

# REMOTE OPERATED SMART ELECTRONIC VOICE GUIDER FOR PHYSICALLY DISABLED BED RIDDEN PATIENTS OR OLD AGE PEOPLE

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## ABSTRACT

A nonverbal communication involves movements of different body parts to communicate a particular message. Hand, face and lips movements are other movements of body parts are regarded as gesture. In this project we have a method based on head movement's recognition by using a device. This will make a bridge between physically disabled and normal public. This project proposes a wearable device to help patients who are bedridden or have trouble in muscle strength to hold a mobile device .In this project a board is designed which is helpful for housebound people to communicate with people .The device contains two modes that is Keyboard mode or regular mode and Special mode(head mode).Hence this system provides a voice which is understandable by both dumb people as well as normal people.

## INTRODUCTION

The main objective of this project is to provide a keypad device for the disabled people who cannot talk. In this project we are using arduino r3 board for implementing a device. Arduino is an open source computer hardware and software company, project and use community that designs and manufactures single board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. Arduino board designs use a variety of microprocessor and controller. The boards are equipped with sets of digital and analog input/output (i/o) pins that may be interfaced to various expansion boards (shields) and other circuits. The board features serial communication interfaces, including USB on some modules, which are so used for loading programs from personal computers. The microcontrollers are typically programmed using C an C++. ARP9600 is a voice module wherein we can pre record a voice and store in its memory,

each buttons are assigned for specific task with a pre recorded voice which can be altered as per the user specifications. Accelerometer senses the change in direction of head and accordingly the signal is given to micro controller. Depending on the direction of the acceleration, microcontroller controls the device like left, right, front and back. Thus, The device allows users to tap the words they wish to communicate from the device keyboard which consists of a pre prepared words or phrases or by using a head movements, which are then in turn transmitted into audio phrases.

## **EXISTING SYSTEM**

The existing challenges faced by bedridden patients or elderly individuals with limited mobility have prompted the development of a remote-operated smart electronic voice guider. Traditional methods of communication for this demographic often involve physical assistance or reliance on static devices, limiting their independence and ease of interaction. The proposed solution leverages smart technology, integrating voice-guided commands and remote operation to empower bedridden patients or elderly individuals with a more

dynamic and responsive communication system.

The smart electronic voice guider consists of a compact device equipped with a microphone, speakers, and IoT connectivity. It can be strategically placed within the patient's reach, allowing them to communicate verbally with the device. The remote operation aspect comes into play through a user-friendly mobile application or a dedicated remote control device that caregivers or family members can use to interact with the voice guider from a distance.

Through voice recognition technology, the smart electronic voice guider interprets verbal commands, enabling bedridden patients or elderly users to request assistance, control their immediate environment (such as adjusting the room temperature or turning on lights), or even engage in entertainment activities like listening to music or audiobooks. The device responds with clear and concise spoken instructions or acknowledgments, creating a more interactive and user-friendly experience.

The IoT connectivity allows caregivers or family members to remotely monitor the

patient's requests, ensuring a timely and efficient response to their needs. Additionally, the system can be integrated with other smart home devices, facilitating seamless control over various aspects of the patient's surroundings. This not only enhances the quality of life for the bedridden or elderly individuals but also provides peace of mind for caregivers, who can remotely assist and monitor their loved ones.

In summary, the remote-operated smart electronic voice guider represents a significant advancement in assistive technology, offering a personalized and responsive communication solution for bedridden patients and elderly individuals.

## **IMPLEMENTATION**

The envisioned Remote-Operated Smart Electronic Voice Guider represents a compassionate and innovative solution tailored for physically disabled, bedridden patients, or elderly individuals. This system integrates advanced voice-guided technology with remote operation capabilities to provide assistance and companionship. A compact electronic voice guider device is placed near the individual, equipped with a microphone and speakers, facilitating two-way communication.

Caregivers or family members can remotely operate and communicate through the device using a dedicated mobile application or web interface.

