VISVESVARAYA TECHNOLOGICAL UNIVERSITY
BELAGAVI-590014

Project Report Phase 1

SMART GLOVES WITH HAND GESTURE RECOGNITION AND HEALTH MONITORING FOR THE MILITARY PURPOSE

Submitted by

Karthik G Nayak (1DT18EC040)

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Under the Guidance of

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Department of Electronics and Communication Engineering

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Signature of the Guide **Signature of the Coordinator** **Signature of the HOD**

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I. ABSTRACT

The nation's safety or security is extremely important in the current world situation. It's been observed that the nation's security is primarily dependent on the soldier's unit or army force. In battleground or clandestine operations, troops communication and health monitoring are critical. Technologies such as walkie-talkies or GSM modules were often used methodologies for communication and tracking soldiers' lives on the battlefield in the last few decades. These studies suggest an effective way to use an electronic device that can transform sign language hand gestures into speech to allow effective interaction among soldiers in order to adapt to the current technology. The technology involves turning hand signals into voice signals, which can subsequently be transmitted via wireless modules. The 'Hand Talk' glove is a regular driving glove with electrode sensors built in. The sensors produce a stream of data that varies depending on how much the fingers flex. Electrode sensors are sensors that vary resistance according on how far the sensor is bent. They convert bend change to electrical resistance; the greater the bend, the higher the resistance value. The sensor's output is converted to digital and processed with an Arduino, after which it reacts to voice commands over Bluetooth. It is also necessary for the control station to know the health condition of soldiers along with the location on the battlefield. To track the current situation, the device can be mounted in a hand glove and data can be transferred to the base station with help of IoT (Internet of things). The main motivation in this research is to know how to build effective communication between soldiers along with their health monitoring system.

II. INTRODUCTION

Indian army force is the world's third-largest standing force with 990,960 reserve troops and 1,200,255 active troops. The army suffers a lot due to the unavailability of information of injuries to its personnel and communicating with others while doing search operations and combing. Sometimes they use a specific hand gesture to communicate with each other due to some of the obstacles or low visibility communication breakage takes place neither they can use speak signal with a higher tone which helps the attackers. Hence, they use tactical signals. It is also observed there are many issues regarding the safety of soldiers. Knowledge of the current location of soldiers, the inability of continuous communication with the control room during the operations, lack of immediate medical attention, and operations under different geographical conditions are the few prominent safety issues.

It is observed from the past many years, technologies such as walkie-talkie, Zigbee, cable-based systems were the most used methodologies for communication and tracking of soldiers' life in the Warfield. However, all these technologies suffered from one or more reasons like high installation cost, loss of signal, or due to bulky noise in the atmosphere. Hence it is very necessary to have a tracking system for the protection of the valuable life of soldiers.

In order to reduce all problems in this area, we can use real-time communication with tracking. This method provides us to convert the hand gesture to respective speech signals which are accessed through wireless modules. Here, we are developing a system with a ‘Smart glove’ which consists of sensors. This device helps to bridge the effective communication among the soldiers. The smart glove is developed with gesture recognition. The recorded values from the sensors are converted to digital values. The values are transferred to the receiver with help of a wireless channel when the value is received it is compared with predefined data. Based on the value it generates the voice signal for the specific gesture. Hence, the respective receiver receives the voice message. Pulse rate and body temperature can be monitored along with the location tracking of the soldiers using GPS can be monitored using the proposed system. The transmission of these parameters to the base station is carried out by IoT. The base station gets the specific position of soldier from GPS.

III. LITERATURE SURVEY

In [1]: The method proposed by the system in which the soldiers are tracked and monitored for their well-being using live track applications.

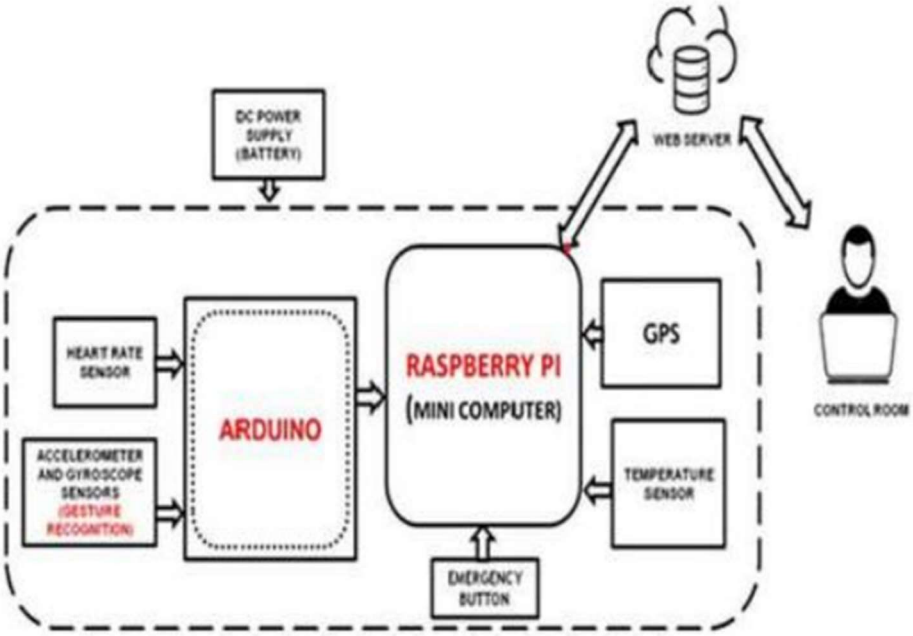

Fig 1: Block diagram of health monitoring system for military applications.

In the above circuit the parameter threshold values are calculated and pre-programmed in atmega328 according to the surroundings. The suggested device is deployed in conjunction with a combat package. The ATmega328P processor is the brain of the device. Heat sensor, cardiac heart rate sensor, GPS receiver, Atmega 328, and Raspberry Pi make up the soldier unit. According to the surroundings and the test person, the desired parameter threshold values are calculated and preprogrammed in the atmega328. Temperature monitors, heart rate monitors, and the soldier's health is constantly monitored. To calculate position and orientation, GPS is employed in real time. The Arduino (ATmega 328P) processor processes and collects sensor and GPS receiver data, which is then forwarded to the Raspberry Pi processor, which displays the status and location of soldiers via the live track application. The system will be notified and the data will be transmitted whenever the threshold value is modified.

In [2]: In this paper it describes the health monitoring and tracking of soldiers and it's responsibility with the GPS to guide the losing direction in the correct direction. Whenever it is necessary the control unit can access the information of the soldier with help of Internet of things (IoT) based on tracking

parameters. The proposed system is divided into two sections i.e., Soldier unit and Control room unit. The below circuit diagram shows the proposed model.

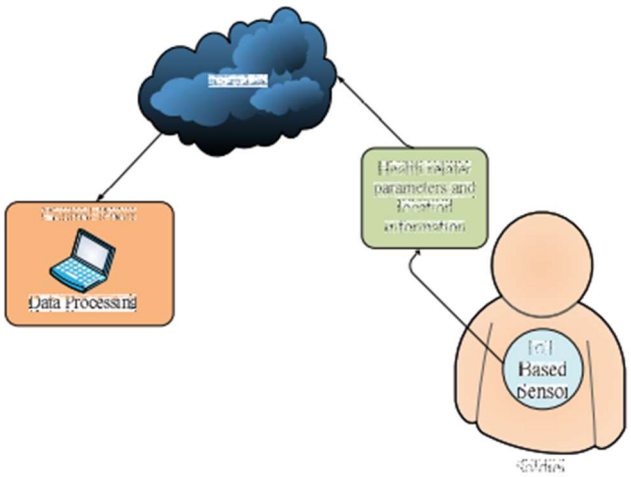

Fig 2: Block Diagram of Soldier Health Monitoring and Tracking System.

