REAL-TIME COMMUNICATION SYSTEM POWERED BY AI FOR SPECIALLY ABLED

USE CASE :-

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.

The project aims to develop 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. We are making use of 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 deaf and dumb people to convey their information using signs which get converted to human-understandable language and speech is given as output.

EXISTING SOLUTION :-

Many of us think that artificial intelligence represents an abstract and futuristic notion we only see in sci-fi films with humanoid robots and holograms. However it's more and more grounded in our reality reaching various fields and categories of people including people with disabilities. Artificial intelligence truly revolutionizes accessibility and inclusion! Thanks to AI technology solutions, people with disabilities can drastically improve their everyday lives.
We had previously seen that smartphones are a powerful tool that help users with a visual impairment. Indeed, many apps enable them to remain

autonomous. For example, thanks to Seeing AI, visually impaired people can easily read their mail by placing documents under the smartphone camera. AI technology can apply to any type of disability profile. For instance, people with reduced mobility can control everything at home just by using their voice with a virtual personal assistant such as Amazon Alexa.

What is artificial intelligence and how does it work regarding accessibility?

Artificial intelligence (AI) refers to smart machines or algorithms that are capable of performing cognitive tasks usually made by humans. This includes different technology solutions that mimic humans and use logic from playing chess to solving equations. Machine learning is one of the technologies that is part of AI: when algorithms are exposed to more data, they can learn and improve from it in order to anticipate consumers' needs. For example, Google uses machine learning: its algorithms collect what Internet users searched and what they liked on social networks in order to provide more personalized search results and recommendations.
Nearly 4 billion people in the world use Google search engine, therefore AI, which is perceived as a social good. Anybody can have access to it including people with disabilities. Technology in general and artificial intelligence in particular have a key role in accessibility. It's not just about finding the latest innovations but mostly about providing a solution at the service of a category of people in order to improve their lives. This represents a major progress for over 1 billion disabled people in the world who could use AI. What can AI do towards accessibility?

It can remove accessibility barriers through different solutions:
⊗ Image recognition for people with a visual impairment,
⊗ Facial recognition for people with a visual impairment,
⊗ Lip-reading recognition for people with a hearing impairment,
⊗ Text summarization for people with a mental impairment,
⊗ Real-time captioning or translations for people with a hearing impairment or even people who don't speak the language.

AI has a huge impact on people with disabilities' everyday lives: a person with a mental impairment can easily comprehend the world around him thanks to text summarization.

Now lets see how the AI helps in communication for specially abled people.

Communicating with others and being connected

Depending on the type of disability and profile, communicating with others can be a challenge. The same holds true for staying connected to others in a world that's more and more digitized with the growing importance of social media and our dependence to the Internet. But technology and AI leave no one behind and can be at the service of people with disabilities. A lot of apps use artificial intelligence to favor accessibility.

For blind or visually impaired people:

⊗ VoiceOver: a screen reader directly integrated on iPhones. Although its main use is to enunciate any email or textual message, VoiceOver also uses AI to describe apps icons, the battery level and even in part images.
⊗ TalkBack: the equal of VoiceOver for Android smartphones. It enables users to fully use their smartphones.
⊗ Siri: iPhones virtual assistant. Thanks to voice control, users simply have to enunciate their request: from doing a Google search or dictating a text message to send to a friend. People with a visual impairment can easily use Siri and stay in touch with others.
⊗ Cortana: a virtual assistant created by Microsoft and implemented on Windows. It helps blind or visually impaired users to navigate on their computer using simply their voice. In a sense, it's similar to Siri.
⊗ Google Assistant: an app activated by voice control. Users can easily set up an alarm or manage their schedule, the same way as Siri.

For deaf or hard of hearing people:

⊗ Ava: an instant transcription app that uses AI to instantly transcribe the conversation of a group of people. Its algorithm adds punctuation, the name of the person who is talking and the necessary vocabulary from the user's dictionary. An easy way for people with a hearing impairment to be included and to follow a conversation with several people without lip-reading.
⊗ RogerVoice: a French instant transcription app for group conversationsavailable in 90 languages. It works the same way as Ava.

