Literature Survey

(Team Id: PNT2022TMID22136)

Based On Real-Time Communication System Powered By AI For Specially Abled

1. Interactive Software Technology for Deaf Users: Mapping The HCI Research Landscape that Focuses on Accessibility

(Alexandros yeratziotics, panayiotics zaphiris)

The purpose of this paper is to chart research developments in HCI literature that focuses on accessibility for the deaf user group. A map for this particular landscape has been constructed based on a review of the four most relevant sources in HCI that focuses on accessibility, from 2000 to 2013. The map describes topics of research that are covered under the umbrella of Interactive Software Technology (IST) for deaf users in HCI literature that focuses on accessibility. To construct the map and identify these topics a systematic approach was applied, involving a number of stages and employing several research methods (literature review, focus group and card sorting). The resulting map, which underwent three revisions, consists of 23 code categories in total: 3 main categories, 8subcategories, 7 second-level subcategories and 5 third-level subcategories. This paper can act as a guide for other researchers interested in conducting research within this landscape.

2. Deaf Talk Using 3D animated Sign Language: A sign Language Interpreter Using Microsoft's Kinect v2

(Mateen Ahmed; Mujtaba Idrees; Zain ul Abideen; Rafia Mumtaz; Sana Khalique)

This paper describes a neoteric approach to bridge the communication gap between deaf people and normal human beings. In any community there exists such group of disable people who face severe difficulties in communication due to their speech and hearing impediments. Such people use various gestures and symbols to talk and receive their messages and this mode of communication is called sign language. Yet the communication problem doesn't end here, as natural language speakers don't understand sign language resulting in a communication gap. Towards such ends there is a need to develop a system which can act as an interpreter for sign language speakers and a translator for natural language speaker. For this purpose, a software based solution has been developed in this research by exploiting the latest technologies from Microsoft i.e. Kinect for windows V2. The proposed system is dubbed as Deaf Talk, and it acts as a sign language interpreter and translator to provide a dual mode of communication between sign language speakers and natural language speakers. The dual mode of communication has following independent modules (1) Sign/Gesture to speech conversion (2) Speech to sign language conversion. In sign to speech conversion module, the person with speech inhibition has to place himself within Kinect's field of view (FOV) and then performs the sign language gestures. The system receives the performed gestures through Kinect sensor and then comprehends those gestures by comparing them with the trained gestures already stored in the database. Once the gesture is determined, it is mapped to the keyword corresponding to that gesture. The keywords are then sent to text to speech conversion module, which speaks or plays the

sentence for natural language speaker. In contrast to sign to speech conversion, the speech to sign language conversion module translates the spoken language to sign language. In

this case, the normal person places himself in the Kinect sensor's FOV and speaks in his native language (English for this case). The system then converts it into text using speech to text API. The keywords are then mapped to their corresponding pre-stored animated gestures and then animations are played on the screen for the spoken sentence. In this way the disable person can visualize the spoken sentence, translated into a 3D animated sign language. The accuracy of Deaf Talk is 87 percent for speech to sign language conversion and 84 percent for sign language to speech conversion.

3. ML-Based Hand Sign Detection System For Deaf-Mute People

(Nikita Malik, Nipun Walia)

Communication is imperative to human existence and pervasive in all aspects of our lives. It is also an important right to everyone. This paper focuses on solving the communication problem with the deaf and mute population of the world. This is done using real-time machine learning (ML) for sign language detection along with certain APIs (Application Programming Interfaces). The discussed system detects the signs in the region of interest (ROI) and then converts them into the appropriate format. Computer vision has been used for detection and API function for many other functionalities. This idea here is focused on reducing the communication gap within the deaf-mute population and bringing a sense of normal in their daily life. INTRODUCTION Communication is a way of exchanging information, opinions, and feelings among individuals in order to reach a common understanding. People with disabilities may require assistance due to complex communication needs, but they are still left behind in communicating their ideas to the general public to some extent because the majority of people are not educated enough to understand their first language, resulting in one-way communication. It's easy to be scared by the thought of communicating with someone who has a disability, particularly if you're not sure what to say or how to say it. As a result, we hope to use artificial intelligence and other technologies in our project to bridge these gaps and bring everyone, special or not, on the same level, resulting in a better world. For the general public also this application will be a very useful platform as it will completely demolish the different prerequisites that were required earlier to communicate to people with different special needs. The transmitter and the receiver are the two basic components of any communication. The sender expresses a sentiment or emotion, seeks information, or transmits an idea or notion, and the recipient receives the message. To summarize, each communication entails a sender and a receiver, a message, and both sides' interpretations of the message's meaning [1]. We interact with individuals on a daily basis and it's crucial to remember to treat each person with a disability as an individual while talking with them. To communicate responsibly and respectfully with and about an individual, people-first language is utilized which emphasizes the person first, not the disability. When it is impossible or undesirable to speak orally, sign language is any form of communication involving physical movements, mainly hand gestures. It is possible that the practice precedes speech. Sign language can be as crude as frowns, shoulder shrugs, or gesticulation or it can be a fine combination of manually coded signals complemented by face expressions or spelled out words. When voice communication is impossible, such as between speakers of mutually incomprehensible languages or when one or more potential communicators are deaf, sign language can be employed to bridge the

gap. The deaf and hard-of-hearing community uses sign language as their primary mode of communication, but it can also be useful for other groups. The BSL (British Sign Language) alphabet is fingerspelling. There is a symbol for each letter of the alphabet. On your hand, you can use these letter signs to spell out words-most common names and places-and sentences. If you don't know or can't remember some BSL signs, you can use fingerspelling to communicate. With the help of deep learning method, computer vision, we plan to read the hand sign of the user and translate it to the appropriate format. For example, a deaf person who wants to communicate with a person with no disability can do so using our website in which we read the hand sign of the person with a disability and convert it to audio for the other person to hear. The key features implemented in this paper are: • Taking video inputs of sign language used by differently abled people. • With the use of artificial intelligence, convert these video inputs of various signs used by the user, interpret them to their corresponding speech and text, making it more comprehensible for the respective auditor. • Personalize the application for each user as per their preference, if needed.