The information received is stored in Cloud and can be extracted on the PC of the base station. Based on the information the immediate action is taken with necessary medical aids and back force for the help. The proposed system can monitor pulse, body temperature, and oxygen level in an area, as well as the location tracking of soldiers using GPS. The Internet of Things (IoT) is used to send these parameters to the control room. The position and orientation of the soldier are transmitted to the control room through GPS. Furthermore, soldiers can use GPS to steer them in the right route during operations.

In [3]: There are various ways to detect the sign language such as Data glove approach, Vision-based approach and Virtual button approach. This paper highlights the advantages of sign language using Data glove approach i.e., Flex sensor-based glove that has high level of reliability, consistency, harsh temperature resistance, with stationary surfaces for mounting, an Infinite number of resistance possibilities and with specific value of bend ratios. The each bent in the finger the different values are obtained. The glove is equipped with five flex sensors that detect finger movements, an Inertial Measuring Unit (IMU) that detects movements in 3-D space, and a Bluetooth device that transmits data over a short distance to other Bluetooth connectivity devices. The task at hand is to recognise gestures done by a single hand. Arduino is a microcontroller that serves as the processing unit for all connected devices. The IMU is utilised to recognise the gestures or finger positions in a three-dimensional area after a range of values are collected from the flex sensor when the gestures are

made. The combination of these values represents or identifies a gesture. These, along with the gesture's text format, are communicated to an external device, which produces a voice output of the text. The external device in this case is a smartphone with a Bluetooth TTS app installed for text-to-speech conversion and voice output.

In [4]: The proposed methodology was on sensor-based data acquisition glove with hand gesture recognition. Flex sensors and Force Sensing Resistors (FSRs) are used to detect bending movement in the gloves. Then data will send to the computer by Arduino micro for the further simplification. By using Support Vector Machine (SVM) and the Dynamic Time Wrapping (DTW) based algorithm we can find the average accuracy of the hand gesture recognition for a single subject.

Fig. 3: The data acquisition glove with 3 kinds of sensors

In this project 3 subjects are asked to put on the glove and make 7 gestures 100 times each. The collected data will separate into 100 segments by using the automatic data segmentation method. In Single Subject Hand Gesture Recognition, SVM for each gesture a twenty-eight-dimensional feature vector is fetched from sensor data. In this 80 of group vectors are used for training the model, rest twenty is used for testing. Using DTW based algorithm for each gesture. the first group of data is selected as the template, and rest twenty groups are used as test samples. The average accuracy of the three-subject using SVM and DTW based algorithm are e 96.9% and 94.5% respectively. Here two different method is used for each gesture, will give a different recognition result for the same gesture. For the further verification, in Cross-Subject Hand Gesture Recognition the training data will be maintained by one user and hand gesture recognition is done by another user. Same procedure of single subject hand gesture recognition will be followed here. When doing gestures there will be bending movement on fingers it will result in some deviation in the recognition. So, by this accuracy

value got decreased. The accuracy can be improved by increasing collecting of subjects as well as training of subjects.

In [5]: Individuals that suffer from discourse impedance believe that it is their fault. It's difficult to communicate in a general audience where the vast majority of people don't know what you're talking about. The general public does not understand gesture-based communication. So, in this paper smart gloves used with flex sensors and mem sensor attached to it. This type of model is used to convert Indian sign gesture into understandable voice. Artificial mouth is implemented to overcome from the complexity. Motion sensors are helpful to detect motion. Database stores messages and templates. Also, the speaker and microphone are used as input devices.

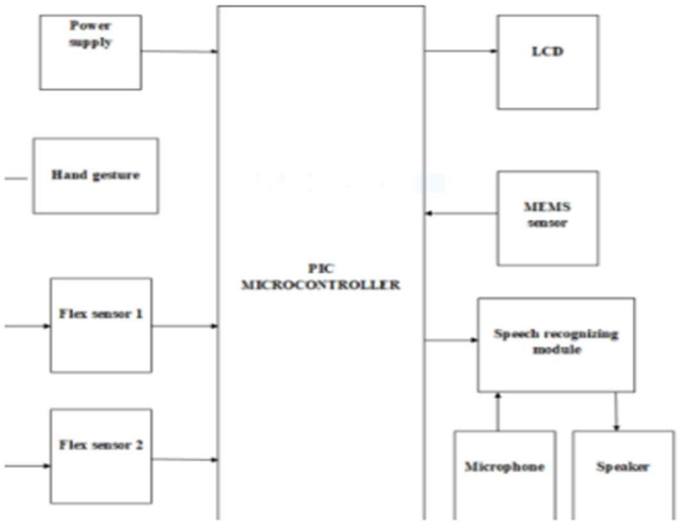

Fig. 4: Block Diagram of Microcontroller connections

In this system gloves with flex and MEM sensors are more flexible and accurate. The microcontroller stores all the data that is send from sensors. Database which stores messages and templates which transfer or store copy of templates in the microcontroller as well. Motion sensors reacts to every action made by the user and it is placed on hand. Motion sensors which will activate only if there is any motion detected. For every action the motion detector gets high and fed to the microcontroller. Now the microcontroller has copy of templates which compared with the fetched motion signals. Microcontroller will match both of this and convert hand gesture into suitable speech signals. After this speech signals transferred to the artificial mouth to retrieve the data and now dumb people can talk with their artificial mouth. The result of the model or message of the model shown on the display also it will be played on speaker as well.

In [6]: Sambhav Jain, Sushanth D, Varsha, Vijetha N Bhat and J V Alamelu suggested the way through which a smart glove can be used to aid the visually impaired. They have designed the glove

using USB (Universal Serial Bus) camera using built-in microphone. Here gloves are used to point out the object which a visually impaired person says to the microphone. Whenever the input of audio is given by the user it is converted to respective text format using “pyttsx3” – speech to text module. Using keyword Extraction technique the name of the object needed by the user is extracted. Which is passed through running DNN (Deep Neural Networks) which processes the real-time video and locates the required object and tags the same. The DNN on the Raspberry Pi processes real-time video and locates and tags the relevant object. After that, the object tracking algorithm takes over to boost the frame rate. The micro-vibrating motors is used to guide the user to move his hand in such a way that the object is brought back to the center of the frame when object is not pointed to centre of the glove. Till the object is pointed to center of the glove micro-vibrating motor keeps vibrating to guide the user forward. The Raspberry Pi is connected to the micro-vibrating motors via transistors. The graphic below shows an interface diagram for one microvibrating motor with the Raspberry Pi. Thereby the required object is fetched by user of smart glove.

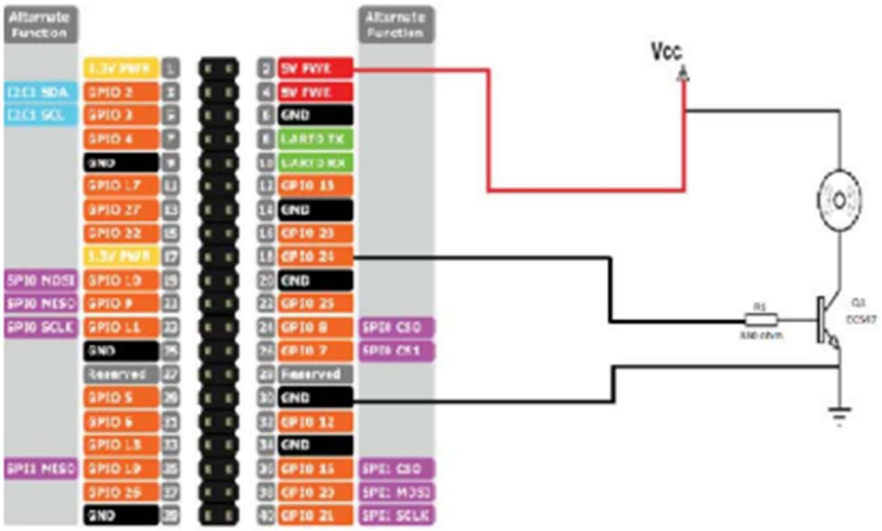

Fig. 5: Interface diagram of Raspberry Pi and micro-vibrating motor (resistor value=330 ohm and transistor EC547)

In [7]: Generally, in this paper smart gloves are named as “Hand Talk”. The movements are detected based on the electrode sensors attached to it. To convert to digital signals Arduino is used. Use of voice kit will produce voice signals. Also, Wi-Fi module is used to take advantage from internet for the model. Whenever it is necessary to compact the integrated circuit with specific operation

microcontroller is used in embedded system. For the computing power embedded system is used because as day by day there is increasing requirement for the embedded software.