For people with physical disabilities:

⊗ Virtual assistants like Siri, Google Assistant and Google Voice Access: people with reduced mobility can use their smartphone by voice command. Google Voice Access was especially created for people with reduced dexterity.
⊗ IFTTT: an app that connects other apps so that the user with poor dexterity can use all his smartphone's functionalities without struggling. It creates combinations with the apps to automatically perform tasks such as reading an email aloud and sending a tweet.

Even people with speech impediments can benefit from AI technology with the app Voiceitt. Thanks to machine learning, Voiceitt can easily understand people with brain injuries or Parkinson's and whose speech may first seem difficult to apprehend. This app normalizes their speech to create an output of audio or text so that people with speech impediments can still communicate with others and be understood.

Of course, AI apps and smartphones aren't the only way for people with disabilities to communicate and to be connected to others. Web accessibility keeps improving to comply with the Americans with Disabilities Act (ADA) thus providing the same access and services to everybody regardless of their disabilities.

Indeed designing an accessible website can be quite tricky but AI technology turns out to be a game-changer. A site's design is scanned and analyzed thanks to machine learning. It can then improve its accessibility through many points:
⊗ A facial recognition with an AI software to replace CAPTCHAs that can be difficult to find for people with a visual impairment,
⊗ A keyboard navigation optimization via the "Tab" button for people with physical disabilities,
⊗ A voice-recognition or a speech-recognition technology like Google's Project Euphonia for people with speech impairments to use the Internet thanks to sounds and gestures,
⊗ Audio descriptions content for people with a visual impairment,
⊗ Captions and translations of online videos for people with a hearing impairment like Microsoft Translator,
⊗ Readjustments of graphic elements such as fonts, colors and spacing for people with a visual impairment,
⊗ A built-in library of idioms, slang and phrases that are unusually used for people with a mental impairment.

Machine learning mimics a browser, the same way it mimics humans, to automatically adapt what's on the screen and make it accessible for people with disabilities. Artificial intelligence technology fully enhances accessibility and inclusion.

EXISTING PAPERS :-

1.D-TALK: SIGN LANGUAGE RECOGNITION SYSTEM FOR PEOPLE WITH DISABILITY USING MACHINE LEARNING AND IMAGE PROCESSING

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.

2.ARTIFICIAL INTELLIGENCE AND INFORMATION COMMUNICATION TECHNOLOGY ACCESSIBILITY

expectations are high, and experts foresee that AI/ML shows potential for diagnosing, managing and treating a wide variety of medical conditions. However, the obstacles for implementation of AI/ML in daily clinical practice are numerous, especially regarding the regulation of these technologies. Therefore, we provide an insight into the currently available AI/ML-based medical devices and algorithms that have been approved by the US Food & Drugs Administration (FDA). We aimed to raise awareness of the importance of

regulatory bodies, clearly stating whether a medical device is AI/ML based or not. Cross-checking and validating all approvals, we identified 64 AI/ML based, FDA approved medical devices and algorithms. Out of those, only 29 (45%) mentioned any AI/ML-related expressions in the official FDA announcement. The majority (85.9%) was approved by the FDA with a 510(k) clearance, while 8 (12.5%) received de novo pathway clearance and one (1.6%) premarket approval (PMA) clearance. Most of these technologies, notably 30 (46.9%), 16 (25.0%), and 10 (15.6%) were developed for the fields of Radiology, Cardiology and Internal Medicine/General Practice respectively. We have launched the first comprehensive and open access database of strictly AI/ML-based medical technologies that have been approved by the FDA. The database will be constantly updated.

3.AI FOR DISABLITY INCLUSION

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.

4.EDGE ARTIFICIAL INTELLIGENCE FOR 6G: VISION,ENABLING TECHNOLOGIES, AND APPLICATIONS

The thriving of artificial intelligence (AI) appli- cations 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.