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INFORMATION CONVEYING SYSTEM FOR DISABLED PERSONS

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ABSTRACT

Providing assistance for individuals with disabilities, particularly those with visual, auditory, or speech impairments, can be a complex challenge that cannot be addressed by a single technology alone. The main objective of this project is to offer an all-in-one device that is user-friendly, efficient, accurate, and cost-effective. The study introduces a Raspberry Pi-based system that caters to the needs of the blind, deaf, and mute. The primary aim of this technology is to empower individuals with disabilities and boost their self-reliance by providing them with a means of seeing, hearing, and speaking. For those who are unable to speak, the camera can capture their hand gestures or sign language, and the resulting text is converted to audio using image-to-text conversion and speech synthesis. On the other hand, for those who are hard of hearing, the microphone captures spoken words, and the audio is converted to text and displayed on the device's screen. The audio message can also be sent via the speaker to individuals who are visually impaired.

Keywords— blind, deaf, dumb, hearing.

I.INTRODUCTION

Despite the advancements in science and technology, there are still millions of people worldwide who face challenges in communicating due to disabilities such as deafness, blindness, and muteness. This can lead to social isolation and inequality for these individuals. To address this issue, we propose the development of a new system prototype that utilizes wearable technology, Texas Instrumentation Circuitry, and Raspberry Pi Boards to bridge the communication gap for differently-abled individuals.

Our research aims to create a gadget that can assist individuals with hearing and speech impairments in communicating effectively. The deaf-mute communication interpreter system consists of a glove equipped with sensors that can detect hand orientation for specific gestures. The processing of these gestures is executed in an Arduino, and the device also includes a text-to-speech conversion block that translates the matched gestures to voice output. Additionally, braille is available for composing messages that blind individuals can read. However, it is important to note that these devices only provide one-way communication and cannot eliminate the complete disability of an individual.

Our proposed prototype goes beyond existing technologies that focus on specific parameters of disability and can only assist individuals with one type of impairment. Instead, our approach aims to convert different modalities into a common medium that is shared and understandable by individuals with deafness, blindness, or muteness. For example, our prototype includes cameras attached to dark glasses, a speaker, a microphone, and a portable PC, which can convert images into natural language text. This approach can be used as a general way to help people suffering from any combination of these three disabilities communicate and feel like a part of the world. It is crucial to recognize disability as an issue of equality, and our prototype aims to bridge the communication gap and promote inclusivity for differently-abled individuals.

II.LITERATURE SURVEY

This System have created an Android application that can assist paralyzed, deaf, and mute patients. The application uses wireless serial port modules to quickly and securely transmit data. In case of an emergency, the system sends alert messages to the appropriate person. Compared to vision-based techniques, this glove-based system reduces noise and algorithmic complexity[1].

This System have developed a pair of eyeglasses that serve as a visual aid system for completely blind individuals. The device is wearable, low power, and cost-effective. It incorporates a camera and ultrasound sensors to detect objects and measure distances. The system can be further developed and tested for outdoor environments using advanced machine learning algorithms and an improved user interface[2].

This System have used LabVIEW software and a data acquisition device to capture finger movements and hand gestures of disabled individuals using flex sensors. The captured alphabet in sign language is concatenated into corresponding words, and the process is implemented and customized on the LabVIEW platform[3].

This System have developed a system for facially paralyzed individuals that assists them with displaying messages and
controlling appliances. The system uses a single flex sensor and displays output on an LCD through Node MCU ESP8266. Other wireless gadgets can also be interfaced with the system[4].

This System have developed a system that enables patients with severe paralysis to communicate their thoughts and needs. The system combines eye motion and blink detection algorithms to help patients navigate and communicate efficiently[5].

This System have developed a system that recognizes sign language used by deaf and speechless people. The system uses an ARM cortex development board and an application that can convert audio replies to text, allowing for two-way communication between disabled and normal people[6]

This System have developed a communication tool for people with disabilities such as blindness, deafness, and dumbness. The system allows users to communicate in their preferred mode, including American Sign Language or audio, Braille, or text output. This makes communication with the outside world more accessible[7].

This System have developed a hand gesture recognition system, but it has limitations, as both hands cannot be used simultaneously. Proper lighting conditions are necessary for efficient results. The system can be made more accessible by incorporating it into a mobile phone[8].