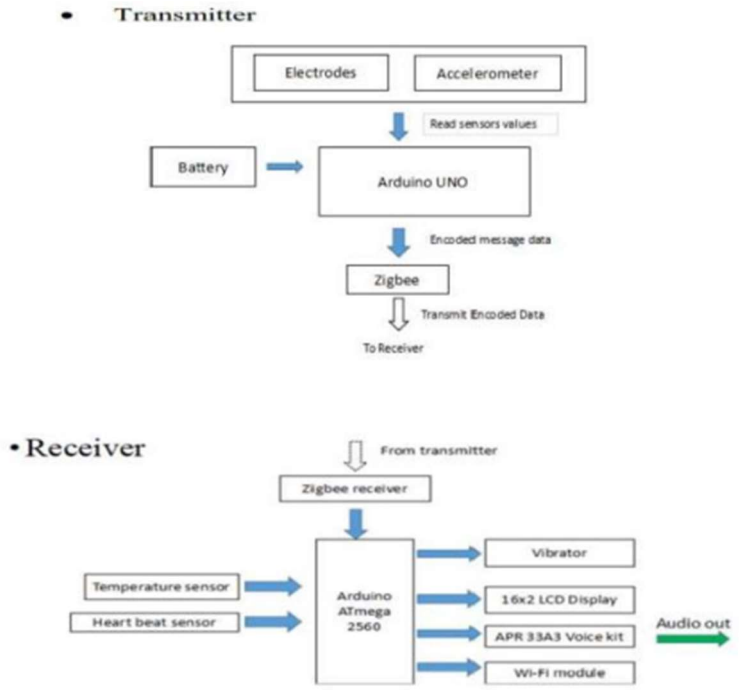

Fig 6: Block diagram of working of smart glove

Smart gloves are attached with the electrodes and accelerometer which will record the values for the different hand gestures did by user. Accelerometer helps to analyse the position of the hand gesture. The copper electrodes or sensors what we used will collect the values and send to the Arduino UNO for the further process. Now the Arduino UNO will help to convert the sensors collected values into digital signals. Zigbee helps to transfer converted digital signals to the Arduino ATmega2560. Now the heart beat sensors and temperature sensors are connected to this for the health monitoring system. Converted Digital signals will compare with the pre-defined data stored in the memory at receiver side. Now by using this the following hand gesture are converted into voice message and send to the nearby devices.

In [8]: Dr. Golda Jeyasheeli P, Miss. Annapoorani K suggests the way how deaf and dumb people can use alphabets in mobile devices through the use of smart glove which converts the gesture to relevant alphabet. Flex sensors are connected to all ten fingers of with different sizes based on the fingers and pressure sensor is implemented to invoke the use of flex sensor which in turn is attached to Arduino mega microcontroller. The proposed methodology has two HC-05 Bluetooth modules.

Predefined data for various movements of flex sensors are recorded which is used to compare the output when gesture is done using all the fingers. Based on both the hand movements and predefined data the output is recorded and sent to mobile device using inbuilt Bluetooth.

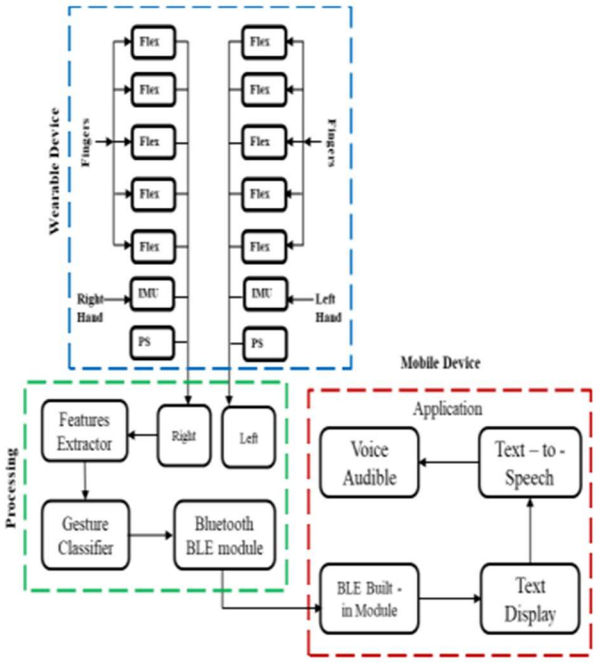

Fig 7: System Design of the Indian Sign Language System that consists of three modules, namely Wearable device, Processing module and finally a Mobile application.

A 3.7V 400mAh lithium polymer battery powers the hardware components. The sensor data obtained from the wearable data glove is used to extract features, which are then used to classify and determine the sign created by the data glove using the Support Vector Machine (SVM). This paper generates a total of 28 signs, including 26 alphabets, one neutral sign, and one invalid sign. The observed indications are converted to a csv file and sent to an Android phone via Bluetooth using the HC-05 Bluetooth low energy module. On the mobile display screen, the received symbol is presented. A text-to-speech capability is also included in the mobile app, which converts the given sentence or word into an audio version.

In [9]: In this methodology it tells how Smart gloves is helpful to the communication for deaf and dumb people. The main intension of a smart glove is to convert hand gesture into sound message. Smart gloves which are attached with the flex sensors. And the microcontroller is used for the further communication. So, in the output side Bluetooth module is used to hear the voice signal.

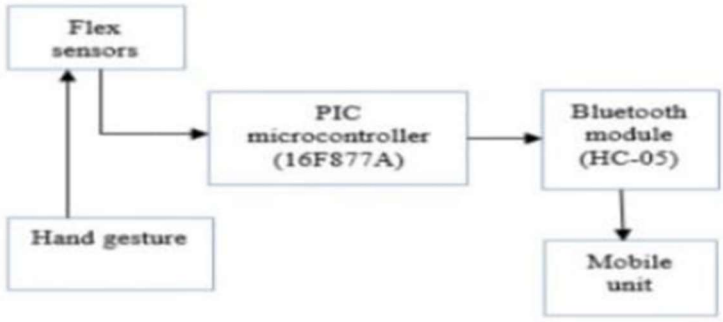

Fig 7: Block diagram explaining the operation

This model is used mainly for the translating hand gesture into suitable voice system so that there will be no any problem for deaf and dumb people during communication. Movement detected in flexes sensors which can rotate in any direction. The signals that are sensed are send to the PIC Microcontroller (16F877A). Microcontroller matches sensed signals with threshold frequency. If the sensed value is above 150 then output state as 1, if it is below then it says as 0. This will be done for all hand gestures. After converting to zeros and ones the microcontroller coded in such a way that it decodes the message from it and sends it to the Bluetooth module. Now module will recognize the message and output it through voice message.

In [10]: As referred to the work of Shahrukh Javed, Ghousia Banu, J Aarthy Suganthi Kani and Ateequeur Rahman they put forward the way of designing gadget put on a hand with sensors fit for assessing hand signals thereby communication via gestures interpretation. This arrangement plans Human Computer Interface (HCI) gadget that can be easily used by any hard of hearing and quiet people with the capacity to easily speak with anybody. Here they made use of flex sensors, Arduino nano, accelerometer/gyroscope sensors, graphic LCD display and a speaker.