4. Smart Communication System Using Sign Language Interpretation

(Divyansh Bisht, Manthan Kojage, Manu Shukla, Yash Prakash Patil, Priyanka Bagade)

Although sign language has become more widely used in recent years, establishing effective communication between mute/deaf people and non-signers without a translator remains a barrier. There have been multiple methods proposed in the literature to overcome these challenges with the help of Sign Language Recognition (SLR) using methods based on arm sensors, data glove and computer vision. However, the sensorbased methods require users to wear additional devices such as arm bands and data-glove. The sensor-free vision-based methods are computationally intensive and sometimes less accurate as compared to the wearable sensor-based methods. In this paper, we propose a vision-based light weight web-based sign-language interpretation system. It provides two-way communication for all classes of people (deaf-and-mute, hard of hearing, visually impaired, and non-signers) and can be scaled commercially. The proposed method uses Mediapipe to extract hand features from the input image/video and then uses a light weight random forest classifier to classify the signs based on the extracted features with the accuracy of 94.69 %. The proposed model is trained on alphabets from American Sign Language. We developed a web-based user interface to remove for ease of deployment. It is equipped with text-to-speech, speech-to-text and auto-correct features to support communication between deaf-and-mute, hard of hearing, visually impaired and non-signers.

5. Glove Based Gesture Recognization Sign Language Translator Using Capacitive Touch Sensor

(kalpattu S. Abishek, Lee Chun Fai Qubeley,Derek ho)

The sign language translator is a bridge between those who comprehend sign languages and those who do not which is the majority of humanity. However, conventional signa language translators are bulky and expensive, limiting their wide adoption. In this paper, we present a gesture recognition glove based on charge-transfer touch sensors for the translation of the American Sign Language. The device is portable and can be implemented with low-cost hardware. The prototype recognize gestures for the numbers 0 to 9 and the 26 English alphabets, A to Z. The glove experimentally achieved, based on 1080 trials, an overall detection accuracies of over 92 %, which is comparable with current high-end counterparts.

The proposed device I expected to bridge the communication gap between the hearing and speech impaired and members of the general public.

6.Application Of Machine Learning Techniques for Improving learning Disabilities

(Dr. T.S. Poornappriya and Dr. R. Gopinath)

Learning disorders such as dysgraphia, dyslexia, dyspraxia, and others obstruct academic progress while also having long-term implications that extend beyond academic time. It is well acknowledged that this type of disability affects between 5% and 10% of the overall population. Children must complete a battery of tests in order to be assessed for such disabilities in early life. These assessments are scored by human professionals, who determine if the youngsters require special education strategies depending on their results. The evaluation can be time-consuming, costly, and emotionally draining. Dyslexia is a learning disability marked by a lack of reading and/or writing skills, as well as difficulties with fast word identifying and spelling. Dyslexics have a hard time reading and understanding words and letters. Different methodologies are used in research to distinguish dyslexics from non-dyslexics, such as machine learning, image processing, studying cerebrum behaviour through brain science, and pondering the variations in life systems of mind. E-learning technologies have been increasingly important in higher education in recent years, particularly in improving learning experiences for those with learning disabilities. However, many professionals involved in the creation and deployment of e-learning tools fail to consider the needs of dyslexic pupils. In this research, a comprehensive literature review is conducted on machine learning algorithms for dyslexia prediction and e-learning for learning and cognitive disorders.

7. Sign Language Recognition System For Deaf And Dumb People

(Sakshi Goyal , Ishita Sharma , Shanu Sharma)

The Sign language is very important for people who have hearing and speaking deficiency generally called Deaf And Mute. It is the only mode of communication for such people to convey their messages and it becomes very important for people to understand their language. This paper proposes the method or algorithm for an application which would help in recognising the different signs which is called Indian Sign Language. The images are of the palm side of right and left hand and are loaded at runtime. The method has been developed with respect to single user. The real time images will be captured first and then stored in directory and on recently captured image and feature extraction will take place to identify which sign has been articulated by the user through SIFT (scale invariance Fourier transform) algorithm. The comparisons will be performed in arrears and then after

comparison the result will be produced in accordance through matched keypoints from the input image to the image stored for a specific letter already in the directory or the database the outputs for the following can be seen in below sections. There are 26 signs in Indian Sign Language corresponding to each alphabet out which the proposed algorithm provided with 95% accurate results for 9 alphabets with their images captured at every possible angle and distance i.e. for every alphabet even if have approximately 5 images at different angles and distances then the algorithm is working accurately for 45 types of inputs.

8. AI Improving the Lives Of Physically Disabled

(Hemashree Madan, Shubham Gupta)

Physical disability is one of the significant concerns that hamper individuals to access the web easily. Most of the physically disabled people cannot use technology because of the limitation of accessibility tools and techniques. It is required that the websites should be made compliant with the requirements of every citizen in a country; that's why they should cater to the needs of the differently-abled citizens as well. Features have to be introduced in the websites so that they are easy to use, readily accessible, understandable, and convenient to everyone including best practices/standards and global innovation techniques. At times, accessibility is confused with providing solutions to disabled people, but the fact is accessibility is not only for differently-abled people, but it's also there for everyone. The matter is every person needs accessibility and uses it when in need.