REAL TIME COMMUNICATION SYSTEM POWERED BY AI FOR SPECIALLY ABLED

LITERATURE SURVEY

Domain name: Artificial Intelligence

Team leader: Navaneethan B

Team members: 1.Oruganti Mahesh Babu

2. Mukesh M

3. Vasanth P M

ABSTRACT:

The communication and technologies associated with it is devoloping day by day. Especially, In the domain of Artificial Intelligence-healthcare systems, communication between specially abled and normal persons is becoming popular day by day. Differently abled peoples require better forms of communication with the help of new technologies so that they can significantly improve their ability to get around and participate in daily activities. Since normal people are not trained, it is very difficult for them to understand their needs. Hence, normal people need special mechanisms to communicate with the differently abled and thus understand their needs and concerns and to have a proper communication medium.

The project focuses on developing a system which 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. For this, we use a convolution neural network to create a model that is trained on different hand gestures. An app is built which uses this model. This app enables disabled people to convey their information using signs which get converted to human-understandable language and speech is given as output.

LITERATURE SURVEY:

1. D-Talk: Sign Language Recognition System for People with Disability using Machine Learning and Image Processing

Authors: Bayan Mohammed Saleh,
Reem Ibrahim Al-Beshr ,
Muhammad Usman Tariq

Abstract:

Communication plays a significant role in making the world a better place. 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 tech era, no one should be limited due to his or her inability. This paper shows how artificial intelligence is being used to help people who are unable to do what most people do in their everyday lives. Aligned with communication, D-talk is a system that allows people who are unable to talk and hear be fully understood and for them to learn their language easier and also for the people that would interact and communicate with them. This system provides detailed hand gestures that show the interpretation at the bottom so that everyone can understand them. This research allows the readers to learn the system and what it can do to people who are struggling with what they are not capable of and will provide the technical terms on how the system works.

2. A Face Based Real Time Communication for Physically and Speech Disabled People.

Authors: Ong Chin Ann,

Marlene lu,

Bee Theng Lau

Abstract:

The main purpose of this research is to enhance the communication of the disabled community. The authors of this chapter propose an enhanced interpersonal-human interaction for people with special needs, especially those with physical and communication disabilities. The proposed model comprises of automated real time behaviour monitoring, designed and implemented with the ubiquitous and affordable concept in mind to suit the underprivileged. In this chapter, the authors present the prototype which encapsulates an automated facial expression recognition system for monitoring the disabled, equipped with a feature to send Short Messaging System (SMS) for notification purposes. The authors adapted the Viola-Jones face detection algorithm at the face detection stage and implemented template matching technique for the expression classification and recognition stage. They tested their model with a few users and achieved satisfactory results. The enhanced real time behaviour monitoring system is an assistive tool to improve the quality of life for the disabled by assisting them anytime and anywhere when needed. They can do their own tasks more independently without constantly being monitored physically or accompanied by their care takers, teachers,or even parents.

3.An AI-based communication system for motor and speech disabled persons: design methodology and prototype testing

Authors: B.K. Sy,
J.R. Deller

Abstract:

An intelligent communication device is developed to assist the nonverbal, motor disabled in the generation of written and spoken messages. The device is centered on a knowledge base of the grammatical rules and message elements. A "belief" reasoning scheme based on both the information from external sources and the embedded knowledge is used to optimize the process of message search. The search for the message elements is conceptualized as a path search in the language graph, and a special frame architecture is used to construct and to partition the graph. Bayesian "belief" reasoning from the Dempster-Shafer theory of evidence is augmented to cope with time-varying evidence. An "information fusion" strategy is also introduced to integrate various forms of external information. Experimental testing of the prototype system is discussed.

4. Design and Implementation of a Contactless AI-enabled Human Motion Detection System for Next-Generation Healthcare

Authors: Yukai Song,
William Taylor,
Yao Ge,
Kia Dashtipour,
Muhammad Ali Imran,
Qammer H. Abbasi

Abstract:

In the field of Artificial Intelligence-driven healthcare systems, human motion detection is becoming increasingly popular as it can be applied to give remote healthcare for vulnerable people. This paper aims to develop a contactless AI-enabled Healthcare system, aimed to detect human motion using Channel State Information (CSI) from wireless signals, which can record patterns of human movements. Although human motion detection systems have been developed using wearable devices, this system still leaves many issues that cannot be solved. For some disabled and elderly people, it is difficult and easily forgotten to wear the devices. Thus, to tackle those issues, a novel method is proposed by using non-wearable methods. We first produced a dataset of CSI that contains patterns of human motion by using software-defined radios. Next, machine learning algorithms like Neural Network (NN), K Nearest Neighbors (KNN), Random Forest, and Support Vector Machine (SVM) were applied to processed CSI data to classify different human activities. Finally, we ensembled the three best-performed classifiers as the healthcare system to reduce the possibility of False Positive cases or True Negative cases. The ensemble classifier can achieve an accuracy of around 98% using 70% data for training and 30% data for testing. This is much higher in contrast with a benchmark dataset measured by accelerators of wearable devices with an accuracy of around 93%, proving the effectiveness of the non-invasive method.

5. Smart Wearable Hand Device for Sign Language Interpretation System With Sensors Fusion

Authors: Boon-Giin Lee,
Su Min Lee

Abstract:

Gesturing is an instinctive way of communicating to present a specific meaning or intent. Therefore, research into sign language interpretation using gestures has been explored progressively during recent decades to serve as an auxiliary tool for deaf and mute people to blend into society without barriers. In this paper, a smart sign language interpretation system using a wearable hand device is proposed to meet this purpose. This wearable system utilizes five flex-sensors, two pressure sensors, and a three-axis inertial motion sensor to distinguish the characters in the American Sign Language alphabet. The entire system mainly consists of three modules: a wearable device with a sensor module and a processing module, and a display unit mobile application module. Sensor data are collected and analyzed using a built-in embedded support vector machine classifier. Subsequently, the recognized alphabet is further transmitted to a mobile device through Bluetooth low energy wireless communication. An Android-based mobile application was developed with a text-to-speech function that converts the received text into audible voice output. Experiment results indicate that a true sign language recognition accuracy rate of 65.7% can be achieved on average in the first version without pressure sensors. A second version of the proposed wearable system with the fusion of pressure sensors on the middle finger increased the recognition accuracy rate dramatically to 98.2%. The proposed wearable system outperforms the existing method, for instance, although background lights, and other factors are crucial to a vision-based processing method, they are not for the proposed system.
Index Terms—Gest

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