IMPLEMENTATION OF IoT BASED SMART ASSISTANCE GLOVE FOR DISABLED PEOPLE

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Abstract - This project represents the entire design of a smart glove for disabled people to smoothen their communication. As the communication between normal people and disabled people becomes difficult, this IoT based smart glove makes the process simple. The communication barrier created by the sign language is solved by this project. The main idea of this system is to convert the language used by the disabled people to text commands with voice output. For such people, we have proposed the implementation of IoT based smart assistance glove. The glove is attached with flex sensors whose deflection shows the prestored command in the android application with voice output. The brain of the system is Arduino Nano microcontroller and ESP8266. The communication between the modules are done by the wireless serial port. Also, during emergency situations, alert messages can be sent.

*Key Words***:** Arduino Nano, ESP8266, wireless serial port

1. INTRODUCTION

There are lot of people in our society who are having disabilities to speak, hear, see etc. It is found hard for them to communicate with normal people or express their feelings and emotions. Thus, the proposed system helps people with any sort of disabilities to communicate what he/she wants without anyone's help. We have designed this system for an accurate, efficient and faster way for communication. The fair mode of the system converts the movements of the fingers to various commands which the person wants to convey to others. The Arduino Nano microcontroller detects the change in resistance values due to the finger gestures. By this way, those commands which are already saved in the database get displayed in the android application with voice output. ESP8266 microcontroller acts as the wi-fi module. Also, an alert message will be sent to a respective person during emergency situations. This is done by the GSM module in the system.
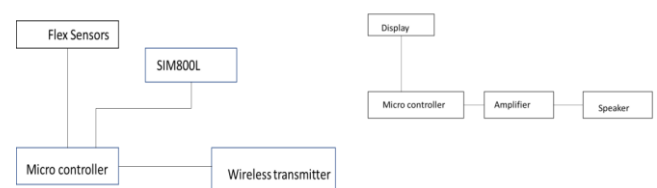
2. PROPOSED SYSTEM

Figure 1: Transmitter and hand control architecture

Figure 2: Receiver and output module architecture

As there occurs a communication barrier between disabled people and others, a solution needs to be introduced. Thus, we have implemented a system, smart assistance glove for them. It is easy to wear and just very simple and effective. The glove consists of five flex sensors which detect the finger movements and deflections. Arduino nano microcontroller we used here is the heart of the system. It functions in every part of the

system. Here we use a wi-fi module ESP8266 which connects every modules in the system altogether with wi-fi network. Communication between normal people and people with vocal and hearing troubles is a difficult task. The sign language used by these people is not understandable by the common people, so it creates a communication barrier. People who are paralyzed also require assistance regularly. For such people we have proposed Implementation of IoT based smart assistance gloves for disabled people. The gloves we designed is very simple yet effective when compared to the existing system. With the help of flex sensors, the finger gesture is detected and the   corresponding instructions are displayed in the android app with audio output.

2.1 SENSORS AND COMPONENTS USED

2.1.1 ARDUINO NANO

Arduino may be a single-board microcontroller meant to form the appliance more accessible which are interactive objects and its surroundings. The hardware features an open-source hardware board designed around an 8-bit Atmel AVR microcontroller or a 32-bit Atmel ARM.

2.1.2 ESP8266

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much Wi-Fi ability as a Wi-Fi Shield offers.

2.1.3 FLEX SENSOR

Flex sensors generally detect the amount of bending and deflection. As the bending increases, the resistance also increases. Based on the surface linearity, the flex sensor resistance also increases. A flex sensor is a two terminal device; it is not polarized and it does not have positive and negative terminals. It has two pins namely P1 and P2 where p1 is usually connected to the positive of the power source end P2 is connected to the ground.

2.1.4 GSM MODULE

A GPRS or a GSM module is generally used as a communication between a microcontroller and GSM network as shown in fig 5. The SIM900A is a GSM / GPRS module which is generally used in mobile phones. This module is generally used for developing IoT based projects and also embedded applications. GSM module is a dual band engine. It operates on different frequencies like 850MHz,1900MHz, 900MHz and 1800 MHz.

2.1.5 METHODOLOGY

As there is no significant development for disabled people, we have designed the smart assistance gloves for them.

The proposed model is designed with the help of flex sensors and the instructions are fed into the Arduino Nano board. The finger gesture is captured by the flex sensor and a corresponding output is displayed in the form of a sentence in the Android app and output is also displayed as an audio output.

The overall process is carried out by Arduino Nano, ESP 8266 and GSM module. The Data transmission between the Arduino Nano and ESP 8266 is done with the help of a wireless serial port module. An alert message will be sent through the GSM module during emergency situation to the emergency contact.

3. CONCLUSION

The main outline for the project is to be able to ensure an easy communication way for disabled people to communicate with normal people. IOT or Internet of Things is an upcoming technology that will allow us to do this controlling hardware devices over the Internet. Here we suggest to use IOT in smart assistance gloves designed for the disabled people. The finger gestures shown is converted to textual commands with voice output, which makes others understand. The system uses Arduino Nano microcontroller as its brain. ESP8266 is the wi-fi module used to transmit data. The mobile application is featured with the display of the command and it is said in voice too. This makes the proposed system simple and effective.

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