# Smart Gloves for Surgical Strike

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***Abstract* - The method which involves the conversion of those hand signals into respective voice signals that can be transmitted via wireless modules. The 'Hand Talk' glove is a normal cloth driving glove fitted with electrode sensors. The sensors output a stream of data that varies with degree of bend made by the fingers. Electrode sensors are sensors that change in resistance depending on the amount of bend on the sensor. They convert the change in bend to electrical resistance - the more the bend, the more the resistance value. The output from the sensor is converted to digital and processed by using arduino and then it responds in the voice using speaker. In this project we have used microcontroller, Wi-Fi module and voice kit to produce the voice signal.The importance of embedded systems is growing continuously. Exponentially increasing computing power (Moore's law) connectivity and convergence of technology have resulted in hardware/software systems being embedded within everyday products and places. Already 90% of computing devices are in embedded systems and not in PC's. The growth rate of Embedded System is more than 10% per annum and it is forecasted there will be over 40 billion devices worldwide by 2020.The value added to the final product by embedded software is often orders of magnitude higher than the cost of the embedded devices themselves.The aim of this project is to develop smart gloves which are useful for our defence forces in the borders and in the surgical strikes**

***Keywords* - *Gloves, Zigbee, Voice kit, sensors, vibrator, accelerometer.***

## I. INTRODUCTION

Gesture recognition has emerged as a very important and effective way for interaction between human and machine. Nowadays gesture recognition system are becoming very popular, so many projects are developing in this field. In Army, there is difficulty in communicating with others while doing search operation and combing. Even though they use tactical hand symbols it is not received by others due to low visibility of light during night. Due to formation of mist, It's not possible to use speak signal with loudness, since it will helps to the attackers or intruders. Since, the signal transmitted can be hijacked also so it's not safer side for communication. Hence they use tactical signals. In order to overcome the disadvantages of this in critical areas we can use this method for real time communication. This method which involves the conversion of those hand signals into respective voice signals that can be transmitted via wireless modules. The 'Smart glove' is a normal cloth driving glove fitted with sensors. Smart glove is very useful in many ways. We can use this device to communicate with control station in noisy environment. In order to overcome the disadvantage of this in a critical we can use this method for real time communication. Using voice recognition to control the Internet of Things is quite popular nowadays. There are still many features need to be improved. One of the biggest drawback is the accuracy might be low when the voice recognition system is not familiar with the user's accent. The main objective of this proposed system is to make real time communication war fields. This method which involves the conversion of those hand signals into respective voice signals that can be transmitted via wireless modules. To maintain the soldiers health conditions during the war.

## II. PROBLEM STATEMENT

Most of the Surgical Strikes are carried out during night time. so we cannot see the hand signals from the commander in the war field. It is difficult to communicate via Walkie Talkie because of its sound it can alert the intruders or enemies. It is difficult to find the soldiers health conditions during the war. The Existing systems are walkie talkie.nowadays mostly using this system. Their is a disadvantages in using this system most of times voices cannot transfered to the receipient due to the disturbances. Tactical hand symbols are using .most of the time it is not received by others due to low visibility of light during night. Using of speak signal with loudness, since it will helps to others attackers or intruders.

## III. OBJECTIVES

The main objective of this project is in order to overcome the problems in noisy environmental critical conditions, gesture controlled commands are very usefull so we are are planned to make a wearable handgloves for communicating with soldiers. To monitor the Soldiers health conditions in the war field. To use this smart gloves to include the IOT. We use different sensors to measure the heart beat rate and body temperature. We will upload the measured health conditions to cloud through the IOT. To keep the records on soldiers health management.

## IV. METHODOLOGY

The Smart glove is fixed with copper electrode sensors and accelerometer. These sensors will record the different values for different hand gestures. Accelerometer analyses position of hand with respect to three dimensional axes. The sensors output a stream of data that varies with degree of bend made by the fingers. Copper electrode sensors are the sensors that change in resistance depending on the amount of bend on the sensor. Electrode sensors convert the change in bend to electrical resistance - the more bend, the more resistance value. Sensor values transferred to Arduino UNO. Arduino is the brain of the transmitter. The output from the sensor is converted to digital values in the Arduino UNO and is transmitted on wireless channel through zigbee. Zigbee used as the trans receiver we can use this on both sides. At the receiver, these values are compared with pre-defined data, which are stored in memory of Arduino Mega. Depending on compared value it generates voice signal for respective input gesture. The vibrator indicates the incoming messages. LCD Displays the corresponding voice message into text. APR 33A3 produces the audio respective of input hand gesture. wi-fi module used to connect the device to the IOT. Health parameters like body temperature and heart beat rate will be stored in the cloud using IOT. The data will be stored in the www.thingspeak.com.