The system enables caregivers to offer verbal instructions, companionship, and emotional support from a distance. Additionally, the voice guider can assist bedridden patients in controlling smart home devices, such as lights, fans, or the television, enhancing their level of independence and comfort. Voice commands can be customized based on individual needs, allowing for a personalized and user-friendly experience.

Moreover, the electronic voice guider is designed to incorporate health monitoring features. Integrated sensors can measure vital signs or detect emergency situations, providing real-time alerts to caregivers or medical professionals. This proactive monitoring capability enhances the safety and well-being of bedridden patients or elderly individuals, allowing for prompt intervention in case of any health-related concerns.

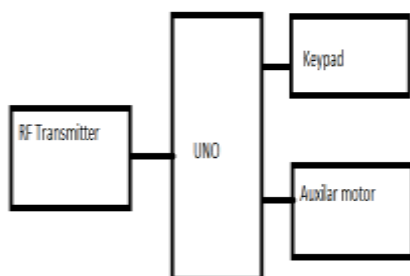
The system also contributes to the mental well-being of the users by reducing feelings of isolation and providing a means of social

interaction. Through the remote-operated voice guider, family members can engage in conversations, share updates, or even play music to uplift the spirits of the individual. The device can be programmed to provide reminders for medication schedules, ensuring adherence to prescribed treatments.

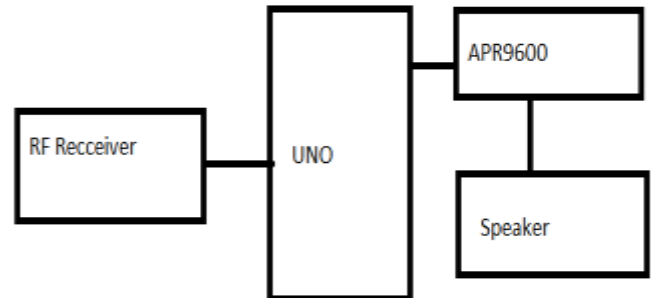
In summary, the Remote-Operated Smart Electronic Voice Guider is a holistic and user-centric solution that not only addresses the physical limitations of bedridden patients or elderly individuals but also integrates intelligent features for health monitoring and emotional well-being. This innovative system aims to enhance the quality of life for those who require extended periods of bed rest or face mobility challenges, fostering a sense of connection and care through the power of technology.

## BLOCK DIAGRAM

### TRANSMITTER



### RECEIVER



## LITERATURE SURVEY

**“An iconic and keyboard based communication tool for people with multiple disabilities”**by **Ratnajit Mukherjee,Soumyajit Dey,Sumit Das, Anupambasu [3-4 April 2010],Kharagpur**

In today’s world, there is a high need for automatic appliances with an increase in standard of living; there is a sense of urgency for developing circuits that would make our life go on easier. This project is designed and developed to help deaf and dumb people in their needs. Speaking microcontroller makes awareness about the needs of disabled. The person should know how to operate control buttons. When control buttons are pressed, voice IC will give out a sound signal corresponding to the control buttons. Speaking micro controller

helps to indicate what the patient needs. A smart assistive device for dumb and deaf people is designed to give the signs or by using switches, which are already loaded in the device. It is a microcontroller based device, which gives the warn sounds just by using hand gesture sensor, which are given some redefined messages like asking for water, washroom etc., here the person can just give the already defined gesture which indicates the sign of Water then the device sounds the same with some output volume. Microcontroller is the heart of the device. It stores the data of needs of a person. So that it can make use of data stored whenever the person uses the device. This device helps deaf and dumb people to notify their requirements. By this the person who is near can be able understand their need and help them. This saves the time to understand each other and makes communication easier. This device is developed and made to provide with a higher advantage producing voice based announcement for the users i.e., the user gets the voice which he is need as and when it is required. "Speech" and "gestures" are the expressions, which are mainly used in communication between humans. Learning of their use begins with the first years of life. In our communication, the use

of speech and gestures are completely coordinated. Machine gesture and sign language recognition is about recognition of gestures and sign language using gloves or some other devices. A number of hardware techniques are mainly used for gathering information about body positioning; typically either image-based (using cameras) or devicebased (using instrumented gloves, position trackers etc.). However, getting the data is only the first step. The second step, that of Recognizing the sign or gesture once it has been captured is highly challenging, especially in a Continuous stream. In fact currently, this is the focus of the research going on about these signs.

