Sign Language Recognition System for People with Disability using Machine Learning and Image Processing

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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. On the other hand, technology is the most innovative thing on Earth for every time the clock ticks, researchers, software engineers, programmers, and information technology specialists are always coming up with bright ideas to provide convenience to everyone. 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.

Advantages

1) Reduction in Human Error
2) Takes risks instead of Humans
3) Available 24x7

Disadvantages

1) High Costs of Creation
2) Making Humans Lazy
3) Unemployment

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

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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. The rest of this chapter is organized as follows. The background of the facial expression recognition system is reviewed in Section 2. Section 3 is the description and explanations of the conceptual model of facial expression recognition. Evaluation of the proposed system is in Section 4. Results and findings on the testing are laid out in Section 5, and the final section concludes the chapter.

Advantages

1) Helping in Repetitive Job
2) Digital Assistance
3) Faster Decisions

Disadvantages

1) No Emotions
2) Lacking Out of Box Thinking

Virtual Reality Real-Time Communication System

Jia Fu

The design and implementation of virtual communication system has been one of the main concern in the development of Virtual Reality. The main concern in constructing a network virtual communication system network is to have an appropriate architecture and effective communication protocol design to implement, and thus a research has been carry on based on the task of presenting an effective communication protocol design and realize the data and information transmission in real-time, which sent to the virtual network communication system.

Advantages

- Help in providing training
- Lowest risk
- Increases interest and engagement toward a subject

Disadvantages

- Addiction to Virtual Reality
- Impact on the real human body
- Not engaged in the real world

Artificial Intelligence enabled virtual sixth sense application for the disabled

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The sixth sense is a multi-platform app for aiding the people in need that is people who are handicapped in the form of lack of speech (dumb), lack of hearing (deaf), lack of sight (blind), lack of judicial power to differentiate between objects (visual agnosia) and people suffering from autism (characterized by great difficulty in communicating and forming relationships with other people and in using language and abstract concepts). Our current implementation of the product is on two platforms, namely, mobile and a web app. The mobile app even works for object detection cases in offline mode. What we want to achieve using this is to make a better world for the people suffering from disabilities as well as an educational end for people with cognitive disabilities using our app. The current implementation deals with object recognition and text to speech and a speech to text converter. The speech to text converter and text to speech converter utilized the Web Speech API (Application Program Interface) for the website and text to speech and speech to text library for the mobile platform. The object recognition wouldn't fetch enough use out of a website. Hence, it has been implemented on the mobile app utilizing the Firebase ML toolkit and different pre-trained models, which are both available offline as well as online.

Advantages

AI fosters strong workplace communication

Disadvantages

The implementation cost of AI is very high.

AI Data-Driven Personalisation and Disability Inclusion

Mike wald

This study aims to help people working in the field of AI understand some of the unique issues regarding disabled people and examines the relationship between the terms “Personalisation” and “Classification” with regard to disability inclusion. Classification using big data struggles to cope with the individual uniqueness of disabled people, and whereas developers tend to design for the majority so ignoring outliers, designing for edge cases would be a more inclusive approach. Other issues that are discussed in the study include personalising mobile technology accessibility settings with interoperable profiles to allow ubiquitous accessibility; the ethics of using genetic data-driven personalisation to ensure babies are not born with disabilities; the importance of including disabled people in decisions to help understand AI implications; the relationship between localisation and personalisation as assistive technologies need localising in terms of language as well as culture; the ways in which AI could be used to create personalised symbols for people who find it difficult to communicate in speech or writing; and whether blind or visually impaired person will be permitted to “drive” an autonomous car. This study concludes by suggesting that the relationship between the terms “Personalisation” and “Classification” with regards to AI and disability inclusion is a very unique one because of the heterogeneity in contrast to the other protected characteristics and so needs unique solutions.

Advantages

- It defines a more powerful and more useful computers
- It handles the information better than humans.
- It introduces a new technique to solve new problems.

Disadvantages

- The implementation cost of AI is very high.
- A robot is one of the implementations of Artificial intelligence with them replacing jobs and lead to serve unemployment.

Edge Artificial Intelligence for 6G: Vision, Enabling Technologies

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The thriving of artificial intelligence (AI) applications is driving the further evolution of wireless networks. It has been envisioned that 6G will be transformative and will revolutionize the evolution of wireless from “connected things” to “connected intelligence”. However, state-of-the-art deep learning and big data analytics based AI systems require tremendous computation and communication resources, causing significant latency, energy consumption, network congestion, and privacy leakage in both of the training and inference processes. By embedding model training and inference capabilities into the network edge, edge AI stands out as a disruptive technology for 6G to seamlessly integrate sensing, communication, computation, and intelligence, thereby improving the efficiency, effectiveness, privacy, and security of 6G networks. In this paper, we shall provide our vision for scalable and trustworthy edge AI systems with integrated design of wireless communication strategies and decentralized machine learning models. New design principles of wireless networks, service-driven resource allocation optimization methods, as well as a holistic end-to-end system architecture to support edge AI will be described. Standardization, software and hardware platforms, and application scenarios are also discussed to facilitate the industrialization and commercialization of edge AI systems.