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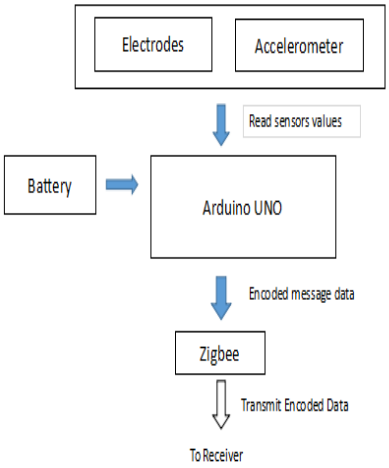
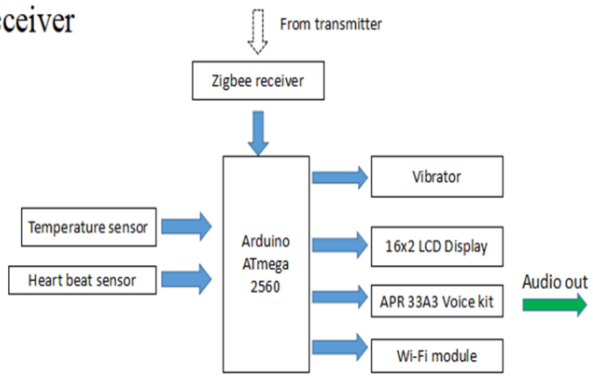
Figure.1: Hand signals.

It is used to provide Secure communication between the soldiers. we can use this device to communicate with control stations in noisy environment. To provide easy and efficient way of communication during night in the war field. It is used to monitor the soldiers body temperature and heart beat rate. We can use this device to keep record on soldiers health. We can use this devices For exchanging critical information during rescue operation.

- Transmitter




• Receiver



A. ATmega2560

The Arduino Mega 2560 is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins, 16 analog inputs, 4 UARTs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The ATmega2560 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the 2560 achieves throughputs approaching 1 MIPS per MHz allowing the system designed to optimize power consumption versus processing speed. The device is manufactured using the Atmega high-density non-volatile memory technology. The On-chip ISP Flash allows the program memory to be reprogrammed in-system through an SPI serial interface, by a conventional non-volatile memory programmer, or by an On-chip Boot program running on the AVR core. The boot program can use any interface to download the application program in the application Flash memory. Software in the Boot Flash section will continue to run while the Application Flash section is updated, providing true Read-While-Write operation. The five different addressing modes for the data memory cover: Direct, Indirect with Displacement, Indirect, Indirect with Pre-decrement, and Indirect with Post-increment. In the Register file, registers R26 to R31 feature the indirect addressing pointer registers.

B. ARDUINO UNO

The Arduino Uno is a microcontroller board based on the ATmega328. 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. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. The Arduino Uno can be powered via the USB connection or with an external power supply. The power source is selected automatically. External (non-USB) power can come either from an AC to DC adapter (wall-wart) or battery.

C. Tempearture sensor

A temperature sensor is an electronic device that measures temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes. There are many different types of temperature sensor. Some temperature sensors require direct contact with the physical object that is being monitored, while others indirectly the temperature of an object.

D. Heart beat sensor

Heart beat sensor is designed to give digital output of heat beat when a finger is placed on it. When the heart beat detector is working, the beat LED flashes in unison with each heart beat. This digital output can be connected to microcontroller directly to measure the Beats Per Minute (BPM) rate. It works on the principle of light modulation by blood flow through finger at each pulse.

Application:

- Digital Heart Rate monitor.
- Patient Monitoring System.
- Bio-Feedback control of robotics and applications.