The major benefit of the design is that Real time translation approximately happens in no time delay and the system can be developed with wifi connection thereby extending database as a future scope so that special symbols and characters can be made supported and also to provide compatibility for multiple international languages, Microsoft Text to Speech (TTS) engine can be utilized.

IV. PROBLEM STATEMENT

Most of the surgical strikes demands for silent operation, Since the soldiers cannot equip walkie talkie as a medium of communication which can alert their presence to intruders or enemies. Tactical hand symbols are using most of the time it is not received by others due to low visibility of light during night. Lack of communication miss gap leads to the huge destruction. Concerning about the health and to reduce failure of soldiers due to health issue it a difficult task to physically monitor the health status of the soldier during the war. If a soldier moves out of the located range it should be recognised and respective action to be taken which can be a struggle.

V. OBJECTIVES

In order to reduce the impact mentioned in the problem statement the main objective is to overcome the complications during the war fare both in day as well as night. The main intent of the project is to design a wearable smart hand gloves for communicating with soldiers, besides for health monitoring as well. Objectives includes to adopt different sensors and components for enhancing the workability and hence, analysing the health condition of the soldiers. Aim is to track the location of the soldier using cloud and providing the basic health status. Using cloud and IoT to improve the effectiveness of the model which are considered as the growing recent technologies.

VI. PROPOSED METHODOLOGY

For recognition of gesture through finger action of all the fingers needs to be analysed. Hence, Gloves is fixed with flex sensors which records different values for various hand gestures. Sensed values of various bends of flex sensors corresponding to different action and positions of all the fingers transferred to Arduino UNO, which is programmed by Arduino IDE which contains several outputs corresponding bend ratio process the output. These values of output is converted to digital values in UNO and sent via Bluetooth transmitter. Based on different hand gesture pre-defined messages for vocalized version is received at receiver end. Near Bluetooth model receives the digital value of output at receiver end.

Temperature sensor parallelly records the temperature and indication are given when the temperature of glove user is out of defined range. With addition to temperature sensing heart beat sensor is adopted to record heart beat which works on principle of photoplethysmography. Google positioning system locates the coordinates of glove which is based on trilateration mathematical principle there by locating continuously the location of the glove user. At receiver end these values are compared with predefined data which is stored using cloud computing software. Stored Data in cloud can be accessed by military base station reference.

VII. CONCLUSION

As observed the various methods through which gesture is converted to required audio output, the same method can be implemented for the use of military purpose where two soldiers can talk with the use of gesture recognition in noisy environment. Arduino design factors produces a variety of counters and processors functioning the systems with an application factor of Arduino. Where the main descriptive parameter components design is going to be used in the formation of project. Also, in present scenario one of the difficulties faced knows the health condition and exact coordinate location of soldier in battleground. Taking this into consideration our project aims to design a device which provides effective communication by vocalizing audio input, knowing the health status and current position with the help of IoT (Internet of Things), flex sensors, medical sensors and GPS tracker. The application features of the normality i.e., gesture vocalization was the main consideration for the network agenda. The end of the agenda was to be proximate a particular clear subjective model is to be implemented and solve the real time obligation in the action.

VIII. REFERENCES

[1] L. Vijay Anand, Murali Krishna Kotha, Nimmati Satheesh Kannan, Sunil Kumar, M.R. Meera, Rashed Qayoom Shawl, Abhra Pratip Ray, "Design and development of IoT based health monitoring system for military applications," 2020 ELSEVIER pp.1-4, doi.org/10.1016/j.matpr.2020.10.767.

[2] Niket Patil, Brijesh Iyer, " Health Monitoring and Tracking System for Soldiers Using Internet of Things (IoT)" 2017 International Conference on Computing, Communication and Automation, 2017, ISBN:978-1- 5090-6471-7/17.

[3] Bhavana Madabathula, Geethika Dantuluri, Alekhya Sripada, Gompa Haasini, Anusha Vangala " Smart glove for hand gesture recognition " 2019 International Journal of Advance Research, Ideas and Innovations in Technology volume 5, issue 2.

[4] Xianzhi Chu, Jiang Liu, Shigeru Shimamoto, " A Sensor-Based Hand Gesture Recognition System for Japanese Sign Language" 2021 IEEE 3rd Global Conference on Life Sciences and Technologies.

[5] Albert Mayan J 1, Dr. B Bharathi 2, Challapalli Vishal 3, Chidipothu Vishnu Vardhan Subrahmanyam4 " SMART GLOVES FOR HAND GESTURE RECOGNITION USING SIGN LANGUAGE TO SPEECH CONVERSION SYSTEM" 2018 International Journal of Pure and Applied Mathematics.

[6] Sambhav Jain, Sushanth D, Varsha, Vijetha N Bhat and J V Alamelu “Design and Implementation of the Smart Glove to Aid the Visually Impaired” International Conference on Communication and Signal Processing, April 4-6, 2019, India.

[7] Meghana H S, Mohamed Zeeshan Ali, Rasheeda Banu B S, Pradeep M K, Yogeesh G H " Smart Gloves for Surgical Strike" 2020 International Journal of Engineering Research & Technology (IJERT) ISSN: 2278- 0181.

[8] Dr. Golda Jeyasheeli P, Miss. Annapoorani K "IoT Based Sign Language Interpretation System" 2019 International Conference on Physics and Photonics Processes in Nano Sciences Journal of physics: conference series.

[9] Anshula Kumari1, Rutuja Benke1, Yasheseve Bhat1, Amina Qazi2 " Smart Gloves for Hand Gesture Recognition and Translation into Text and Audio" 2019 International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 03 p-ISSN: 2395-0072.

[10] Shahrukh Javed, Ghousia Banu S, J Aarthy Suganthi Kani and Ateequeur Rahman" He Wireless Glove for Hand Gesture Acknowledgment: Sign Language to Discourse Change Framework in Territorial Dialect" 2018 Robotics and Automation Engineering journal Volume 3 Issue 2 DOI: 10.19080/RAEJ.2018.03.555609.

IX. ANNEXURE 1 – SURVEY PAPER

SMART GLOVES WITH HAND GESTURE RECOGNITION AND HEALTH MONITORING FOR THE MILITARY PURPOSE

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Abstract – In the present world situation, the safety or security of the nation is highly important. It is observed that the security for the nation mainly depends on soldier's unit or army force. The communication and health monitoring of the soldiers is a key factor in battleground or secret operations. In the last decades, technologies such as walkie-talkie, GSM modules were predominately used methodologies for communication and tracking of soldiers' lives on the battlefield. To adapt to the latest technology, this research proposes an effective way to use an electronic device that can convert sign language hand gestures into speech to provide effective communication between soldiers. In silent conditions soldiers can use the gloves to perform hand gestures and it will be converted into speech and a Bluetooth device is used to receive the speech message information. It is also necessary for the control station to know the health condition of soldiers along with the location on the battlefield. To track the current situation, the device can be mounted in a hand glove and data can be transferred to the base station with help of IoT (Internet of things). The main motivation in this research is to know how to build effective communication between soldiers along with their health monitoring system.

Keywords – IoT (Internet of Things), Hand gesture, sensors.

I. INTRODUCTION

Indian army force is the world's third-largest standing force with 990,960 reserve troops and 1,200,255 active troops The army suffers a lot due to the unavailability of information of injuries to its personnel and communicating with others while doing search operations and combing. Sometimes they use a specific hand gesture to communicate with each other due to some of the obstacles or low visibility communication breakage takes place neither they can use speak signal with a higher tone which helps the attackers. Hence, they use tactical signals. It is also observed there are many issues regarding the safety of soldiers. Knowledge of the current location of soldiers, the inability of continuous communication with the control room during the operations, lack of immediate medical attention, and operations under different geographical conditions are the few prominent safety issues.

