique are used for procedures which are used to enable computer to show human like intelligent activities such as

- Speech recognition
- Visual perception
- Decision-making
- Natural language understanding

Specific application of Artificial Intelligence include expect system, natural language Processing, speech recognition and machine vision.

A system display that can therefore see sign language is shown by the smart interaction on dumb and blind people using hand gesture detection and speech processing, which enables normal people to communicate with groups of people or talk-impaired individuals ever more effectively. This project contains a controller connected to a camera and a voice-recording circuit. By using camera we can convey particular motions, for each motion it coded a voice track. So other conventional individuals will easily fathom the thwarted individual. Identification of sign language requires a pre-processing stage that includes scaling, brightness leveling, background removal, noise reduction, and grayscale conversion. Real Time gesture made by deaf and mute people is captured in various orientations. This used as database image. Real time gesture is captured and it is given as input to the pre-processor stage. The color image is converted noise component and to remove the unwanted background present in image. Furthermore techniques enhance for the exact and accurate analysis of the proposed system.

II. LITERATURE SURVEY

In [1] Md. Mehedi Hasan; Auronno Roy; Md. Tariq Hasan; The author produce ALAPI:An Automated Voice Chat System in Bangle Language. In this Chabot using voice based system or text-based chat as a input for system and the system recognize the speech or instruction from the speaker and to give a suitable answer or to follow the given instructions is quite developed in English some other widely used

languages.Using a speech recognition technology and Artificial Intelligence (AI), this can take an audio input, and give a relevant audio output for that.

In [2] Munner A1-Hammadi; Ghulam Muhammad; Wadood Abdul; Mansour Alsulaiman; Mohammed A. Bencherif; Tareq S. Alrayes; Design the Deep learning-Based Approach for sign Language Gesture Recognition With Efficient Hand Gesture Representation. The translation of sign language is a use for hand motion recognition. Several deep learning architectures are used in the system's suggested method for dynamic hand gesture recognition, including those for hand segmentation, local and global feature representation, and sequence feature globalisation and recognition. Input preprocessing, feature learning and feature fusion, and classification were the three key phases.

In [3] Yijing Wei; Huiru Liu; Junkai Ma; Yuting Zhao; Hu Lu; Guiqing He; the process of the Global voice chat over short message service of Beidou navigation system is designed and tested over the BDS SMS, which can transmit voice of 2 seconds in a single 78-byte message. The voice chat over the BDS SMS is available to any subscriber even he cannot type a single word. In this system saved more than 90% of interaction time and authentication security is enhanced. The global voice chat is an effective supplement to the outdoor emergency communication system.

In [4] M.A.K. Sudozai; Shahzad Saleem. The author create a process of profiling of secure chat and calling apps from encrypted traffic for secure the chat, voice and video app has transformed the social media. The system has access to a framework for profiling secure chat and voice/video calling apps that can be used to extract hidden patterns about the app, information about parties involved, activities during chats and calls, status indicators, and notifications while lacking knowledge of the app's communication protocol and security architecture. It is very useful of criminal investigations and business intelligence to applied any android and windows.

In [5] Jonathan Ozsvath; Bence eros; Akos Toth; Roland Ku; designed a talking head for real-time audio chat on the Android platform that is MPEG-4 based. It is a process of demonstration. In this demonstration we present the actual state of our work on developing an MPEG-4 based talking head for different platforms. Our latest result is Android application for real time voice chatting .

In [6] Eri Sato-Shimokawara; Yoko Shinoda; Tomova Takatani; Haeveon Lee; Kazuyoshi Wada; Toru Yamaguchi; The process of designing and researching chat robots has been the analysis of category estimation for cloud-based chat robots. Category or topic estimation have been studied by many researchers, however voice based chat system needs a quick response. It is used a keyword match and previous dialogue history. The analyzed of the category estimation compares with manual annotation. It compares the categorized sentences and robot's estimated category. "Society" category is difficult to categorized, but "go-out" and "music" can be categorized as around 60% ratio.

