Real-Time Communication System Powered By AI for Specially Abled

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ABSTRACT

Communication plays a significant role in making the world a better place. Communication creates bonding and relations among the people, whether persona, social, or political views. Most people communicate efficiently without any issues, but many cannot due to disability. They cannot hear or speak, which makes Earth a problematic place to live for them. Even simple basic tasks become difficult for them. Disability is an emotive human condition. It limits the individual to a certain level of performance. Being deaf and dumb pushes the subject to oblivion, highly introverted. In a world of inequality, this society needs empowerment. Harnessing technology to improve their welfare is necessary. In a tech era, no one should be limited due to his or her inability. The application of technology should create a platform or a world of equality despite the natural state of humans. So far this project implements the real time application for those disabilities using methodologies such as Neural Network, NLP, Cloudant DB, Watson assistant and Artificial Intelligence.

INTRODUCTION

In our society there are lot of people with disabilities. The technologies has been developing by day by day but there is no improvement for the betterment of these people. The communication between deaf and dumb and normal people is very difficult and that has been very challenging task. During emergency situation without any basic knowledge about the signs which is helpful to communication between normal person and deaf and dumb person is very difficult. The project has the idea of developing a system that converts the sign language into a human hearing voice in the desired language to convey a message to normal people, as well as convert speech into understandable sign language for the deaf and dumb. This app enables deaf and dumb people to convey their information using signs which get converted to human-understandable language and speech is given as output.

LITERATURE SURVEY

Two-way Smart Communication System for Deaf & Dumb and Normal People

Author: Areesha Gul; Batool Zehra; Sadia Shah; Nazish Javed; Muhammad Imran Saleem

Year: 2020

Communication with others is a much bigger difficulty for people who are Deaf & Dumb. They are unable to communicate effectively with people from the past. They encounter challenges locating employment and leading a conventional life like other people. In this work, we present a two-way intelligent communication system for Deaf and Dumb persons as well as for Regular people. The system consists of two primary components: the hardware system for Deaf and Dumb people to use to communicate with a normal person and the Android application enabling a normal person to answer to them without having to learn sign language. This guarantees a two-way intelligent communication system that will make their lives easier. The overall accuracy of the system is 92.5%, with both the hands involved.

Advantages:

This is two way communication system, this will be very helpful to convey messages to normal people and normal people can also convey message to deaf and dumb people.

Disadvantages:

This is an Android Application, Blind people cannot use this method

Glove Based Deaf-Dumb Sign Language Interpreter.

Author: Santosh S Kumar; Ravi Gatti; Sunil K N Kumar; N Nataraja; Rajendra P Prasad; T Sarala

Year: 2021

They utilize sign language, which is difficult for non-deaf people to understand, to communicate because they are deaf. Data transfer activities are managed by a microprocessor-based Sign Language Interpreter, which helps bridge the communication gap with the outside world. The six axis MPU6050, which is utilized for the detection of sign language, is controlled by a small CPU based on the Raspberry Pi. To determine the hand tilt, a triaxial accelerometer is employed. The MCP3008 external analog-to-digital converter serves as the interface between the microprocessor and the flex sensor module. Based on the information from the MPU6050 and MPU3008, the decision to send the message is made. The proposed system is capable of translating various signs into text. The proposed system is able to convert

the different signs into the text and voice message. It is trained for the different symbols and works effectively.

Advantages:

It is wireless with displays and voice device. It is portable, and having inbuilt battery

Disadvantages:

It is bulky in wearing. Difficult to handle.

Hand Gesture Recognition for Deaf and Dumb Using CNN technique.

Author: S. Vanaja; R. Preetha; S. Sudha

Year: 2021

For people who have trouble speaking or hearing, sign language is a successful form of communication. Convolutional neural networks are used to identify the static signs of ISL and to create a hand gesture recognition system to assist the deaf and the mute (Indian Sign Language). A total of 3500 static sign photos of 10 (Indian sign language) static signs were collected from different disabled people in order to have a large enough dataset. Convolution Neutral Network (CNN) Architecture based on Deep Learning approach utilized a total of 4 layers and 16 filters. Adam optimizer has been utilized as the optimizer to adjust the model's weights since it helps to decrease loss and increase accuracy. There are 15 training epochs for the model. The optimizer used to train and validate process is Stochastic Gradient Descent (SGD). The proposed model gives the maximum possible training accuracy of about 99.76%.