It is observed from the past many years, technologies such as walkie-talkie, Zigbee, cable-based systems were the most used methodologies for communication and tracking of soldiers' life in

the Warfield. However, all these technologies suffered from one or more reasons like high installation cost, loss of signal, or due to bulky noise in the atmosphere. Hence it is very necessary to have a tracking system for the protection of the valuable life of soldiers.

In order to reduce all problems in this area, we can use real-time communication with tracking. This method provides us to convert the hand gesture to respective speech signals which are accessed through wireless modules. Here, we are developing a system with a 'Smart glove' which consists of sensors. This device helps to bridge the effective communication among the soldiers. The smart glove is developed with gesture recognition. The recorded values from the sensors are converted to digital values. The values are transferred to the receiver with help of a wireless channel when the value is received it is compared with predefined data. Based on the value it generates the voice signal for the specific gesture. Hence, the respective receiver receives the voice message. Pulse rate and body temperature can be monitored along with the location tracking of the soldiers using GPS can be monitored using the proposed system. The transmission of these parameters to the base station is carried out by IoT. The base station gets the specific position of soldier from GPS.

II. LITREATURE SURVEY

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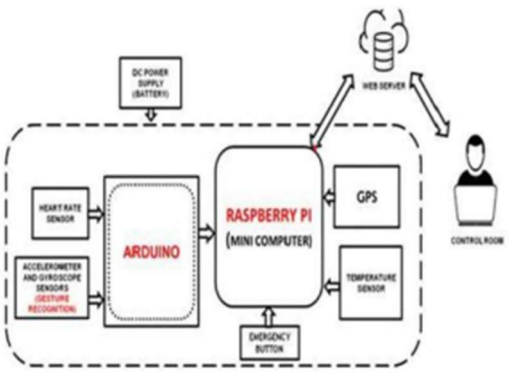

Fig 1: Block diagram of health monitoring system for military applications.

In the above circuit the parameter threshold values are calculated and pre-programmed in atmega328 according to the surroundings. The continuous health monitoring of the soldiers are done such as temperature monitor, heart rate monitor GPS is used to find the real time location of the soldier. The data received from medic sensors and GPS receiver is collected using Arduino and tracked by Raspberry pi. Whenever there is difference in the threshold value, the system is cautioned and data will be transmitted to the base station.

In [2]: In this paper it describes the health monitoring and tracking of soldiers and its responsibility with the GPS to guide the losing direction in the correct direction. Whenever it is necessary the control unit can access the information of the soldier with help of Internet of things (IoT) based on tracking parameters. The proposed system is divided into two sections i.e., Soldier unit and Control room unit. The below circuit diagram shows the proposed model.
The information received is stored in Cloud and can be extracted on the PC of the base station. Based on the information the immediate action is taken with necessary medical aids and back force for the help.

In [3]: There are various ways to detect the sign language such as Data glove approach, Vision-based approach and Virtual button approach. This paper highlights the advantages of sign language using Data glove approach i.e., Flex sensor-based glove that has high level of reliability, consistency, harsh temperature resistance, with stationary surfaces for mounting, an Infinite number of resistance possibilities and with specific value of bend ratios. The each bent in the finger the different values are obtained. The IMU (Inertial Measurement Unit) is used to identify the hand position. When the output of the respective hand gesture is obtained the voice output is given through the mobile application with the help of Bluetooth module.

In [4]: The proposed methodology was on sensor-based data acquisition glove with hand gesture

recognition. Flex sensors and Force Sensing Resistors (FSRs) are used to detect bending movement in the gloves. Then data will send to the computer by Arduino micro for the further simplification. By using Support Vector Machine (SVM) and the Dynamic Time Wrapping (DTW) based algorithm we can find the average accuracy of the hand gesture recognition for a single subject.

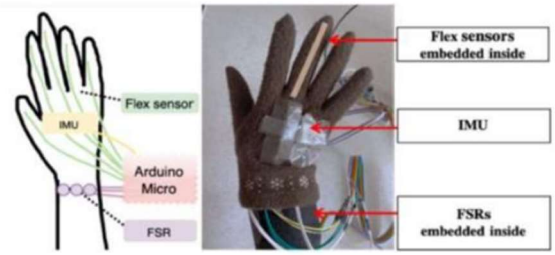

Fig. 3: The data acquisition glove with 3 kinds of sensors

In this project 3 subjects are asked to put on the glove and make 7 gestures 100 times each. The collected data will separate into 100 segments by using the automatic data segmentation method. In Single Subject Hand Gesture Recognition, SVM for each gesture a twenty-eight-dimensional feature vector is fetched from sensor data. In this 80 of group vectors are used for training the model, rest twenty is used for testing. Using DTW based algorithm for each gesture. the first group of data is selected as the template, and rest twenty groups are used as test samples. The average accuracy of the three-subject using SVM and DTW based algorithm are e 96.9% and 94.5% respectively. Here two different method is used for each gesture, will give a different recognition result for the same gesture. For the further verification, in Cross-Subject Hand Gesture Recognition the training data will be maintained by one user and hand gesture recognition is done by another user. Same procedure of single subject hand gesture recognition will be followed here. When doing gestures there will be bending movement on fingers it will result in some deviation in the recognition. So, by this accuracy value got decreased. The accuracy can be improved by increasing collecting of subjects as well as training of subjects.

In [5]: In the reality, even dumb people want to talk like normal people. They don't have proper communication facility available. So, in this paper smart gloves used with flex sensors and mem sensor attached to it. This type of model is used to convert Indian sign gesture into understandable voice. Artificial mouth is implemented to overcome from the complexity. Motion sensors are helpful to detect motion. Database stores messages and templates. Also, the speaker and microphone are used as input devices.

In this system gloves with flex and MEM sensors are more flexible and accurate. The microcontroller stores all the data that is send from sensors. Database which stores messages and templates which transfer or store copy of templates in the microcontroller as well. Motion sensors reacts to every action made by the user and it is placed on hand. Motion sensors which will activate only if there is any motion detected. For every action the motion detector gets high and fed to the microcontroller. Now the microcontroller has copy of templates which compared with the fetched motion signals. Microcontroller will match both of this and convert hand gesture into suitable speech signals. After this speech signals transferred to the artificial mouth to retrieve the data and now dumb people can talk with their artificial mouth. The result of the model or message of the model shown on the display also it will be played on speaker as well.

In [6]: Sambhav Jain, Sushanth D, Varsha, Vijetha N Bhat and J V Alamelu suggested the way through which a smart glove can be used to aid the visually impaired. They have designed the glove using USB (Universal Serial Bus) camera using built-in microphone. Here gloves are used to point out the object which a visually impaired person says to the microphone. Whenever the input of audio is given by the user it is converted to respective text format using "pyttsx3" – speech to text module. Using keyword Extraction technique the name of the object needed by the user is extracted. Which is passed through running DNN (Deep Neural Networks) which processes the real-time video and locates the required object and tags the same. The

micro-vibrating motors is used to guide the user to move his hand in such a way that the object is brought back to the center of the frame when object is not pointed to centre of the glove. Till the object is pointed to center of the glove micro-vibrating motor keeps vibrating to guide the user forward. Thereby the required object is fetched by user of smart glove.

In [7]: Generally, in this paper smart gloves are named as "Hand Talk". The movements are detected based on the electrode sensors attached to it. To convert to digital signals Arduino is used. Use of voice kit will produce voice signals. Also, Wi-Fi module is used to take advantage from internet for the model. Whenever it is necessary to compact the integrated circuit with specific operation microcontroller is used in embedded system. For the computing power embedded system is used because as day by day there is increasing requirement for the embedded software.