This System have developed a system that uses five flex sensors, an IMU module, a Raspberry Pi, a voltage divider circuit, and ADC. The flex sensors on each finger enable detection of finger orientation. The values from the accelerometer are compared with a database to detect gestures[9].

III.PROPOSED SYSTEM

The system proposed is intended to aid individuals who have impairments that make it challenging for them to engage with their environment. The integration of a Raspberry Pi with a camera, microphone, speaker, and LCD presents a comprehensive solution to assist these individuals with their everyday activities.

For individuals who are visually impaired, the camera captures images and uses object recognition technology to identify and classify objects. The device then delivers voice output to describe the object and read any text captured by the camera, making it more accessible for visually impaired individuals to obtain information.

For individuals who are audibly impaired, the microphone records spoken words and displays them as text on the LCD, making it simpler for them to communicate with others. This function enables them to participate in conversations and access information in real-time.

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For individuals who are vocally impaired, the LCD allows them to type messages, and the speaker conveys their message through audio output. This feature enables them to communicate with others effectively.

For individuals who are paralyzed, the camera captures finger gestures, and the corresponding output is shown on the LCD and through audio output. This feature allows them to interact with their environment without the use of their hands.

In the event of an emergency, the device can locate the individual through the cloud and inform their caretakers or family members. This feature provides reassurance to individuals with impairments and their loved ones, knowing that they can be found quickly and easily in case of an emergency.

Overall, the proposed system provides a comprehensive solution for individuals with various impairments, enabling them to interact with their environment more naturally and intuitively, thereby improving their quality of life.

A.FLOWCHART

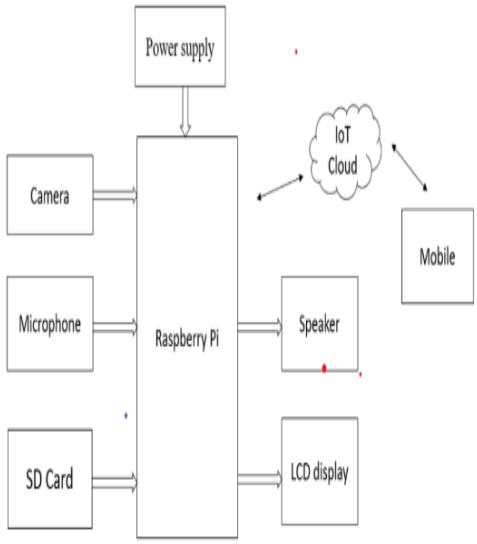

Fig. 1. FlowChart of Information Conveying System

B.DESIGN AND EXPERIMENT

The proposed system incorporates a webcam to capture the hand gestures of individuals with speech or mobility impairments. The system then cross-references the captured gesture with the database of stored gestures. If a match is found, the intended output is produced in both text and audio formats. If the system cannot find a match, it displays an error message and requests a new input. The camera module also takes pictures of important information, which is then converted to audio output via the camera's text-to-speech feature. This function allows individuals with impairments to access necessary information with ease.

For individuals with hearing impairments, the system uses a microphone to record spoken words and then displays them as text on an LCD screen. This feature enables effective communication with others.

Furthermore, the system employs IoT cloud technology to locate disabled individuals during emergencies and notify their family members or guardians of their whereabouts. This feature offers peace of mind to individuals with impairments and their loved ones, knowing that they can be located promptly and effortlessly in case of an emergency. In conclusion, the proposed system

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provides a comprehensive solution for individuals with various impairments, enabling them to interact with their environment in a more natural and intuitive manner, thereby improving their quality of life.

IV.OBSERVATIONS AND RESULTS

The proposed system aims to address the challenges faced by individuals with disabilities, particularly those with visual, auditory, or speech impairments. It is a comprehensive and cost-effective device that is designed to enhance the independence and self-reliance of such individuals. The system, based on the Raspberry Pi platform, offers solutions for the blind, deaf, and mute. Its main objective is to provide a means of communication and interaction with the surroundings. The system is capable of capturing hand gestures or sign language for individuals who are unable to speak, and the resulting text is converted to audio using image-to-text conversion and speech synthesis. Moreover, for those who are hard of hearing, the system uses a microphone to capture spoken words, and the audio is converted to text and displayed on the device's screen. The audio message can also be conveyed via the speaker to individuals who are visually impaired, making it an efficient and user-friendly device.