### **Design of an arduino based voice-controlled automated wheelchair" by Zannatul Raiyan 2017**

This paper represents the design of an Arduino based voice controlled automated wheelchair. The design is developed with a voice recognition system, which allows the physically disabled person to control the wheelchair by voice command who have issues in hand movement due to ageing or paralysis for joystick controlled wheelchairs. The design also provide some additional features such as obstacle detection for the

safe movement and a GSM based navigation system for tracking and sending notifications to increase the usability of the automated wheelchair system. To implement the design, Arduino Mega2560, Easy VR3 speech recognition module, SIM900A GSM module and relay based motor controller circuits are used along with the wheelchair. The designed wheelchair system does not require any wearable sensors for using other biomedical signals to control wheelchair movement (i.e. EEG, EMG, EOG sensors) as reported in several research studies which require complex signal processing techniques done with an extra bulky computing system attached with the wheelchair. In the proposed design, the speech processing is done solely with the available integrated speech processing module (Easy VR3) which removes the necessity of any bulky complex extra computing device. Moreover, the proposed technique is relatively simple and cheaper to implement with the widely used available electronic devices in comparison to other existing techniques which will have a great impact on the societies of developing and under developing countries. Wheelchair is the most widely used mechanical device all over the world, which is used by physically

disabled patients or aged people to move. For normal wheelchair, the user needs an extra supporting person or self-assistance by hand to move on. Statistics show that around 650 million people which is about 15% of the world population are suffering from some sort of physical disability [1]. With the growing number of population, the number of physically disabled and elderly patients is also increasing as well as the demand of automated wheelchair. Due to technological development, mostly joystick controlled automated electric motorized wheelchairs are widely available throughout the world [3]. In developing and under developing countries, these wheelchairs are neither very much available nor much cost effective [10]. Moreover, for handicapped/paralyzed people having issues with hand or finger movement, this type of wheelchair is not suitable as it needs hand control of the joystick. Furthermore, patients who become very weak due to ageing have weak wrist face problems to use joystick controlled wheelchair. Therefore, several researches are still going on to replace the necessity of joystick in controlling wheelchair movement. The revolution of automated electric wheelchairs began after the introduction of it back in the middle of 20th

century by George Klein for the world war II veterans [2]. In 1986, Arizona State University, U.S developed an autonomous system that used machine vision to identify landmarks and center wheelchair in hallway[3]. TinMan KIPR, U.S. developed and marketed some joystick controlled wheelchairs [3]. At the same time University of Osaka, Japan also developed an automated wheelchair using image processing and some other algorithms [3]. During the end of 20th century and start of 21st century, some more prototypes of automated wheelchair were developed [3]. After that in between 2004- 2013, several techniques and designs have been proposed and developed. Among the most reported techniques are eye movement signal (EOG) controlled, EEG controlled, EMG controlled and tongue controlled wheelchairs [4-8]. However, the developed techniques necessitate a wearable sensor system and include complex signal processing methods with additional computing devices which are mounted on the wheelchair. Some of the data processing techniques are still on the research level [9]. As the voice is the most common form of communication, some designs were developed to operate the wheelchairs using voice commands. In 2012