Advantages:

Very High accuracy in image recognition.

Disadvantages:

Lots of training data is required.

Analyzing and Enhancing Communication Platforms available for Deaf-blind User.

Author: Sartha Tambe; Yugchhaya Galphat; Nilesh Rijhwani; Aishwarya Goythale; Janhvi Patil.

Year: 2021

This paper explores the current research effort towards building user friendly application that connects two normal people, deaf and dumb, blind and deaf people together. Nowadays there are many applications available when it comes to hearing and visually impaired but every application has a certain limit till now. The work includes three approaches viz. a voice, text and video based input-output

interaction. When it comes to deaf and dumb communication, the model to learn sign language was implemented and there was conversion of Indian Sign Language into the text. When it comes to communication between the deaf-blind users, Morse code the language of dash, spaces and dots has always been an effective communication tool. Also in some of the processes, there is use of image to text and text to speech conversion. All the work focuses on how these techniques were developed and available to implement and their effectiveness at the same time. It also provides different ways for the visually and hearing impaired to communicate by converting the texts as voice signals and morse code signals. This paper also proposes and explores another method that can be implemented for a full-fledged interaction between visually and hearing impaired without any limitations and the work depends on Morse code, translations such as Morse code to text, speech and vice-versa.

Advantages: Simple to use. Can be used by someone with disability too. No power required for transmission.

Disadvantages:

The Morse code is not an easy concept to understand.

PROBLEM STATEMENT

In our society, we have people with disabilities. The technology is developing day by day but no significant developments are undertaken for the betterment of these people. Communications between deaf-mute and a normal person has always been a challenging task. It is very difficult for mute people to convey their message to normal people. Since normal people are not trained on hand sign language. In emergency times conveying their message is very difficult. The human hand has remained a popular choice to convey information in situations where other forms like speech cannot be used. Voice Conversion System with Hand Gesture Recognition and translation will be very useful to have a proper conversation between a normal person and an impaired person in any language.

PROPOSED SYSTEM

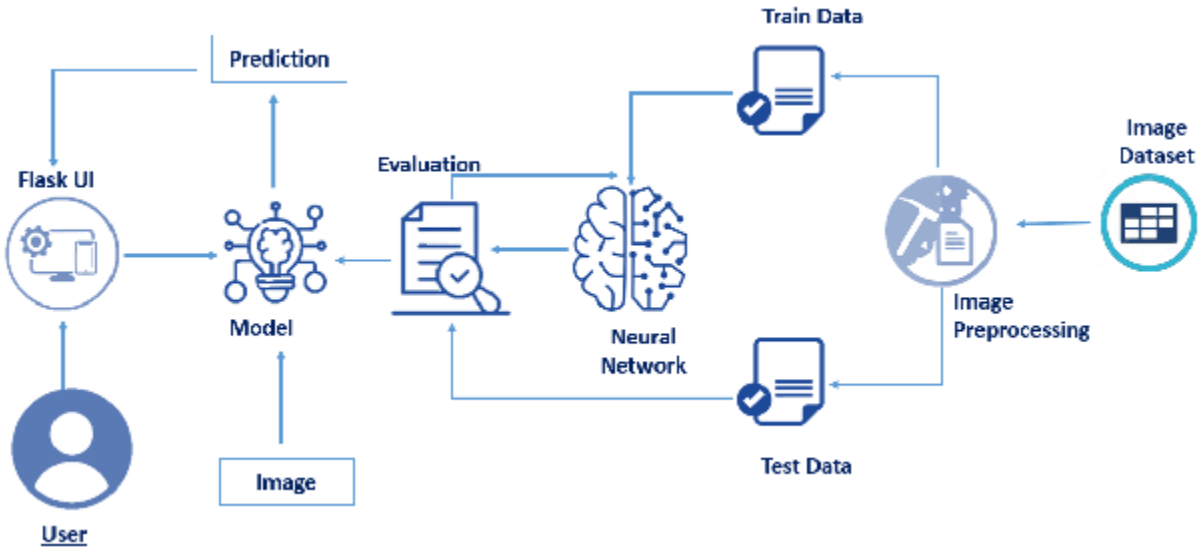
The project aims to develop a system that uses Artificial intelligence to convert the sign language into a human hearing voice in the desired language to convey a message to normal people, as well as convert speech into understandable sign language for the deaf and dumb using Natural language processing and neural network. We are making use of a convolution neural network (CNN) to create a model that is trained on different hand gestures. We are using a pre trained model to develop an expert