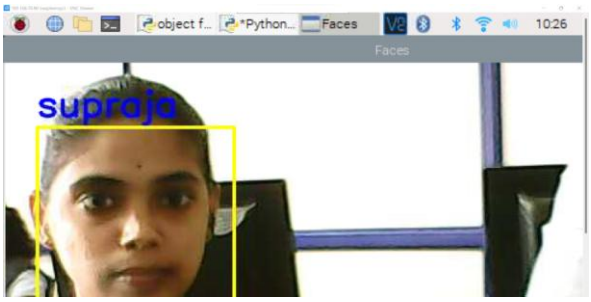

Fig.2 Detection Of Hand Gesture Using Webcam

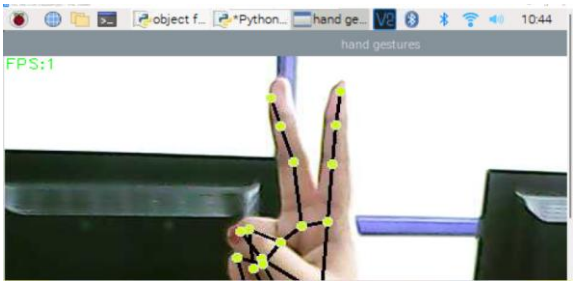

Fig.3. Face Detection Using Webcam

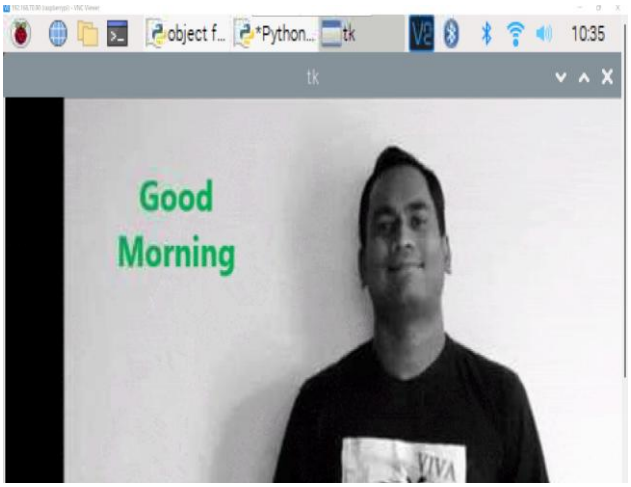

Fig.4. Detection Of Text

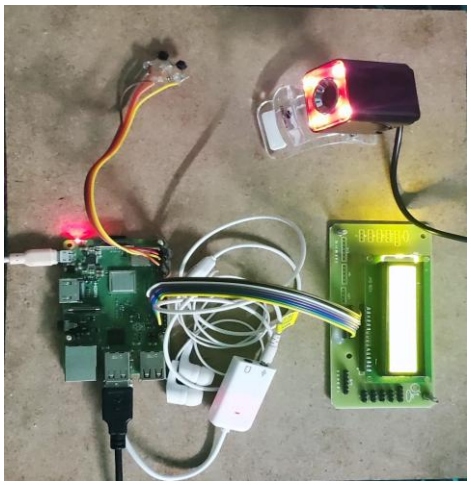

Fig.5.Proposed System Output

V.CONCLUSION

The proposed system is designed to be simple, using deep learning and machine learning algorithms to produce accurate results. Its ease of use and portability make it accessible in any location, and it can be used by individuals with various abilities, including those who are paralyzed or have uneven motor skills.

The main goal of the technology is to improve the independence and self-confidence of individuals with different abilities by allowing them to see, hear, and speak through the system. The

user-friendly design and accurate results of the system enable individuals with impairments to interact more effectively with their surroundings, increasing their self-reliance and autonomy.

In summary, the proposed system is an innovative and comprehensive solution for individuals with diverse abilities, utilizing advanced technology to enhance their quality of life. By providing a means for individuals to see, hear, and speak, the system promotes independence and self-assurance, enabling individuals with impairments to live more fulfilling and rewarding lives.

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