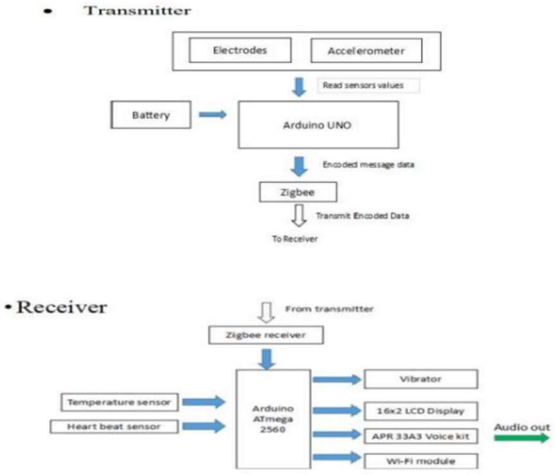

Fig 5: Block diagram of working of smart glove

Smart gloves are attached with the electrodes and accelerometer which will record the values for the different hand gestures did by user. Accelerometer helps to analyse the position of the hand gesture. The copper electrodes or sensors what we used will collect the values and send to the Arduino UNO for the further process. Now the Arduino UNO will help to convert the sensors collected values into digital signals. Zigbee helps to transfer converted digital signals to the Arduino ATmega2560. Now the heart beat sensors and temperature sensors are connected to this for the health monitoring system. Converted Digital signals will compare with the pre-defined data stored in the memory at receiver side. Now by using this the following hand gesture are converted into voice message and send to the nearby devices.

In [8]: Dr. Golda Jeyasheeli P, Miss. Annapoorani K suggests the way how deaf and dumb people can use alphabets in mobile devices through the use of smart glove which converts the gesture to relevant alphabet. Flex sensors are connected to all ten fingers of with different sizes based on the fingers and pressure sensor is implemented to invoke the use of flex sensor which in turn is attached to Arduino mega microcontroller. The proposed methodology has two HC-05 Bluetooth modules. Predefined data for various movements of flex sensors are recorded which is used to compare the output when gesture is done using all the fingers. Based on both the hand movements and predefined data the output is recorded and sent to mobile device using inbuilt Bluetooth.

In [9]: In this methodology it tells how Smart gloves is helpful to the communication for deaf and dumb people. The main intension of a smart glove is to convert hand gesture into sound message. Smart gloves which are attached with the flex sensors. And the microcontroller is used for the further communication. So, in the output side Bluetooth module is used to hear the voice signal.

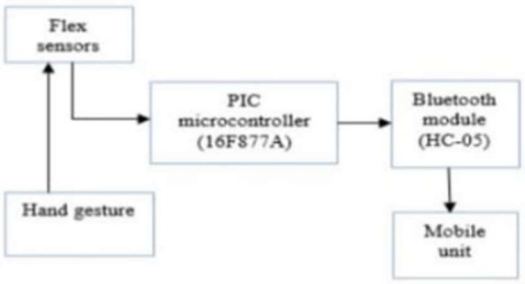

Fig 7: Block diagram explaining the operation

This model is used mainly for the translating hand gesture into suitable voice system so that there will be no any problem for deaf and dumb people during communication. Movement detected in flexes sensors which can rotate in any direction. The signals that are sensed are send to the PIC Microcontroller (16F877A). Microcontroller

matches sensed signals with threshold frequency. If the sensed value is above 150 then output state as 1, if it is below then it says as 0. This will be done for all hand gestures. After converting to zeros and ones the microcontroller coded in such a way that it decodes the message from it and sends it to the Bluetooth module. Now module will recognize the message and output it through voice message.

In [10]: As referred to the work of Shahrukh Javed, Ghousia Banu, J Aarthy Suganthi Kani and Ateequeur Rahman they put forward the way of designing gadget put on a hand with sensors fit for assessing hand signals thereby communication via gestures interpretation. This arrangement plans Human Computer Interface (HCI) gadget that can be easily used by any hard of hearing and quiet people with the capacity to easily speak with anybody. Here they made use of flex sensors, Arduino nano, accelerometer/gyroscope sensors, graphic LCD display and a speaker. The major benefit of the design is that Real time translation approximately happens in no time delay and the system can be developed with wifi connection thereby extending database as a future scope so that special symbols and characters can be made supported and also to provide compatibility for multiple international languages, Microsoft Text to Speech (TTS) engine can be utilized.

III. CONCLUSION

As observed the various methods through which gesture is converted to required audio output, the same method can be implemented for the use of military purpose where two soldiers can talk with the use of gesture recognition in noisy environment. Also, in present scenario one of the difficulties faced knows the health condition and exact coordinate location of soldier in battleground. Taking this into consideration our project aims to design a device which provides effective communication by vocalizing audio input, knowing the health status and current position with the help of IoT (Internet of Things), flex sensors, medical sensors and GPS tracker.

IV. REFEERENCES

[1] L. Vijay Anand, Murali Krishna Kotha, Nimmati Satheesh Kannan, Sunil Kumar, M.R. Meera, Rashed Qayoom Shawl, Abhra Pratip Ray, "Design and development of IoT based health monitoring system for military applications," 2020 ELSEVIER pp.1-4, doi.org/10.1016/j.matpr.2020.10.767.

[2] Niket Patil, Brijesh Iyer, " Health Monitoring and Tracking System for Soldiers Using Internet of Things (IoT)" 2017 International Conference on Computing, Communication and Automation, 2017, ISBN:978-1-5090-6471-7/17.

[3] Bhavana Madabathula, Geethika Dantuluri, Alekhya Sripada, Gompa Haasini, Anusha Vangala " Smart glove for hand gesture recognition " 2019 International Journal of Advance Research, Ideas and Innovations in Technology volume 5, issue 2.

[4] Xianzhi Chu, Jiang Liu, Shigeru Shimamoto, " A Sensor-Based Hand Gesture Recognition System for Japanese Sign Language" 2021 IEEE 3rd Global Conference on Life Sciences and Technologies.

[5] Albert Mayan J 1 ,Dr.B.Bharathi2 ,Challapalli Vishal3 ,Chidipothu Vishnu Vardhan Subrahmanyam4 " SMART GLOVES FOR HAND GESTURE RECOGNITION USING SIGN LANGUAGE TO SPEECH CONVERSION SYSTEM" 2018 International Journal of Pure and Applied Mathematics.

[6] Sambhav Jain, Sushanth D, Varsha, Vijetha N Bhat and J V Alamelu"Design and Implementation of the Smart Glove to Aid the Visually Impaired “International Conference on Communication and Signal Processing, April 4-6, 2019, India.

[7] Meghana H S, Mohamed Zeeshan Ali, Rasheeda Banu B S, Pradeep MK, Yogeesh G H" Smart Gloves for Surgical Strike" 2020

International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181

[8] Dr. Golda Jeyasheeli P, Miss. Annapoorani K "IoT Based SignLanguage Interpretation System" 2019 International Conference on Physics and Photonics Processes in Nano Sciences Journal of physics:conference series.

