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# Smart Glove And Google Assistant Based Control for Disable People

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**Abstract** --The aim of voice assistance for Google Assistantand Smart Gloves-enabled building automation is to automate home appliances for physically challenged People There are various products on the market that can achieve that, but developing our own is amazing. Google Assistant requires voice input for this project. The "If Something like this Than That" website, often known as "If This Than Just that," which is used to develop if-else conditional statements,is connected through the Adafruit account, a cloud-based free IoT web server. Through the IFTTT website, instructions for Google Assistant have been introduced. With this home automation, household equipment like lights, fans, and motors may all be controlled in accordance with the user's commands sent to Google Assistant. we have chosen to assist persons who are physically challenged people by using gestures to manage their home appliances, thereby easing their accessibility to this control.

**Keywords:**IOT, Wifi; ESP32; sensor

## 1.Introduction

Flex sensor is used for gesture purposes by persons with physical disabilities. It is near to a variable resistor but is a flexible sensor. There is a shift in resistances so Flex sensor bends. It is an resistive type sensor, and voltage divider circuit is utilized and gets the output volt. To determine how much deflection or bending has taken place, the "flex sensor" is used. A bend sensor creates a huge element form on a tiny flexible substrate using the idea of a shifting printed resistor.The flex sensor uses the idea of a programmable printed resistor to achieve the desired form factor on a small flexible substrate.Flex sensor is used for gesture purposes by persons with physical disabilities. It is near to a variable resistor but is a flexible sensor. There is a shift in resistances so Flex sensor bends. It is an resistive type sensor, and voltage divider circuit is utilized and gets the output volt. To determine how much deflection or bending has taken place, the "flex sensor" is used. A bend sensor creates a huge element form on a tiny flexible substrate using the idea of a shifting printed resistor.The flex sensor uses the idea of a programmable printed resistor to achieve the desired form factor on a small flexible substrate. The Flex sensor is used for gesture purposes by people who are physically challenged. It is similar to a variable resistor flexible sensor. There is a change in resistance as the Flex sensor bends. It is a resistive type sensor, and the output voltage is obtained using a voltage divider circuit

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. A sensor type called a "flex sensor" is used to gauge how much deflection, or bending, has occurred.Flex Sensor works with the concept of a changeable printed history to produce an enormous form factor on a small flexible substrate.While operating on the notion of a programmable printed resistor, the flex sensor achieves the proper form factor on a small flexible substrate.

## 2. Literature Review

### 2.1 Smart Hand Gloves for Disabled People

Dhawal L. Patel1, Harshal S. Tapase2, Praful A. Landge3, Parmeshwar P. More4 Prof. A. P. Bagade5

Smart Hand Gloves make it possible for impaired persons to coexist in society. Since a deaf person cannot communicate, these smart gloves enable him to translate his hand motion into text and voiceover. Also, it makes it easier for the average individual to comprehend what he is saying and respond appropriately. These smart gloves have the ability to manage home appliances, enabling a person with physical limitations to live independently. The primary goal of the project being implemented is to create a dependable, simple-to-use, lightweight smart hand glove system that reduces the barriers for persons with disabilities so they may participate in the race.

### 2.2Smart glove: sign to speech conversion and home automation control for mute community

Chithra Apoorva D.A, Busetty Sai Gowtham, KonjetiCharishma, Kodandapani Krishna Teja, Gudipati Sai Chaitanya KumarHumans must communicate with one another in order to survive. Using flex device technology, this project helps to improve communication with dumb people.

A technology has been created that can translate a variety of signs, Hindi, and other languages, into text and audio formats.

It's possible that those communicating with dumb individuals won't understand their gestures and facial expressions. A deaf-mute individual can communicate through words without the use of acoustic sounds. The goal of this effort is to develop a language recognition system that will bridge the communication gap between those with normal speech and those who have speech difficulties. The hand gesture is important because it conveys the user's thoughts more quickly than other motions (arm, face, head, and body). The current project creates a Text-to-Speech module, the English alphabet, a few words, and flex sensor-based gesture detection.As a result, a method has been developed and modified to pay attention to gesture-based communication. They will find it quite helpful in communicating their ideas to others.