system which acts as a translator between specially challenged people and normal one. An app is built which uses this model. IBM Watson assistant enables artificial intelligence that understands customers in context to provide fast, consistent, and accurate answers across any application, device. Remove the frustration of long wait times, tedious searches, and unhelpful chat bots with the leader in trustworthy AI. .This app enables deaf and dumb people to convey their information using signs which get converted to human-understandable language and speech is given as output.

METHODOLOGIES USED

- Artificial Intelligence
- Neural Network
- NLP
- Cloudant DB
- Watson assistant

TECHNICAL ARCHITECHTURE



CONCLUSION

The main objective of this research has been achieved successfully. Gesture interpretation works best in case users who understand sign language may interact with people who are unfamiliar with sign language. Speech interpretation is helpful for sign language non-speakers who want the accompanying hand sign to be understood. Room conditions such as lighting can play a role in predicting the outcome of poor lighting. The light that is either too bright or too dim will result in inaccurate hand segmentation, resulting in inaccurate gesture prediction. The type of inaccuracy can emerge from the user's peripherals, such as poor web camera performance or poor microphone quality. In a nutshell, the development of technology is essential, and its deployment in sign language is highly critical. It will serve to bring efficiency in communication, not only to the deaf and dumb but those with the ability to hear and speak as well. In addition to creating opportunities for their career growth, it will enhance their social life through effective communication. Making an impact and changing the lives of the deaf and dump through technology will be an innovation of the year worth the time and resources.

REFERENCES

1. Abhishek, K. S., Qubeley, L. C. F., & Ho, D. (2016,August). Glove-based hand gesture recognition sign language translator using capacitive touch sensor. In 2016 IEEE International Conference on Electron Devices and Solid-State Circuits (EDSSC) (pp.334-337). IEEE. https://doi.org/10.1109/EDSSC.2016.7785276

2. Ahmed, M. A., Zaidan, B. B., Zaidan, A. A., Salih, M.M., & Lakulu, M. M. B. (2018). A review on systems-based sensory gloves for sign language recognition state of the art between 2007 and 2017. Sensors, 18(7), 2208. https://doi.org/10.3390/s18072208

3. Ahmed, M., Idrees, M., ul Abideen, Z., Mumtaz, R., & Khalique, S. (2016, July). Deaf talk using 3D animated sign language: A sign language interpreter using Microsoft's kinect v2. In 2016 SAI Computing Conference (SAI) (pp. 330-335). IEEE. https://doi.org/10.1109/SAI.2016.7556002

4. Artemov, M., Voronov, V., Voronova, L., Goncharenko, A., & Usachev, V. (2019). Subsystem for Simple Dynamic Gesture Recognition Using 3DCNNLSTM. In Conference of Open Innovations Association, FRUCT (No. 24, pp. 571-577). FRUCT Oy.

5. Almisreb, A. A., Jamil, N., Norzeli, S. M., & Din, N. M. (2020). Deep transfer learning for ear recognition: A comparative study. International Journal of Advanced Trends in Computer Science and Engineering, 9(1.1 Special Issue), 490-495.[80].

6. Anderson, R., Wiryana, F., Ariesta, M. C., & Kusuma, G. P. (2017). Sign language recognition application systems for deaf-mute people: A review based on input-process-output. Procedia computer science, 116, 441-448.

7. Ansari, Z. A., & Harit, G. (2016). Nearest neighbor classification of Indian sign language gestures using kinect camera. Sadhana, 41(2), 161-182.