In [7] Haiwei Dong; Ali Danesh; Nadia Figueroa; Abdulmotaleb EI Saddik; An Elicitation Study on Gesture Preferences and Memorability Toward a practical Hand-Gesture Vocabulary for

Smart Televisions introduction of new depth-sensing technologies, interactive hang-gesture device have been rapidly emerging. It can help to learn different vocabularies for different devices. By using this for hand gestures to become a natural communication for users with interactive devices, a standardized interactive hand-gesture vocabulary is necessary. The design methodology for a achieving such a universal hand-gesture vocabulary is presented. The proposed vocabulary emerged from this methodology achieves an agreement score exceeding those of the existing studies.

In [8] Guillaume Plauffe; Ana-Maria Cretu: The Static and Dynamic Hand Gesture Recognition in Depth Data Using Dynamic Time Warping addresses the creation of a real-time tracking and recognition system for hand gestures based on depth data obtained from the Kinect sensor. The algorithm is suggested to speed up scanning so that the first pixel on the hand contour inside this area may be found. The proposed system outperforms most existing solutions for the static recognition of sign digits and is comparable in terms of performance for the static and dynamic recognition of common signs and for the sign language alphabet, according to the comparison of results with state-of-the-art approaches.

In [9] Mart Billinghust; Than Piumsomboon; Huidong Bai. Hands in Space: Gesture Interaction with Augmented-Reality Interface is used for hand gestures are becoming increasingly popular. It hacking has been built into inexpensive and widely available hardware, allowing more and more people access to this technology. In order to facilitate a more

thorough investigation of gesture-based interaction and interfaces, this study offers researchers and users a straightforward but efficient method to perform numerous one-handed motions. This study presents an easy-to-use but original method for identifying both static and moving one-handed movements.

In [10] Shi Yuzhuo; Hoo Kun. Design and realization of chatting tool based on web is process the benefits of implementation of cutting tools in the company which specializes in metal cutting process, after which specializes in metal cutting process, after which the production conditions allows new possibilities for improvement of the tool management design or methodology or approach. It was identification current state and exploration condition current state and exploitation condition of cutting tools on lathes and milling machines and organization of the department and other services. There were some disadvantage have been identified research is easy to apply in company with developed informatics infrastructure and is mostly interesting for CNC workshop. It methodology applied for determination of management efficacy and formation of employees from different department in virtual tool management system.
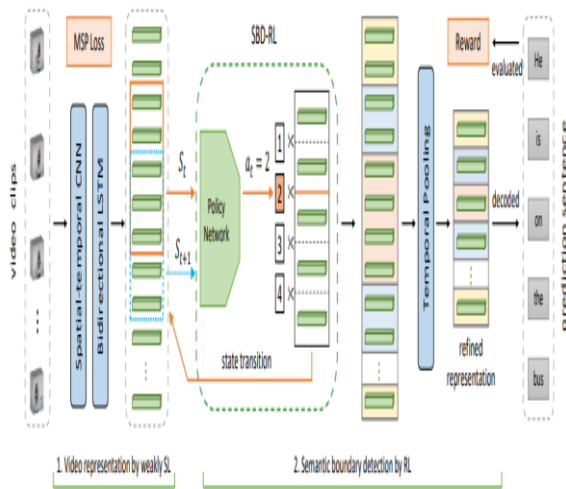
III. EXISTING SYSTEM

In the existing system the Sign language recognition (SLR) is added for significant and promising technique to facilitate the communication for the hearing-impaired people. The systems describe the state as the feature representation of a video segment and the action as locating the semantic border. The difference in ground truth and

prediction's quantitative performance metric sentence.