[9] Anshula Kumari1, Rutuja Benke1, Yasheseve Bhat1, Amina Qazi2 "Smart Gloves for Hand Gesture Recognition and Translation into Text and Audio" 2019 International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 06 Issue: 03 p-ISSN:2395-0072

[10] Shahrukh Javed, Ghousia Banu S, J Aarthy Suganthi Kani and Ateequeur Rahman" He Wireless Glove for Hand Gesture Acknowledgment: Sign Language to Discourse Change Framework in Territorial Dialect" 2018 Robotics and Automation Engineering journal Volume 3 Issue 2 DOI: 10.19080/RAEJ.2018.03.555609

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Words		Date	March 30, 2022
Characters	4226	Excluded URL	

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The nation's safety or security is extremely important in the current world situation. It's been observed that the nation's security is primarily dependent on the soldier's unit or army force. In battleground or clandestine operations, troops communication and health monitoring are critical. Technologies such as walkie-talkies or GSM modules were often used methodologies for communication and tracking soldiers' lives on the battlefield in the last few decades. This studies suggest an effective way to use an electronic device that can transform sign language hand gestures into speech to allow effective interaction among soldiers in order to adapt to the current technology. The technology involves turning hand signals into voice signals, which can subsequently be transmitted via wireless modules. The 'Hand Talk' glove is a regular driving glove with electrode sensors built in. The sensors produce a stream of data that varies depending on how much the fingers flex. Electrode sensors are sensors that vary resistance according on how far the sensor is bent. They convert bend change to electrical resistance; the greater the bend, the higher the resistance value. The sensor's output is converted to digital and processed with an Arduino, after which it reacts to voice commands over Bluetooth.. It is also necessary for the control station to know the health condition of soldiers along with the location on the battlefield. To track the current situation, the device can be mounted in a hand glove and data can be transferred to the base station with help of IoT (Internet of things). The main motivation in this research is to know how to build effective communication between soldiers along with their health monitoring system.

II. INTRODUCTION

Indian army force is the world's third-largest standing force with 990,960 reserve troops and 1,200,255 active troops .The army suffers a lot due to the unavailability of information of injuries to its personnel and communicating with others while doing search operations and combing. Sometimes they use a specific hand gesture to communicate with each other due to some of the obstacles or low visibility communication breakage takes place neither they can use speak signal with a higher tone which helps the attackers. Hence, they use tactical signals. It is also observed there are many issues regarding the safety of soldiers. Knowledge of the current location of soldiers, the inability of continuous communication with the control room during the operations, lack of immediate medical attention, and operations under different geographical conditions are the few prominent safety issues.

It is observed from the past many years, technologies such as walkie-talkie, Zigbee, cable-based systems were the most used methodologies for communication and tracking of soldiers' life in the Warfield. However, all these technologies suffered from one or more reasons like high installation cost, loss of signal, or due to bulky noise in the atmosphere. Hence it is very necessary to have a tracking system for the protection of the valuable life of soldiers.

In order to reduce all problems in this area, we can use real-time communication with tracking. This method provides us to convert the hand gesture to respective speech signals which are accessed through wireless modules. Here, we are developing a system with a ‘Smart glove’ which consists of sensors. This device helps to bridge the effective communication among the soldiers. The smart glove is developed with gesture recognition. The recorded values from the sensors are converted to digital values. The values are transferred to the receiver with help of a wireless channel when the value is received it is compared with predefined data. Based on the value it generates the voice signal for the specific gesture. Hence, the respective receiver receives the voice message. Pulse rate and body temperature can be monitored along with the location tracking of the soldiers using GPS can be monitored using the proposed system. The transmission of these parameters to the base station is carried out by IoT. The base station gets the specific position of soldier from GPS.

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0%	100%	0	52
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In [1]: The method proposed by the system in which the soldiers are tracked and monitored for their well-being using live track applications.In the above circuit the parameter threshold values are calculated and pre-programmed in atmega328 according to the surroundings. The suggested device is deployed in conjunction with a combat package. The ATmega328P processor is the brain of the device. Heat sensor, cardiac heart rate sensor, GPS receiver, Atmega 328, and Raspberry Pi make up the soldier unit. According to the surroundings and the test person, the desired parameter threshold values are calculated and preprogrammed in the atmega328. Temperature monitors, heart rate monitors, and the soldier's health is constantly monitored. To calculate position and orientation, GPS is employed in real time. The Arduino (ATmega 328P) processor processes and collects sensor and GPS receiver data, which is then forwarded to the Raspberry Pi processor, which displays the status and location of soldiers via the live track application. The system will be notified and the data will be transmitted whenever the threshold value is modified.
In [2]: In this paper it describes the health monitoring and tracking of soldiers and it’s responsibility with the GPS to guide the losing direction in the correct direction. Whenever it is necessary the control unit can access the information of the soldier with help of Internet of things (IoT) based on tracking parameters. The proposed system is divided into two sections i.e., Soldier unit and Control room unit. The below circuit diagram shows the proposed model.
The information received is stored in Cloud and can be extracted on the PC of the base station. Based on the information the immediate action is taken with necessary medical aids and back force for the help. The proposed system can monitor pulse, body temperature, and oxygen level in an area, as well as the location tracking of soldiers using GPS. The Internet of Things (IoT) is used to send these parameters to the control room. The position and orientation of the soldier are transmitted to the control room through GPS. Furthermore, soldiers can use GPS to steer them in the right route during operations.
In [3]: There are various ways to detect the sign language such as Data glove approach, Vision-based approach and Virtual button approach. This paper highlights the advantages of sign language using Data glove approach i.e., Flex sensor-based glove that has high level of reliability, consistency, harsh temperature resistance, with stationary surfaces for mounting, an Infinite number of resistance possibilities and with specific value of bend ratios. The each bent in the finger the different values are obtained. The glove is equipped with five flex sensors that detect finger movements, an Inertial Measuring Unit (IMU) that detects movements in 3-D space, and a Bluetooth device that transmits data over a short distance to other Bluetooth connectivity devices. The task at hand is to recognise gestures done by a single hand. Arduino is a microcontroller that serves as the processing unit for all connected devices. The IMU is utilised to recognise the gestures or finger positions in a three-dimensional area after a range of values are collected from the flex sensor when the gestures are made. The combination of these values represents or identifies a gesture. These, along with the gesture's text format, are communicated to an external device, which produces a voice output of the text. The external device in this case is a smartphone with a Bluetooth TTS app installed for text-to-speech conversion and voice output.
In [4]: The proposed methodology was on sensor-based data acquisition glove with hand gesture recognition. Flex sensors and Force Sensing Resistors (FSRs) are used to detect bending movement in the gloves. Then data will send to the computer by Arduino micro for the further simplification. By using Support Vector Machine (SVM) and the Dynamic Time Wrapping (DTW) based algorithm we can find the average accuracy of the hand gesture recognition for a single subject.
In this project 3 subjects are asked to put on the glove and make 7 gestures 100 times each. The collected data will

separate into 100 segments by using the automatic data segmentation method. In Single Subject Hand Gesture Recognition, SVM for each gesture a twenty-eight-dimensional feature vector is fetched from sensor data. In this 80 of group vectors are used for training the model, rest twenty is used for testing. Using DTW based algorithm for each gesture. the first group of data is selected as the template, and rest twenty groups are used as test samples. The average accuracy of the three-subject using SVM and DTW based algorithm are e 96.9% and 94.5% respectively. Here two different method is used for each gesture, will give a different recognition result for the same gesture. For the further verification, in Cross-Subject Hand Gesture Recognition the training data will be maintained by one user and hand gesture recognition is done by another user. Same procedure of single subject hand gesture recognition will be followed here. When doing gestures there will be bending movement on fingers it will result in some deviation in the recognition. So, by this accuracy value got decreased. The accuracy can be improved by increasing collecting of subjects as well as training of subjects.In [5]: Individuals that suffer from discourse impedance believe that it is their fault.It's difficult to communicate in a general audience where the vast majority of people don't know what you're talking about.The general public does not understand gesture-based communication. So, in this paper smart gloves used with flex sensors and mem sensor attached to it. This type of model is used to convert Indian sign gesture into understandable voice. Artificial mouth is implemented to overcome from the complexity. Motion sensors are helpful to detect motion. Database stores messages and templates. Also, the speaker and microphone are used as input devices.

