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Development of Sensi Glove for Creating Sensory Perception

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ABSTRACT: About 3 million people in the world live with limb loss. While prosthetic arm technologies for more advanced motor control are quite numerous, there is a significant lack of a low-cost method of replacing sensory feedback. Prosthetic arms that do include some sort of sensory feedback are often extremely expensive (as high as \$100, 000), and are not accessible to the vast majority of the population. This Sensi Glove, enables people with prosthetic arms to feel touch again through haptic feedback. The characteristics of our device design are, it will be Compatible with virtually any prosthetic arm on the market, low cost and low power consumption. Fortunately, we have developed a prototype that presence a pretty nice solution to this issue. Our device, Sensi Glove, enables people with prosthetic arms to feel touch again through haptic feedback.

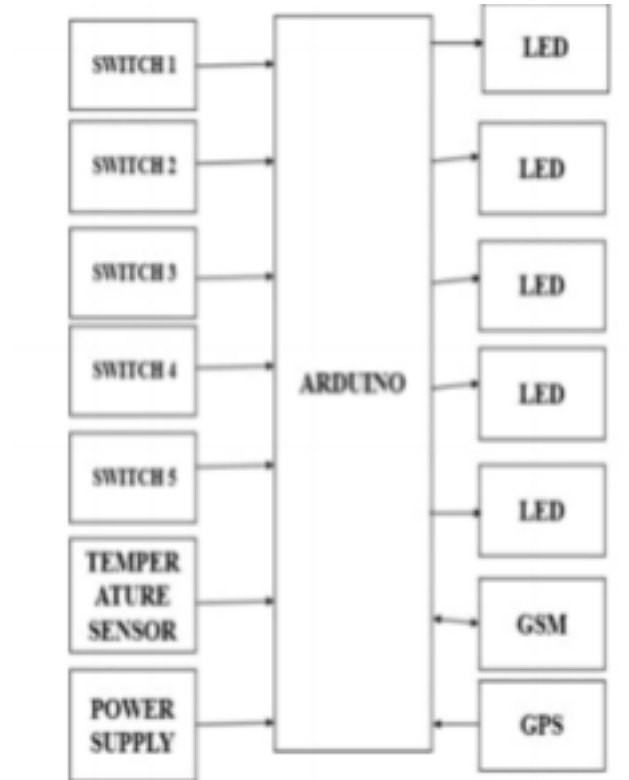
I. INTRODUCTION

The sensing Glove with embedded sensing elements throughout the palm and fingers, allowing for natural and accurate testing of pressures applied to and exerted by the hand. Nearly any hand operation can be measured accurately through 65 individual sensing elements within the glove. Wireless and battery powered, this sensing allows for full range of motion and creates an organic testing environment. High resolution pressure sensing and mapping enable you to research and develop human movements, comfort, and ergonomics through visual feedback of hand Interactions. In proposed system we use capacitive switch, led, temperature sensor, GSM. to send a message and GPS to send latitude and longitude readings to specified mobile number In this method hand and finger movements with sensors using the sensing gloves developed for the study were analyzed and attempted to measure the locations. when the finger touches any object that led will glow and if there is any temperature beyond the limit the latitude and longitude.

II. PROPOSED SYSTEM

In the proposed system, hand and finger movements with sensors using the sensing gloves is developed for the study, were analyzed and attempted to measure the locations. when the finger touches any object, the led will glow and if there is any temperature beyond the limit, it alerts the user to remove the hand from that place and if the glove is left somewhere, the latitude and longitude readings of that place will be sent through a message using GPS module.

BLOCK DIAGRAM :



HARDWARE DETAILS :

ARDUINO UNO: The Arduino UNO is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button and it contains everything that is needed for a microcontroller.

Figure 1 : Arduino Uno -



SOFTWARE DETAILS:

- Arduino IDE is an opensource software that is mainly used for writing and compiling the code into the Arduino Module.

- Arduino IDE where IDE stands for Integrated Development Environment – An official software introduced by Arduino.cc, that is mainly used for writing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go.

- **Working principle,Algorithm and Explanation :**

- The working principle is:

- There are five buttons attached to the five fingers which are used to make the user aware of which finger is touched/pressed and these buttons are connected to five LEDs to make him know.

- A temperature sensor is placed on the glove to restrict the user when the arm is placed in high temperatures and alert him through a buzzer.

- Incase of situations like this, an alert message will be sent to the user's relative/friend through GSM and sends them his location to their mobile number stating that

the user is in risk.

- The algorithm includes the following steps:

- Using Arduino UNO, we connect five buttons which are on the tips of each finger to five LEDs and when a button is pressed, the LED will blink for 1 second (1000ms).

- In the second step, we connect the temperature sensor to the buzzer and it alerts the user if he/she places the arm in a high temperature areas (like if the temperature is more than 100 degree celsius).

- If the user is constantly placing it in those type of areas, an alert will be sent to the user's relative/friend about his location through GPS and GSM.

III. RESULTS

Figure 8 - Final Model of SensiGlove -

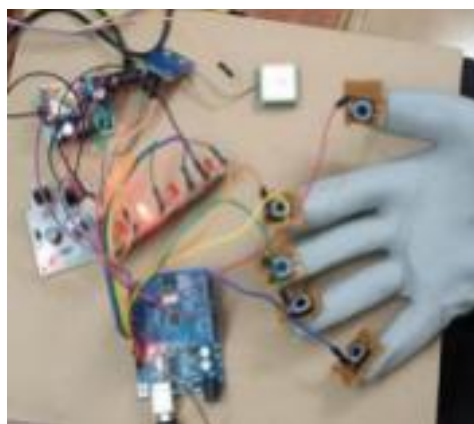


Figure 9 - Thumb finger LED blinks If thumb is touched -



Figure 10 - Temperature sensor giving alert -

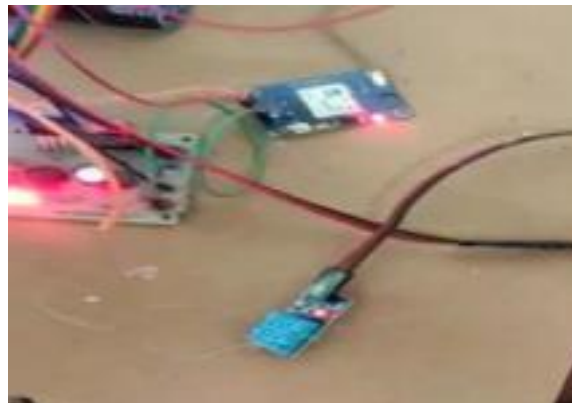


Figure 11 - GSM is used to the user's friend -



Figure 12 – Alert message -



IV. CONCLUSION

In this project we implemented that for handicapped people with the help of temperature sensor if any obstacle touches the finger they can easily sense which type of finger is touched with the help of led. It will glow when finger touches the object.

V. FUTURE SCOPE

If the glove is designed and implemented in the above discussed manner, then it would be helpful to the people who are using prosthetic arms and to those who couldn't afford a highly expensive sensory prosthetic arms.

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