Advantages

- New Inventions
- Unbiased Decisions
- Perform Repetitive Job

Disadvantages

- High Costs

  No creativity

  Unemployment

AI-based chatbots in customer service and their effects on user compliance

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Communicating with customers through live chat interfaces has become an increasingly popular means to provide real-time customer service in many e-commerce settings. Today, human chat service agents are frequently replaced by conversational software agents or chatbots, which are systems designed to communicate with human users by means of natural language often based on artificial intelligence (AI). Though cost- and time-saving opportunities triggered a widespread implementation of AI-based chatbots, they still frequently fail to meet customer expectations, potentially resulting in users being less inclined to comply with requests made by the chatbot. Drawing on social response and commitment-consistency theory, we empirically examine through a randomized online experiment how verbal anthropomorphic design cues and the foot-in-the-door technique affect user request compliance. Our results demonstrate that both anthropomorphism as well as the need to stay consistent significantly increase the likelihood that users comply with a chatbot's request for service feedback. Moreover, the results show that social presence mediates the effect of anthropomorphic design cues on user compliance.

Advantages

- Unbiased Decisions
- Perform Repetitive Jobs
- Daily Applications

Disadvantages

- Make Humans Lazy
- No Ethics

A literature review of Artificial Intelligence applications in railway systems

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Nowadays it is widely accepted that Artificial Intelligence (AI) is significantly influencing a large number of domains, including railways. In this paper, we present a systematic literature review of the current state-of-the-art of AI in railway transport. In particular, we analysed and discussed papers from a holistic railway perspective, covering sub-domains such as maintenance and inspection, planning and management, safety and security, autonomous driving and control, revenue management, transport policy, and passenger mobility. This review makes an initial step towards shaping the role of AI in future railways and provides a summary of the current focuses of AI research connected to rail transport. We reviewed about 139 scientific papers covering the period from 2010 to December 2020. We found that the major research efforts have been put in AI for rail maintenance and inspection, while very limited or no research has been found on AI for rail transport policy and revenue management. The remaining sub-domains received mild to moderate attention. AI applications are promising and tend to act as a game-changer in tackling multiple railway challenges. However, at the moment, AI research in railways is still mostly at its early stages. Future research can be expected towards developing advanced combined AI applications .

Advantages

- Maintenance and Inspection
- Safety and Security

Disadvantages

- Revenue Management

Deaf Chat: A Speech-to-Text Communication Aid for Hearing Deficiency

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Hearing impairments have a negative impact in the lives of individuals living with them and thosearound such individuals. Different applications and technological tools have been developedto help reduce this negative impact. Most mobile applications that have been developed thatuse Speech-to-Text technology have been inconsistent such that they are not inclusive of alltypes of hearing impaired individuals, only work under specifically predefined environmentsand do not support conversations with multiple participants. This makes the present tools lesseffective and makes hearing impaired participants feel like they are not completely part of theconversation. This paper presents a model that aims to address this by introducing the use ofMultiple-Speaker Classification technology in the design of mobile applications for hearingimpaired people. Furthermore we present a prototype of a mobile application calledDeafChatthat uses the newly designed model. A survey was conducted in order to evaluate thepotential that this application has to address the needs of hearing-impaired people. The resultsof the evaluation presented a good user acceptance and proved that a platform likeDeaf Chatcould be useful for the greater good of those who have hearing impairment

Advantages

- Facial recognition for people with a visual impairment.
- Lip-reading recognition for people with a hearing impairment.

Disadvantages

- AI Hiring Tools Can Violate Disability Protections

Innovative study of an AI voice based smart Device to assist deaf people in understanding and responding to their body language

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Lakshmisri Surya

Human beings can communicate with one another via natural language channels including words and writing, or through body language (gestures) like hand gestures, head gesticulations, facial expressions, lip motion, and so forth. Learning to read and write in normal language is essential but knowing sign language is equally essential. Individuals who are partially deaf rely on sign language as their primary mode of communication. People who have hearing impairments have difficulty communicating with those who do not have hearing issues if they do not have access to a translator [1]. This is why the deaf community will benefit greatly from a technology that understands sign language especially hand gestures.

Advantages

- help those with disabilities accomplish tasks they never thought possible

Disadvantages

- No creativity.