### 2.3Implementation Of IOT-Based Smart Assistance Gloves For Disabled People

R. Senthil Kumar, P. Leninpugalhanthi, S. Rathika

It might be challenging to communicate with those who have vocal and hearing issues and regular people. Communication is hampered by the fact that most people cannot understand the sign language these individuals use. Paralyzed people also frequently need assistance. We have suggested the use of IOT-based smart support gloves for the disabled for these individuals.

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Comparing our design to the current system, the gloves we created are incredibly straightforward yet effective. The finger gesture is recognized by flex sensors, and the accompanying instructions are then displayed via the Android app with voice output.

The wireless serial port module is used in the proposed system's implementation between the Arduino uno and Raspberry Pi due to its safe data transmission. When there is an emergency, the GSM module will send an alert message.

## 3. Proposed System

Humans who are partially paralyzed or visually impaired can use a system that uses Google help and flex sensors to operate their household appliances. A microcontroller, flex sensor, and LCD display make up the system. Several hand movements are detected by the sensor in this system, and the appropriate signal is supplied to the Arduino Uno microcontroller. The home appliances are controlled by an Arduino.

**Technique Used:** IOT and IFTTT SEVER FOR Google Assistance and Flex Sensor for Smart Gloves.

### 3.1 Internet of Things (IoT):

All the items, entities, and sensors can be connected in order to communicate data gathered from multiple locations, process that data for use in medical applications, industrial security measures, etc., and coordinate applications like traffic signalling. According to industry experts, the Internet of Things (IoT) is predicted to connect 50 billion objects by the year 2020. For complete machine-to-machine communication, the Internet of Things offers a range of device connections with various protocols and application characteristics.

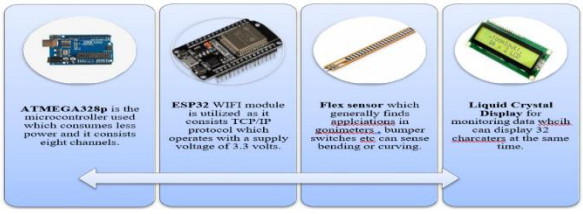


**Fig.3Components presented in proposed system**

Through the advent of IoT, established technologies like wireless sensor networks, control systems, and home automation will become more intelligent and efficient.IoT has many application areassuch is wireless information transmission and patient health monitoring applications in medicine. In the current state of development, wearables are also IoT-based. Wearable technology includes things like navigational pills and smart wristbands. In order to update health information or operate the gadget using a smartphone, all of these techniques need an internet interface. IoT also plays an important role in advertising communication applications and information exchange around the world. IoT is also needed for manufacturing operations to manage the supply chain, and digital control systems are needed to monitor the production process. Fig 3 represents the list of components present in the proposed system.

### 3.2System Architecture

Flex sensors and load output devices can be connected to the microcontroller in the intended system, which uses ESP32 and ATMEGA328p as the primary controllers for the complete

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proposed system. A microcontroller can control the sensors to gather data from them and process analyses using the sensor data.

### 3.2.1 ATMEGA328p

**Fig.3.1 Arduino Uno**

Using a microcontroller is a good option for the system and Arduino is implemented in current work. Since our system is a low-power consumable solution, the microcontroller should consume less energy. Arduino has eight channels. One of the key benefits of microcontrollers is that analogue sensors attached to them may be converted to digital using analogue to digital converters. There are a lot of features on the chip.

### 3.2.2 ESP32 Module:

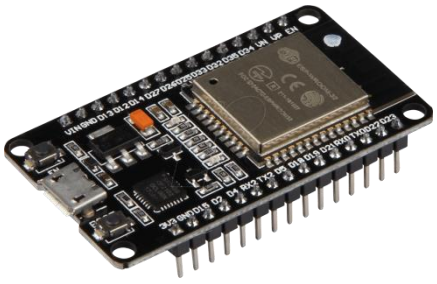

**Fig.3.2 ESP32**

The ESP32 WIFI module was utilized in this instance because it includes a TCP/IP protocol stack on the chip, enabling any microcontroller to connect to a Wi-Fi network. As ESP32 is a pre-programmed SOC, all microcontrollers must use the UART interface to connect with it. The module is configured using AT instructions, and in order to setup the module in client mode, microcontroller must be programmed to transmit the AT commands in proper order.It operates with a supply voltage of 3.3 volts. Both client and server modes can be applied to the ESP32

