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ABSTRACT

Smart Glove for Translating Arabic Sign Language.

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Abstract: Deaf and mute people who use sign language are often isolated and forced to live in a limited world, as they face serious communication problems. This project uses small components to build a communication device to support the communication between deaf and mute people with people who do not understand their language, thus fostering their independence. The proposed system includes a smart glove that translates the Arabic sign alphabets, which is the representation of the letters of a writing system, and sometimes numeral systems, using only the hands. These manual alphabets (also known as finger alphabets or hand alphabets) have often been used in deaf education. The smart glove that translates the Arabic Sign Language (ARSL) alphabet was successfully enabled deaf and mute users to translate the signals they make with their hands and fingers into Arabic letters that are transmitted via Bluetooth to the mobile device to appear on the mobile screen. The glove also enabled the user to communicate with people who have no idea about ARSL.

Background:

- Arabic Sign Language (ARSL)

Arabic Sign Language is a natural language that serves as the predominant sign language of Deaf communities in the Arab World. Many efforts have been made to establish the sign language used in individual countries, including Jordan, Egypt, Libya and the Gulf States, by
trying to standardize the language and spread it among members of the Deaf community and other concerned.

ARSLs are still in their developmental stages, only in recent years has there been an awareness

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of the existence of communities consisting of individuals with disabilities; the Deaf are not an exception. Arab Deaf communities are almost closed ones. Interaction between a Deaf community and a hearing one is minimal and is basically concentrated around families with deaf members, relatives of the deaf.

- Literature Review

There are several types of translating sign language to readable text systems. These types appear with many features, but nearly with the same task. In the next sections, a discussion about translating sign language to a readable text system that exists and the scientific topic of some sign language applications is presented. In addition, we make a comparison between all of them.

Objectives:

We aim in our project to achieve several objectives:

1. Create a technology that helps deaf communicate with un-deaf people by translating sign language into readable text. Through the invention of the smart glove that senses the hand and fingers movement of the deaf person.
2. Eliminate the barrier between deaf people who use sign language and those who do not understand it, through the translation of the sign language, used by the deaf people, to Arabic language and display it on the screen.
3. Make this project the first step to create a robot that can be used to teach people sign language. We can make this technology part of the special robot by using an intelligent technological system.

Methods:

The system consists of two parts. The first part is the sensor system which consists of the flex sensors, accelerometer and pushbuttons. Because the output of the flex sensors and accelerometer is an analog value, we convert it into digital signals. The second part consists of smart phone and Bluetooth module. These two parts are connected to Arduino.

The smart glove converts the Arabic sign language into letters in Arabic language. Therefore, we designed it as follows: nine of flex sensors will be put on the glove, nine sensors on finger joints and two pushbuttons, as shown in figure 2. This system is based on wearing the deaf

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the glove in his right hand and then makes an Arabic sign language signal.

The system consists of a number of flex sensors and pushbuttons which give a certain value reading that reflects the states of whole hand and each finger, In addition we put accelerometer to distinction between similar lettering in the movement of the fingers but different in the direction of the hand. Then these readings are compared with the readings that are stored according to the 28 signals of the Arabic Sign Language. Based on this. The system will take the correct signal and send it as a readable text through Bluetooth to the mobile android application and displayed it on the screen.

:Results

By the end of the implementation process, the smart glove was constructed. (Figure 3 a) shows the back side of the glove, on which the flex sensors are fixed. The pushbuttons and lithium battery are fixed on the inner part (Figure 3 b).

Conclusions:

In this project, we constructed a smart glove for supporting deaf people in communicating with normal people who don't know Arabic sign language. The smart glove which is able to connect to Android mobile and make facilitates sending character. Whereas the android application is able to receive text message from smart glove and the smart glove the smart glove able to send Arabic character to the application. The smart glove is light and easy to use and no risk. At the end of the project we believe that the project is an effective and very useful for deaf people to communicate with other, and it is very useful for deaf and dump people if they are taught Arabic sign language where they can communicate with their families and people around them.

Ultimately, with this project, we aim to develop it to support sending a full sentence instead of a single letter. Mainly the system should be extended to support languages more than Arabic, and the system can use several ways to communicate, if can use Wi-Fi connection, which enables a faster connection and better range from the base station or Global System for Mobile communication (GSM module) that is the most widespread and it's a cellular technology used for transmitting mobile data services, the most obvious advantage of it is widespread use throughout the world.

Key words: Deaf and mute people, sign language, Arabic, smart glove, ARSL, hand and fingers, translates.

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