REAL-TIME COMMUNICATION SYSTEM POWERED BY AI FOR SPECIALLY ABLED

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LITERATURE SURVEY

S.No	Title	Authors	Description
1.	Design of an integrated learning approach to assist real-time deaf application using voice recognition system	Arun Prasath G, Annapurani, Panaiyappank	Modern voice recognition is the process of predicting the human voice using emergent artificial intelligence techniques. It is extensively adopted in real-time applications for identity verification, helping deaf/dumb people, electronic voice eavesdropping, and hearing-impairment purposes. Predicting salient and discriminative process flow in the voice recognition

			process is the most challenging task in identifying the voice. Some existing research works find it complex to provide better prediction results. However, this work concentrates on modelling an efficient approach to predict the voice using deep learning approaches and it includes four essential phases: data acquisition phase, input voice pre-processing phase, word segmentation phase and classification. For experimentation purpose, an available online dataset was initially acquired and fed as an input to the proposed model. Subsequently, the provided input is pre-processed using an improved Mel-DCT filter for voice activity detection and to improve the classifier performance. The pre-processed image is then supplied into the word segmentation phase where the words from the input data are segmented using the Grab Cut segmentation. Finally, the classification was done with the integrated Recurrent Neural Network (RNN) and Convolutional Neural Network (CNN). The integration is performed to handle the drawbacks of the single classifier model and to boost the prediction accuracy.

2.	Layered architecture for real time sign recognition: Hand gesture and movement	A.Ibarguren, I.Maurtua, B.Sierra	Sign and gesture recognition offers a natural way for human–computer interaction. This paper presents a real time sign recognition architecture including both gesture and movement recognition. Among the different technologies available for sign recognition data gloves and accelerometers were chosen for the purposes of this research. Due to the real time nature of the problem, the proposed approach works in two different tiers, the segmentation tier and the classification tier. In the first stage the glove and accelerometer signals are processed for segmentation purposes, separating the different signs performed by the system user. In the second stage the values received from the segmentation tier are classified. In an effort to emphasize the real use of the architecture, this approach deals specially with problems like sensor noise and simplification of the training phase.

| 3. | Two Way Communicator between Deaf and Dumb People and Normal People | Prashant G. Ahire, Kshitija B. Tileka, Tejaswini A. Jawake, Pramod B. Warale | One of the most precious gift of nature to human beings is the ability to express himself by responding to the events occurring in his surroundings. Every normal human being sees, listens and then reacts to the situations by speaking himself out. But there are some unfortunate ones who are deprived of this valuable gift. This creates a gap between the normal human beings and the deprived ones. This application will help for both of them to communicate with each other. The system is mainly consists of two modules, first module is drawing out Indian Sign Language(ISL) gestures from real-time video and mapping it with human-understandable speech. Accordingly, second module will take natural language as input and map it with equivalent Indian Sign Language animated gestures. Processing from video to speech will include frame formation from videos, finding region of interest (ROI) and mapping of images with language knowledge base using Correlation based approach then relevant audio generation using Google Text-to-Speech(TTS) API. The other way round, natural language is mapped with equivalent Indian Sign Language gestures by conversion of speech to text using Google Speech-to-Text (STT) API, further mapping the text |

			to relevant animated gestures from the database.
4.	SignPro-An Application Suite for Deaf and Dumb	Ashish Sethi, Hemanth S, Kuldeep Kumar, Bhaskara Rao N, Krishnan R	This application helps the deaf and dumb person to communicate with the rest of the world using sign language. Suitable existing methods are integrated in this application. The key feature in this system is the real time gesture to text conversion. The processing steps include: gesture extraction, gesture matching and conversion to speech. Gesture extraction involves use of various image processing techniques such as histogram matching, bounding box computation, skin colour segmentation and region growing. Techniques applicable for Gesture matching include feature point matching and correlation-based matching. We have come up four different approaches based on the methods used for gesture extraction and matching. A Comparative study of these approaches is also carried out to rank them based on time efficiency and accuracy. The other features in the application include voicing out of text and text to gesture conversion.
5.	Video Gesture Classification using Fourier Descriptors and General Fuzzy	Ms. Rashmi D. Kyatanavar , Prof. P. R. Futane	— Sign languages are natural languages that use different means of expression for communication in day-to-day life. There are various sign languages across the world. In

	Min Max Neural Network		India, it's Indian Sign Language (ISN) which is on the way of standardization & very less work has been done on it. As the sign language is the only communication means for hearing impaired people; we need Sign Language Translator (SLT). The approach proposed in this paper will work on ISL to convert the video of full sentence gesture to text. It will initially identify individual words from the video & covert them to text. Finally, the system will process those words to form a meaningful sentence.
6.	Real-time two-way communication approach for hearing impaired and dumb person based on image processing	Shweta S. Shinde, Rajesh M. Autee, Vitthal K. Bhosale	In the recent years, there has been rapid increase in the number of deaf and dumb victims due to birth defects, accidents and oral diseases. Since deaf and dumb people cannot communicate with normal person so they have to depend on some sort of visual communication. Gesture shows an expressive movement of body parts such as physical movements of head, face, arms, hand or body which convey some message. Gesture recognition is the mathematical interpretation of a human motion by a computing device. Sign language provide best communication platform for the hearing impaired and dumb person to communicate with normal person. The objective of this research is to develop a real time