J. Kathirvelan et al. developed a system which uses oral command to operate the wheelchair using a FPGA based speech processing device driven by LABVIEW [10]. In 2013 a speech-controlled cloudbased wheelchair platform was proposed Andrej Skarba et al. [11]. In Bangladesh, G Azam and M T Islam proposed a voice controlled wheelchair, which used a laptop computer for voice processing [12]. However, this design has weight limitation which is not very suitable for elderly patients. The major limitations of the voice controlled designs are the necessity of the costly computing device for speech processing and the design of a proper motor controller system capable of carrying the load of an elderly adult (i.e. 60~80 Kg). In this paper, the proposed technique aims to design a voice controlled automated wheelchair by using the available technology which reduce the need of extra bulky complex data processing unit (i.e. laptop) and any wearable sensors. The need of an extra computing system has been removed by using integrated voice recognition module (EasyVR 3) and an Arduino microcontroller that are easily available in the market, cheaper and smaller in size. The remaining parts of the paper

describe the operation of speech processing module and the motor controller circuit with an estimated cost analysis.

**“A remote computer control system using speech recognition technologies of mobile devices” by Hae-Duck J. Jeongsang-kug Ye Jiyoung Lim,2013.**

This paper presents a remote control computer system using speech recognition technologies of mobile devices for the blind and physically disabled population. These people experience difficulty and inconvenience using computers through a keyboard and/or mouse. The purpose of this system is to provide a way that the blind and physically disabled population can easily control many functions of a computer via speech. The configuration of the system consists of a mobile device such as a smartphone, a PC server, and a Google server that are connected to each other. Users can command a mobile device to do something via speech such as directly controlling computers, writing emails and documents, calculating numbers, checking the weather forecast, and managing a schedule. They are then immediately executed. The proposed system also provides the blind people with a function via

TTS (text to speech) of the Google server if they want to receive contents of the document stored in a computer. Speech recognition technology, which is able to recognize human speech and change to text, or to perform a command, has emerged as the 'Next Big Thing' of the IT industry. Speech recognition is technology that uses desired equipment and the service which can be controlled through voice without using items such as a mouse or keyboard. It also appeared as part of ongoing research in progress in 1950s, but was not popularized until the mid-2000s, with a low voice recognition. Until now, related speech recognition technologies, which have been used limitedly for special-purposes, have been rapidly evolving because of the proliferation of portable computing terminals such as smartphones interconnected with the expansion of the cloud infrastructure [1]. One of the most prominent examples of a mobile voice interface is Siri, the voice-activated personal assistant that comes built into the latest iPhone. But voice functionality is also built into Android, the Windows Phone platform, and most other mobile systems, as well as many applications. While these interfaces still have considerable limitations, we are

inching closer to machine interfaces we can actually talk to [2]. This paper presents a remote control computer system using speech recognition technologies of mobile devices for the blind and physically disabled population. These people experience difficulty and inconvenience using computers through a keyboard and/or mouse. The purpose of this system is to provide a way the blind and physically disabled population can easily control many functions of a computer via speech. The configuration of the system consists of a mobile device such as a smartphone, a PC server, and a Google server that are connected to each other. Users command a mobile device to do something via speech such as directly controlling computers, writing emails and documents, calculating numbers, checking the weather forecast, and managing a schedule. They are then immediately executed. The proposed system also provides blind people with a function via TTS (text to speech) of the Google server when they want to receive contents of the document stored in a computer.

## CONCLUSION

The existing Remote-Operated Smart Electronic Voice Guider for physically

disabled, bedridden patients, or elderly individuals stands as a testament to the ongoing advancements in assistive technologies. This system represents a significant leap forward in providing personalized care, independence, and companionship for individuals facing mobility challenges. By incorporating remote operation capabilities and voice-guided technology, the existing system has successfully created a means for caregivers or family members to remotely communicate with and assist bedridden patients. The inclusion of health monitoring features further adds a layer of safety and proactive care, addressing not only physical needs but also contributing to the mental well-being of the users. As a holistic solution, the existing Remote-Operated Smart Electronic Voice Guider is a noteworthy contribution to the field of assistive technologies, showcasing the potential of technology to enhance the quality of life for individuals with limited mobility or in the later stages of life. Its user-centric design and multi-functional capabilities underscore the importance of considering both physical and emotional aspects when developing technologies for those in need of extended care and support.

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