E. ADXL335 Accelerometer

An accelerometer is a sensing element that measures acceleration; acceleration is the rate of change of velocity with respect to time. Accelerometers are used to sense both static (e.g. gravity) and dynamic (e.g. sudden starts/stops) acceleration. One of the more widely used applications for accelerometers is tilt-sensing. Because they are affected by the acceleration of gravity, an accelerometer can tell you how it's oriented with respect to the Earth's surface.

F. APR 33A3 VOICE KIT:

The aPR33A series are powerful audio processor along with high performance audio analog-to-digital converters (ADCs) and digital-to-analog converters (DACs). The aPR33A series are a fully integrated solution offering high performance and unparalleled integration with analog input, digital processing and analog output functionality. The aPR33A series incorporates all the functionality required to perform demanding audio/voice applications. High quality audio/voice systems with lower bill-of-material costs can be implemented with the aPR33A series because of its integrated analog data converters and full suite of quality-enhancing features such as sample-rate convertor.

G. LCD DISPLAY:

A liquid crystal display (LCD) is a flat panel display, electronic visual display, based on Liquid Crystal Technology. A liquid crystal display consists of an array of tiny segments (called pixels) that can be manipulated to present information. Liquid crystals do not emit light directly instead they use light modulating techniques. LCD's are used in a wide range of applications, including computer monitors, television, instrument panels, aircraft cockpit displays, signage, etc.

H. ESP8266-01 Wi-Fi module:

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 . The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.

## I. Zigbee Transmitter And Reciever:

In this present communication world there are numerous high data rate communication standards that are available, but none of these meet the sensors and control devices communication standards. These high-data rate communication standards require low-latency and low-energy consumption even at lower bandwidths. The available proprietary wireless systems Zigbee technology is low-cost and low-power consumption and its excellent and superb characteristics makes this communication best suited for several embedded applications, industrial control, and home automation and so on.

Fig: (a)

Fig: (b)


Fig: (a), (b), (c) Complete Hardware Diagram

## V RESULT

We expect to develop Smart Gloves for Surgical Strikes which are usefull for our Defence Forces in the borders and in the surgical strikes.

Fig: (a)


Fig: (b)

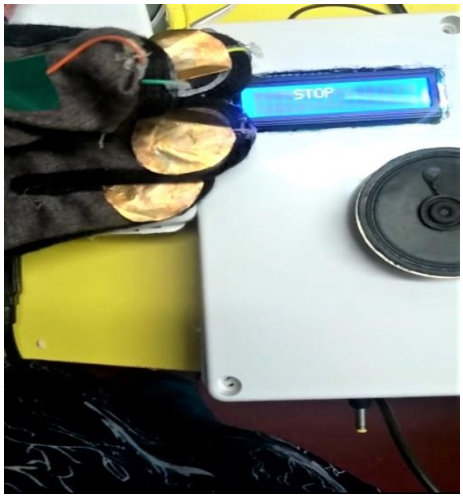



Fig: (c)


Fig: (a),(b),(c),(d) Result display on LCD

## VI FUTURE SCOPE

By using heartbeat sensor and temperature sensor we can monitor the health of the person during operation. By using high précised sensors, we can improve the system. The improved system can be connected with the other devices for different applications. The system can made two way communications. Android application can be done for displaying gesture messages.

## ACKNOWLEDGMENT

In order to overcome the problems in these critical conditions, gesture controlled commands that are encoded can be used which can be decoded at the receiver and converted to voice messages for necessary action during real time communication.

## VII CONCLUSION

Smart glove is very usefull in many ways. We can use this device to communicate with control station in noisy environment. By using this smart gloves to include the IOT. We can use different sensors to measure the heart beat rate and body temperature. We will upload the measured health conditions to cloud through the IOT. To monitor the Soldiers health conditions in the war field. To keep the records on soldiers health management.

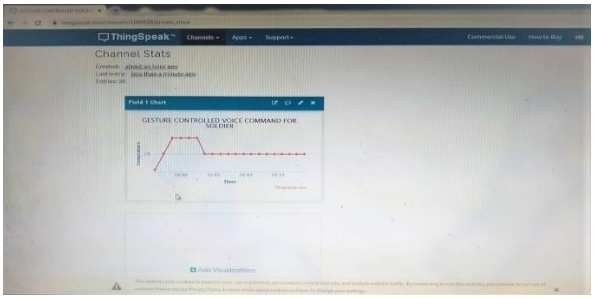



Fig:

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