			system for hand gesture recognition which recognize hand gestures, features of hands such as peak calculation and angle calculation and then convert gesture images into voice and vice versa. To implement this system we use a simple night vision web-cam with 20 megapixel intensity. The ideas consisted of designing and implement a system using artificial intelligence, image processing and data mining concepts to take input as hand gestures and generate recognizable outputs in the form of text and voice with 91% accuracy.
7.	Albanian Sign Language (AlbSL) Number Recognition from Both Hand's Gestures Acquired by Kinect Sensors	Eriglen Gani, Alda Kika	Albanian Sign Language (AlbSL) is relatively new and until now there doesn't exist a system that is able to recognize Albanian signs by using natural user interfaces (NUI). The aim of this paper is to present a real-time gesture recognition system that is able to automatically recognize number signs for Albanian Sign Language, captured from signer's both hands. Kinect device is used to obtain data streams. Every pixel generated from Kinect device contains depth data information which is used to construct a depth map. Hands segmentation process is performed by applying a threshold constant to depth map. In order to differentiate signer's hands a K-means clustering algorithm is applied to partition pixels into two groups corresponding to each signer's

			hands. Centroid distance function is calculated in each hand after extracting hand's contour pixels. Fourier descriptors, derived form centroid distance is used as a hand shape representation. For each number gesture there are 15 Fourier descriptors coefficients generated which represent uniquely that gesture. Every input data is compared against training data set by calculating Euclidean distance, using Fourier coefficients. Sign with the lowest Euclidean distance is considered as a match. The system is able to recognize number signs captured from one hand or both hands. When both signer's hands are used, some of the methodology processes are executed in parallel in order to improve the overall performance. The proposed system achieves an accuracy of 91% and is able to process 55 frames per second.

8.	Development of full duplex intelligent communication system for deaf and dumb people	Surbhi Rathi, Ujwalla Gawande	Sign language is the only essential communicating tools, for deaf and dumb people. To ensure an independent life for hearing impaired and mute people, the automatic interpretation of sign language is an extensive era of research. Using sign languages, deaf and mute people can communicate among themselves but they find it tough to face the outside world. The aim of the proposed system is to make a dual way communication system between deaf-dumb and normal people. The paper presents a vision based approach where continuous sequences of frames of dynamic hand gestures have been taken. Preprocessing, Segmentation, Feature Extraction and Classification these four are the main steps to recognize dynamic hand gestures of ISL words. After that, dual way communication is performed. In that, first the recognized gesture has converted into text message and voice format, so that normal person can understand it. Second, voice has converted into text message and its corresponding gesture, so that physically impaired humans can understand it. Hence, the proposed system can definitely breaks the barrier between deaf-dumb and normal people.

9.	Sign Language Recognition for Deaf and Dumb People Using Android Environment	A. Gayathri, A. Sasi Kumar	This paper helps the deaf and dumb person to communicate with the rest of the world using sign language. Communication plays an important role for human beings. Speech-to-sign technology and VRS enables audible language translation on smart phones with signing and application has characters feature in mobile without dialling number uses a technology that translates spoken and written words into sign language with video. Interaction between normal people with blind person is very difficult because of communication problems. There are many applications available in the market to help the blind people to interact with the world. Voice-based email and chatting systems are available to communicate with each other by blinds. This helps to interact with persons by blind people. This work includes a voice based, text based and video based interaction approach. Video chat technology continues to improve and one day may be the preferred means of mobile communication among the deaf. Technologies not mashed up to solve the problem of mobile sign language translation in daily life activities. Video interpreter is responsible for helping deaf or hearing impaired individuals understand what is being said in a variety of situations.

			The main feature of this work is that it can be used to learn sign language and to provide sign language translation of video for people with hearing impairment.
10.	Real-Time Application for Deaf and Dumb: Bidirectional Communication Using Learning Methods	G. Arun, Prasath, K Annapurani	In this world, we have more than 466 million deaf dumb peoples. Normal peoples are communicating with voice, likewise deaf and dumb people are communicating by the use of sign language. Generally, without knowing the language, one cannot talk to other people in the world, similarly without knowing the sign language normal people cannot talk to deaf and dumb people. Within themselves, deaf and dumb people will communicate using sign language, which normal people cannot understand, but still hearing is one way to understand the people, so expression and gesture are also a way to understand thoughts of deaf and

			dumb people. To find a solution for this problem, either normal person needs to learn the sign language or we need to create a platform which will convert the sign language to voice and voice to sign language. Though we have many different types platform, still it not efficient so we need to use the advanced method which recognizes the input much efficiently. Since we are using gesture and voice as an input, this will act as bidirectional way communication. The focus of this work is to create a bidirectional-based system to identify sign language gestures from the sign language images and converting that to voice output. Since we are developing the application to computer and android, it should have two-way communication so that both can act as input and output node. For efficient voice input and output, we are using android mobile.