**Fig 1 system architecture of the existing system**

The recognition for video units is crucial, but there is a potential risk of misrecognition when a video unit contains insufficient information and describes only part of sign gloss. It a CTC- based methods and this type of unit-level misrecognition to action incompletion. Besides, there are pointless video units interspersed among semantic units. Such pointless units may contain several disturbing actions and be recognized as certain glosses by mistake, where the disturbing actions include action transitions between adjacent glasses, hand raising at the beginning of a video, hand falling at the end of a video.

Disadvantage

- The exact classification of the hand gesture signal is not done.
- There were more process and method used for output.

- The output of this process is a hand signal converted into number or text.
- Accuracy is comparative low at only 80%

IV. PROPOSED SYSTEM

In the proposal system, a supervised learning approach is enhanced on the hand based gesture recognition. Here a communicative approach has been lent to the people communication. Feed forward neural network approach provide with the classification of the multiple symbol recognition. The trained features are getting matched with the symbol recognized and the extracted feature points are well known. Matching of the trained feature given with the identification approach of the voice system. Here Hidden Markov Model (HMM) algorithm proposed to covert the voice model and the hand based model. The text matched is converted to voice signals and mark a easy chat application. The systems define the action as finding the semantic boundary and the state as the feature representation of a video segment. The quantitative performance statistic between predictions and ground truth. Noise can be added to the image and media filter is used to reduce the unwanted noise component and to remove the unwanted background present in image.
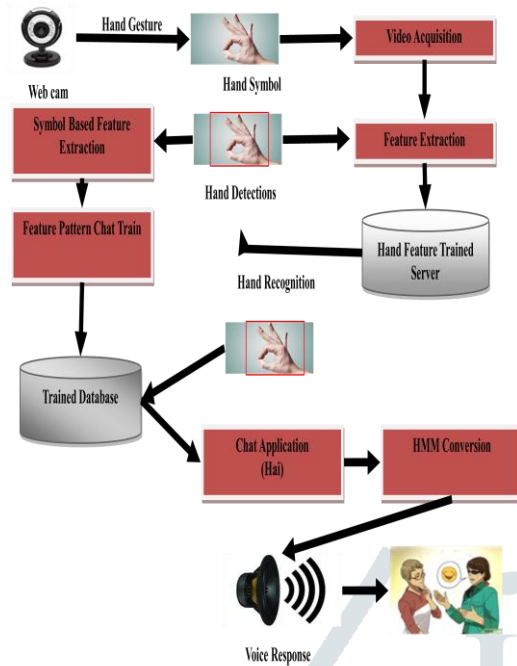
Fig 2 Architecture diagram of proposed Framework

Advantage of the proposed system

- Easy chat application is developed for the dumb and the blind people
- The accuracy of the dump and the blind people
- HMM based voice conversion makes a effective approach of our project

V. METHODOLOGY

The modules which are used in our proposed system are:

(i) Video Acquisition

(ii) Frame Conversion

(iii) Gaussian Feature Extractor

(iv) Hand Detection

Video Acquisition:

Video acquisition is the process by which the web cam based accessing system gives out image on light source processing. The light source approach on the process converted as a video and showed out in the screen. These video will be taken for the further processing or analysis of any other system. Hand gesture identification based on station modeling is possible for dynamic gestures by treating them as the results of a stochastic process. The video acquisition based developed a system which uses a camera to observe the information received through finger and hand movement is the most widely adopted visual-based approach. But the key limitation of the proposed work was lack of portable in nature.

Frame conversion:

Frame conversion is the process where the video will be converted as frames. Frames for an example the video with 60 sec where each will be converted as 60 frames. Each frame will be shown as image with the image the hand symbols are made. Thus with these image only the extracted feature points are known.
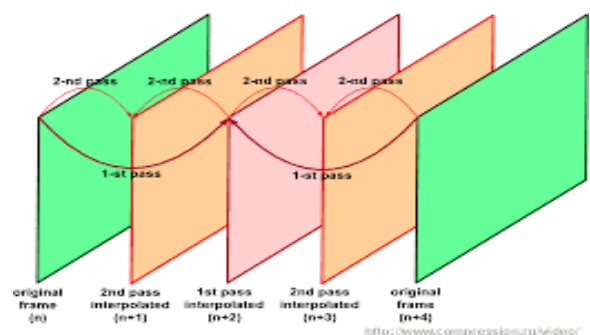

