Talking Glove With Home Automation

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Abstract- *Communication barriers faced by deaf and mute individuals often stem from the general public's lack of familiarity with sign language. The Talking Glove project aims to bridge this gap by developing a wearable device that translates hand gestures into spoken words. The glove is embedded with flex sensors, an accelerometer, and a microcontroller (e.g., Arduino) to detect and interpret finger and hand movements. These gestures are mapped to predefined sign language patterns, which are then converted into audio output using a speech synthesizer module. The system enhances accessibility, promotes inclusivity, and offers a portable, costeffective solution for real-time gesture- to-speech translation.*

Keywords- Talking Glove, ESP32, Gesture Recognition, Assistive Technology, Home Automation, IoT, Flex Sensor, Speech Impairment.

I. INTRODUCTION

Communication is a fundamental human need, yet millions of individuals who are deaf or mute face daily challenges due to the widespread unfamiliarity with sign language. Traditional methods of interaction often fall short, creating barriers in education, employment, and social engagement. The Talking Glove project introduces an innovative solution—a wearable device that translates hand gestures into audible speech. By integrating flex sensors, an accelerometer, and a microcontroller, the glove detects specific finger and hand movements associated with sign language. These gestures are then interpreted and converted into spoken words using a speech synthesis module, enabling real- time communication between sign language users and nonsigners.

II. LITERATURE SURVEY

Growing impact of poststroke upper extremity (UE) functional limitations entails newer dimensions in assessment methodologies. This has compelled researchers to think way beyond traditional stroke assessment scales during the outpatient rehabilitation phase. Here, we have emphasized an instrumented wearable for systematic monitoring of stroke patients with right hemiparesis for evaluating their grasp abilities deploying intelligent algorithms. An optimally tuned support vector classifier was employed to classify patients with different degrees of disability and an accuracy of 92% was achieved supported by a high area under the receiver operating characteristic score. Furthermore, selected features could provide additional information that can be Reaveled.

III. PROPOSED SYSTEM

The proposed model is designed with the help of accelerometer, pulse sensor, vibrator sensor, GPS Module, GSM Module, WIFI Module, buzzer and the instructions are fed into the Arduino Uno board. The hand gesture is captured by the accelerometer sensor and a corresponding output is displayed in the form of a sentence Information are displayed in LCD Display and SMS is sent to Admin via GSM Module. The overall process is carried out by Arduino Uno and GSM module. Fig . 2. Is the overall setup of Implementation of IoT Based Smart Assistance Gloves for Disabled Person Using IoT. an accelerator looks like a simple circuit for some larger electronic device. Despite its humble appearance, the accelerometer consists of many different parts and works in many ways, two of which are the piezoelectric effect and the capacitance sensor. The piezoelectric effect is the most common form of accelerometer and uses microscopic crystal structures that become stressed due to accelerative forces. These crystals create a voltage from the stress, and the accelerometer interprets the voltage to determine velocity and orientation. The capacitance accelerometer senses changes in capacitance between microstructures located next to the device. If an accelerative force moves one of these structures, the capacitance will change and the accelerometer will translate that capacitance to voltage for interpretation. Accelerometers are made up of many different components, and can be purchased as a separate device.
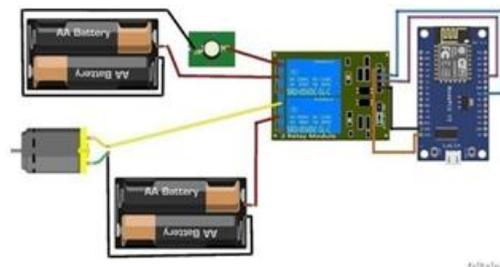
IV. BLOCK DIAGRAM

Fig. 1. Implementation of IoT Based Smart Assistance Gloves for Disabled Person Using IoT

V. CONCLUSION

The proposed Talking Gloves with Home Automation system presents an efficient and user-friendly assistive technology designed to aid speech- and hearing-impaired individuals in daily communication and home management. By integrating flex sensors and motion sensors with the ESP32 microcontroller, the glove is capable of accurately detecting hand gestures and converting them into meaningful speech outputs. Additionally, the incorporation of IoT-based control enables the user to operate home appliances through specific gestures, enhancing independence and convenience. The system provides a costeffective, portable, and reliable solution that bridges the gap between differently-abled individuals and their environment, contributing to both social inclusion and smart living applications.

VI. FUTURE ENHANCEMENT

Future developments of this system can focus on improving accuracy, usability, and integration with modern smart technologies. Machine learning algorithms may be implemented to enable adaptive gesture recognition for different users, enhancing system reliability. The addition of multilingual and customizable voice synthesis can further increase accessibility. Hardware improvements such as flexible PCBs and compact sensor integration can make the glove more ergonomic and comfortable for continuous use. Moreover, the system can be expanded to include two-way communication using haptic or visual feedback and integration with existing smart home ecosystems such as Alexa or Google Assistant. Future versions may also feature mobile application support for real-time monitoring, gesture customization, and wireless power management to improve overall portability and performance.

VII. APPLICATIONS

- Assistive Technology: Helps deaf and mute individuals communicate in public, educational, and professional environments.
- Special Education: Used in schools to support inclusive learning for students with speech or hearing impairments.
- Healthcare: Facilitates communication between patients and medical staff in hospitals or clinics.
- Customer Service: Enables better interaction in service industries like banking, retail, and transportation.
- Smart Home Integration: Can be extended to control devices using gestures for accessibility.
- Research & Development: Serves as a platform for exploring gesture recognition, wearable tech, and human-computer interaction.

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