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2%	98%	1	53
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In this system gloves with flex and MEM sensors are more flexible and accurate. The microcontroller stores all the data that is send from sensors. Database which stores messages and templates which transfer or store copy of templates in the microcontroller as well. Motion sensors reacts to every action made by the user and it is placed on hand. Motion sensors which will activate only if there is any motion detected. For every action the motion detector gets high and fed to the microcontroller. Now the microcontroller has copy of templates which compared with the fetched motion signals. Microcontroller will match both of this and convert hand gesture into suitable speech signals. After this speech signals transferred to the artificial mouth to retrieve the data and now dumb people can talk with their artificial mouth. The result of the model or message of the model shown on the display also it will be played on speaker as well.
In [6]: Sambhav Jain, Sushanth D, Varsha, Vijetha N Bhat and J V Alamelu suggested the way through which a smart glove can be used to aid the visually impaired. They have designed the glove using USB (Universal Serial Bus) camera using built-in microphone. Here gloves are used to point out the object which a visually impaired person says to the microphone. Whenever the input of audio is given by the user it is converted to respective text format using “pyttsx3” – speech to text module. Using keyword Extraction technique the name of the object needed by the user is extracted. Which is passed through running DNN (Deep Neural Networks) which processes the real-time video and locates the required object and tags the same. The DNN on the Raspberry Pi processes real-time video and locates and tags the relevant object. After that, the object tracking algorithm takes over to boost the frame rate. The micro-vibrating motors is used to guide the user to move his hand in such a way that the object is brought back to the center of the frame when object is not pointed to centre of the glove .Till the object is pointed to center of the glove micro-vibrating motor keeps vibrating to guide the user forward. The Raspberry Pi is connected to the micro-vibrating motors via transistors. The graphic below shows an interface diagram for one microvibrating motor with the Raspberry Pi. Thereby the required object is fetched by user of smart glove.In [7]: Generally, in this paper smart gloves are named as “Hand Talk”. The movements are detected based on the electrode sensors attached to it. To convert to digital signals Arduino is used. Use of voice kit will produce voice signals. Also, Wi-Fi module is used to take advantage from internet for the model. Whenever it is necessary to compact the integrated circuit with specific operation microcontroller is used in embedded system. For the computing power embedded system is used because as day by day there is increasing requirement for the embedded software.Smart gloves are attached with the electrodes and accelerometer which will record the values for the different hand gestures did by user. Accelerometer helps to analyse the position of the hand gesture. The copper electrodes or sensors what we used will collect the values and send to the Arduino UNO for the further process. Now the Arduino UNO will help to convert the sensors collected values into digital signals. Zigbee helps to transfer converted digital signals to the Arduino ATmega2560. Now the heart beat sensors and temperature sensors are connected to this for the health monitoring system. Converted Digital signals will compare with the pre-defined data stored in the memory at receiver side. Now by using this the following hand gesture are converted into voice message and send to the nearby devices.
In [8]: Dr. Golda Jeyasheeli P, Miss. Annapoorani K suggests the way how deaf and dumb people can use alphabets in mobile devices through the use of smart glove which converts the gesture to relevant alphabet. Flex sensors are connected to all ten fingers of with different sizes based on the fingers and pressure sensor is implemented to invoke the use of flex sensor which in turn is attached to Arduino mega microcontroller. The proposed methodology has two HC-05 Bluetooth modules. Predefined data for various movements of flex sensors are recorded which is used to compare the output when gesture is done using all the fingers. Based on both the hand movements and predefined

data the output is recorded and sent to mobile device using inbuilt Bluetooth.A 3.7V 400mAh lithium polymer battery powers the hardware components. The sensor data obtained from the wearable data glove is used to extract features, which are then used to classify and determine the sign created by the data glove using the Support Vector Machine (SVM). This paper generates a total of 28 signs, including 26 alphabets, one neutral sign, and one invalid sign. The observed indications are converted to a csv file and sent to an Android phone via Bluetooth using the HC-05 Bluetooth low energy module. On the mobile display screen, the received symbol is presented. A text-to-speech capability is also included in the mobile app, which converts the given sentence or word into an audio version.
In [9]: In this methodology it tells how Smart gloves is helpful to the communication for deaf and dumb people. The main intension of a smart glove is to convert hand gesture into sound message. Smart gloves which are attached with the flex sensors. And the microcontroller is used for the further communication. So, in the output side Bluetooth module is used to hear the voice signal. In [10]: As referred to the work of Shahrukh Javed, Ghousia Banu, J Aarthy Suganthi Kani and Ateequeur Rahman they put forward the way of designing gadget put on a hand with sensors fit for assessing hand signals thereby communication via gestures interpretation.

Sources	Similarity
Design of the Smart Glove to Aid the Visually Impaired has micro-vibrating motors, used to guide the user's hand. ... to move his hand in such a way that the object is brought back to the center of the frame. https://ijarsct.co.in/Paper56.pdf	5%

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Words		Date	March 30, 2022
Characters	4000	Excluded URL	

3%	97%	1	30
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IV. PROBLEM STATEMENT
Most of the surgical strikes demands for silent operation, Since the soldiers cannot equip walkie talkie as a medium of communication which can alert their presence to intruders or enemies. Tactical hand symbols are using most of the time it is not received by others due to low visibility of light during night. Lack of communication miss gap leads to the huge destruction. Concerning about the health and to reduce failure of soldiers due to health issue it a difficult task to physically monitor the health status of the soldier during the war. If a soldier moves out of the located range it should be recognised and respective action to be taken which can be a struggle.
V. OBJECTIVES
In order to reduce the impact mentioned in the problem statement the main objective is to overcome the complications during the war fare both in day as well as night. The main intent of the project is to design a wearable smart hand gloves for communicating with soldiers, besides for health monitoring as well. Objectives includes to adopt different sensors and components for enhancing the workability and hence, analysing the health condition of the soldiers. Aim is to track the location of the soldier using cloud and providing the basic health status. Using cloud and IoT to improve the effectiveness of the model which are considered as the growing recent technologies.
VI. PROPOSED METHODOLOGY
For recognition of gesture through finger action of all the fingers needs to be analysed. Hence, Gloves is fixed with flex sensors which records different values for various hand gestures. Sensed values of various bends of flex sensors corresponding to different action and positions of all the fingers transferred to Arduino UNO, which is programmed by Arduino IDE which contains several outputs corresponding bend ratio process the output. These values of output is converted to digital values in UNO and sent via Bluetooth transmitter. Based on different hand gesture pre-defined messages for vocalized version is received at receiver end. Near Bluetooth model receives the digital value of output at receiver end.
Temperature sensor parallelly records the temperature and indication are given when the temperature of glove user is out of defined range. With addition to temperature sensing heart beat sensor is adopted to record heart beat which works on principle of photoplethysmography. Google positioning system locates the coordinates of glove which is based on trilateration mathematical principle there by locating continuously the location of the glove user. At receiver end these values are compared with predefined data which is stored using cloud computing software. Stored Data in cloud can be accessed by military base station reference.
VII. CONCLUSION
As observed the various methods through which gesture is converted to required audio output, the same method can be implemented for the use of military purpose where two soldiers can talk with the use of gesture recognition in noisy environment. Arduino design factors produces a variety of counters and processors functioning the systems with an application factor of Arduino. Where the main descriptive parameter components design is going to be used in the formation of project. Also, in present scenario one of the difficulties faced knows the health condition and exact coordinate location of soldier in battleground. Taking this into consideration our project aims to design a device which provides effective communication by vocalizing audio input, knowing the health status and current position with the help of IoT (Internet of Things), flex sensors, medical sensors and GPS tracker. The application features of the normality i.e., gesture vocalization was the main consideration for the network agenda. The end of the agenda was to be proximate a particular clear subjective model is to be implemented and solve the real time obligation in the action.

Sources	Similarity
Smart Gloves for Surgical Strike – IJERT - International ... https://www.ijert.org/smart-gloves-for-surgical-strike	4%