Fig 3 Frame conversation system

The simple frame-rate conversion presents the original frames at a different rate than at which they were shot. Time-lapse footage shot at one frame per minute and played back at 30fps or 25fps. The output sampling mode of the output signal parameter, which may either be Frame-based or sampling mode, can also be inherited from the signal, is set by the Frame Conversion block, which also sets the output and sets the output sampling mode to the value of the output signal parameter.

Gaussian Feature Extractor:

Feature extraction is the pattern of extraction feature points from the images. Feature point is nothing but the outward coordinating points, Morphological points, Texture color etc. From these feature points the analysis are made exactly for the recognition. With already trained feature dataset will be known to identify the hand gesture from image.
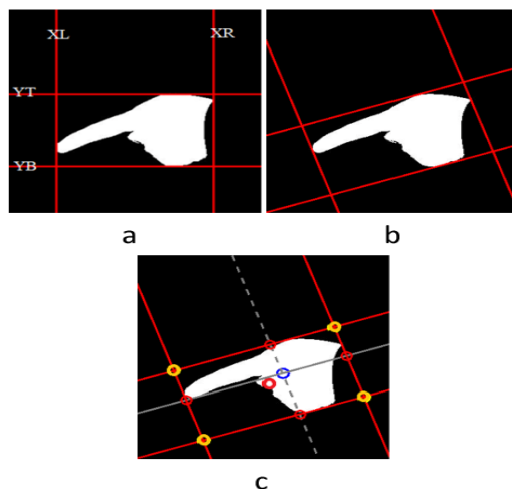
Fig 4 Feature co-coordinator of hand

For the exact extraction Gaussian based feature extractor technique is added. This extracts the correct point of the pixels points from the image. The given

feature formula calculated extracted the peak of the co-ordinates, probability, total counts with the analyzed processing. The final value executed will go with the training using ML technique.

Gaussian Algorithm

start

for j=1 to n

if akj=0 for all k≥ j, stop; print "A is singular"

if ajj=0 but akj≠ 0 for some k>j, switch rows k and j

for i=j=1 to n

set zij= aij/ajj

add _ zij times row j to row I of A

next i

next j

end

Hand Detection

Hand gesture recognition is very significant for human-computer interaction. In this work, we present a novel real-time method for hand gesture recognition. The output sampling mode of the output signal parameter, which may either be Frame-based or sampling mode, can also be inherited from the signal, is set by the Frame Conversion block, which also sets the output and sets the output sampling mode to the value of the output signal parameter. The matching feature with the highest probability will give out the exact classification of the different object from the hand. Thus the extracted Gaussian feature

technique gives out to match with the hand gesture pattern analysis.
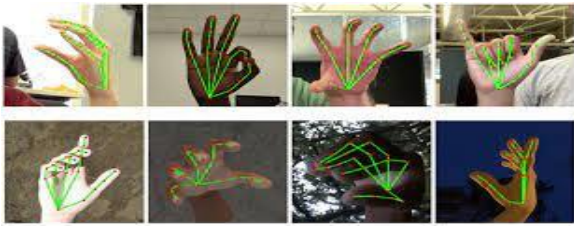
Fig 5 Hand detection system with co-ordinates

An essential component of human-computer interaction is vision-based hand gesture recognition technology (HCI). In the last time, keyboard and mouse play a significant role in human-computer interaction.