### 3.2.3 Sensors

**Fig.3.3 Flex sensor**

A bend resistance sensor, sometimes known as a flex sensor, is a simple, inexpensive sensor made specifically to monitor bending or curving.It became a popular Nintendo Power Glove in the gaming interface in the 90s. Since then, people have been using different applications like goniometers, door movement sensors, bumper switches for surface wall detection, or pressure sensors on robotic grippers to control motors.

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### 3.2.4 LCDs


**Fig.3.4 LCD Display**

The LCD (***Liquid Crystal Display***) is used for monitoring current process and sensor data. We use an I2C based 16x2 model display it displays 32 characters at the same time. I2C is synchronous communication and the massage-based protocol it requires 2 wire Serial data and a Serial clock.in our project, the LCD displays How many loads are activated and sensor status, and google assistant commands.

## 4. Software Implementation

The software implementation is key to this glove and Google assistance system's ability to monitor and manage data from IoT and IFTTT servers. Here there are two software used mainly, The ATMEGA and ESP32 microcontrollers are supported by the ARDUINO integrated development environment, which also offers a complete programming structure for the microcontrollers.The device implementation's whole programming component can be carried out in the C programming language. Then, we must instruct the ESP32 to establish a WiFi connection by issuing a few AT commands, such as AT and AT+JAP.The initialization process includes verifying communication with the ESP32 to find a WiFi network nearby and connecting the WiFi module to that network by authenticating with the required authorization. After first procedure is finished, we must program the ESP32 module to set it up as a TCP/IP client.

When configuring ESP32, verifying that the ESP32 module is configured correctly is important. After ESP32, we need to create the adafruit IOT account to the adafruit server to control the Load and also need the IFTTT server to interface with the google assistant to command the load turning on and off programmatically to connect. All registers, including clock Time-frequency, ADC resolution, and data, must be set up on the ADC (Analogue to Digital Converter) device. The controller will then continuously receive data from the flex sensor after that. Now the main task has come in the discussion: plot the sensor data in graphical form and controlled the load with respect to the sensor value.

## 5. Experimental Results

Fig.5.1 Sensors Glove


Fig.5.2 Supply ON

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Fig.5.3 GLOVE and Google Assistant-Controlled Home Automation

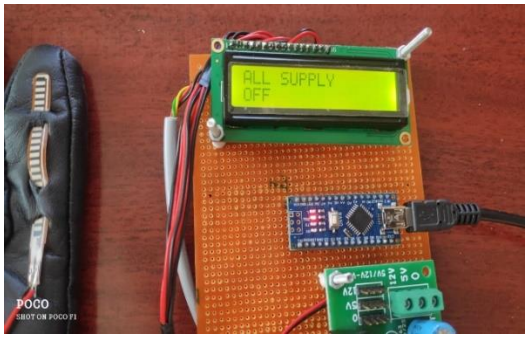


Fig.5.4 All Supply OFF


Fig 5.5 Depics the Conversion of Sign into Control of Appliances

## 6. Conclusion

The proposed approach is mainly designed for people who have physical problems and are not able to relocate from their current position. It offers work for them. The physically challenged people turning on and turning off the home appliance is a very difficult task for them to control from idle stage. It enables people to operate their household appliances independently and manually switch between turning them on and off using a relay configuration. From this proposed method, The relay arrangement needed to control the home appliance connects Glove and Esp32 to Arduino. The benefit of a system using our suggested methodology will be a cost-effective product, less complicated circuitry and installation, and environmental friendliness. The user requires low level skill for operating the Proposed Setup. The user will be able to easily and completely control any appliance by simply swiping the sensor finger, entering a value into the controller, and using Google Assistant to send a command to the ESP32 to turn on or off Turing.

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