VI. EXPERIMENT RESULT ANALYSIS

In this study, a novel technique for hand gesture identification is introduced. The background subtraction approach distinguishes the hand region from the surrounding area.
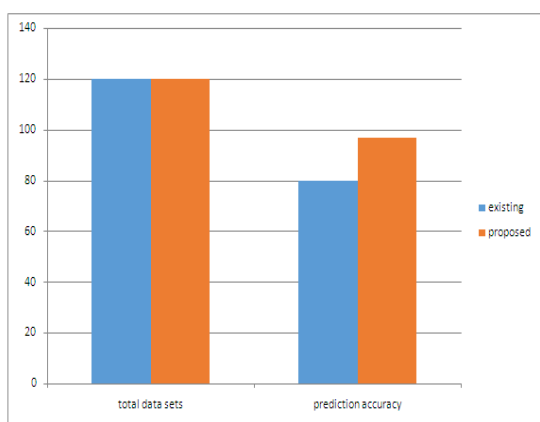
Fig 6 this chart show the prediction accuracy different

The region of hand are segmented. On the basis of the segmentation, the fingers in the hand image are discovered and recognized. The recognition of hand gesture is accomplished by simple rule classifier. The recognition of hand gestures is accomplished by a simple rule classifier. The performance of our method is evaluated on a data set of 1300 hand images. The results of the experiments demonstrate that our method works well and is appropriate for real-time applications. Moreover, when applied to a collection of hand gesture images, the suggested technique surpasses the state-of-the-art Gaussian feature extraction.
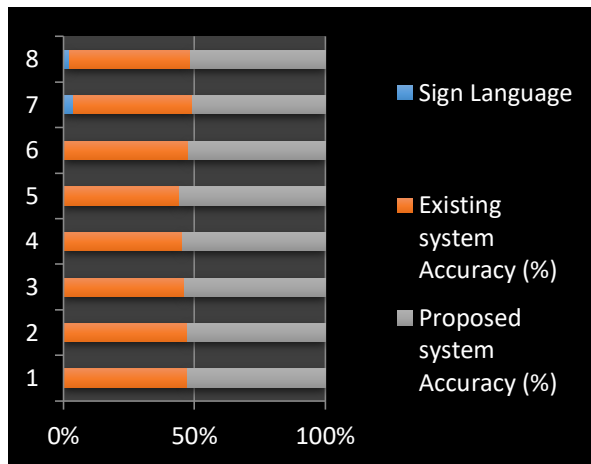
Sign Language	Existing system Accuracy (%)	Proposed system Accuracy (%)
He	88	98
She	87	97
Okay	83	97
A	78	94
B	76	96
1	84	94
7	87	97
4	85	95

Table 1 the accuracy graph measurement of existing and proposed solution

The performance of the proposed method highly depends on the result of hand detection. If there are moving objects with the color similar to that of the skin, the object exist in the result of the hand detection and then degrade the performance of the hand gesture recognition. However, the machine learning algorithms can discriminate the hand from

the background. ToF cameras provide the depth information that can improve the performance of hand detection. So, in future works, machine learning methods and ToF cameras may be used to address the complex background problem and improve the robustness of hand detection.

Fig 7 this chat show the prediction of features different in existing system and proposed system

The trained features are getting matched with the symbol recognized and the extracted feature points are well known. Matching of the trained feature based on the voice system. Here Hidden Markov Model (HMM) algorithm proposed to convert the voice model and the hand based model.

VII. CONCLUSION AND FUTURE ENHANCEMENT

The main purpose of this project is to help the deaf and dump people. This Hand gesture recognition and voice conversion system can help the speed impaired people to communicate with normal people in the real world. In order to express the wanting, or in the case of emergency or to express the feelings, communication plays a major role, the project is useful tool for speech impaired and partially paralyzed patients which fill the communication gap between people. One of the helpful methods for facilitating communication between the deaf and mute populations and mainstream culture is sign language. Although sign language may be used to communicate, the recipient must understand sign language, which is not always achievable. Our project thereby removes these obstacles.

In the future enhancement the detection given accuracy of level which can be made and change with good feasible accuracy system.

VIII. REFERENCE

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