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# Real Time Wireless Embedded Electronics For Solider Security

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***Abstract:*** In present era, the threat of enemies plays an important role in security policies of any state. In this prospective, the military soldiers play an important and vital role. There are several considerations concerning the security of those troopers. So, for the security purpose of troopers, a number of equipment or devices are attached with them to take the look on their health status and their ammunitions. Health relating sensors like pulse rate sensor, body temperature measuring sensor, weather updates, emergency buttons data transmission and processing capabilities, can thus help to make low-cost wearable solutions for health monitoring. GPS used for basically point the latitude and longitude to find exact location of soldier. WIFI module can be used for effective range of high-speed transmission that will be required to relay information on situational awareness, tactical instructions, and covert surveillance related data during special operations reconnaissance and other missions. So, by using these equipment's we are trying to implement the basic life guarding system for soldier in low cost and high reliability.

***Keywords: ESP32, NODEMCU, Internet of Things (IoT), MAX30100 sensor, GPS Module, LM35, BMP180, BLYNKAPP***

## I.INTRODUCTION:

Our objective was to establish a cost-effective and consistent project that would aid the base unit in terms of soldier health and security during wartime special operations. Furthermore, soldiers can submit requests for assistance to the base Station. At first obtaining the physical parameters like body temperature, heartrate and oxygen level of the soldier's body. Then Tracking the location of the soldier through GPS. After that obtaining the environmental factors of soldier like atmospheric temperature and atmospheric pressure. Data obtained in these cases is processed through the blynk server and displaying the information in the blynk app. If any abnormalities found in the data obtained from the soldier the soldier, Alerting the soldier and authority in emergency. During the conflict, this project has an associated implementation of tracking the soldier and navigating between soldiers, such as getting their speed, distance, and health state, which allows military decision makers to put up war strategies. As a result, they can take immediate action by

directing help to soldiers who have requested it. Soldiers' health constraints are monitored using a variety of biological sensors, and their location and placement are restricted using a GPS module.

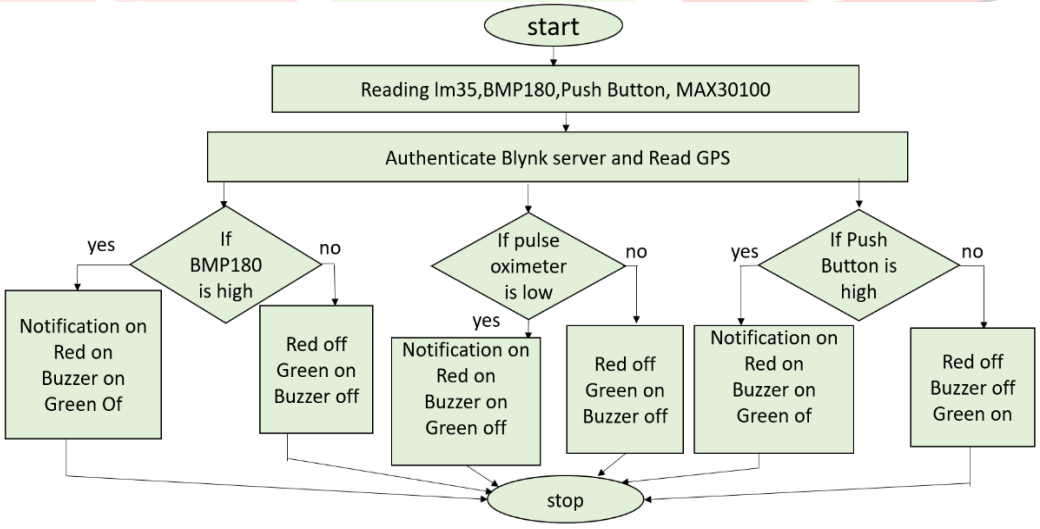
## II EXISTING SYSTEM:

In the existing system they have used Arduino board and the microcontrollers which are different from the microcontroller that we have used. For transferring the data to the authorities and communication between the soldiers near to them and the authorities or base station they have used Zigbee module, Lora WAN module and GSM module. In the existing system they measured the parameters like body temperature, heart rate and atmospheric temperature of the soldier. While using the Arduino and Raspberry Pi we have to use Analog to Digital converters externally.

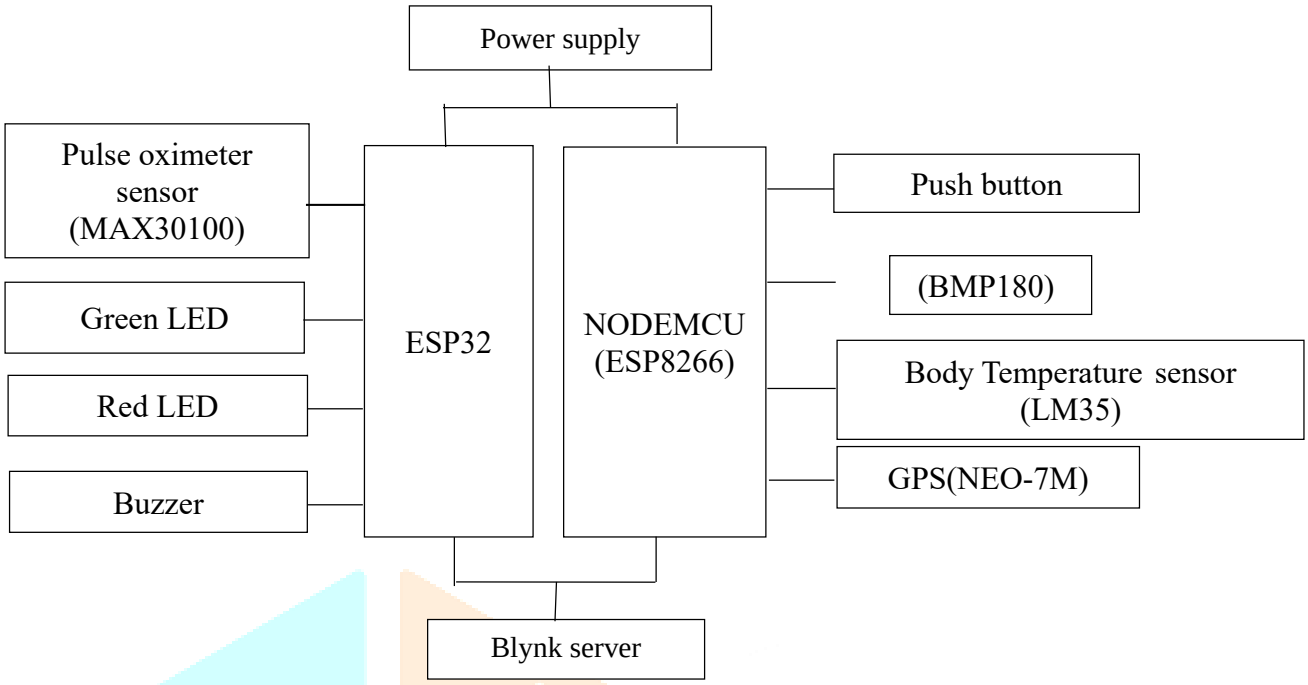
## III PROPOSED SYSTEM:

In Our Proposed System We are using ESP32 & NodeMCU microcontrollers for processing. Here transferring of data and communication between the soldiers and authorities is done through the inbuilt Wi-Fi module present on the ESP-32 microcontroller and NodeMCU. The communication between the nearest soldiers is done through the inbuilt Wi-Fi and Bluetooth module present on ESP-32. ESP-32 microcontroller is having Inbuilt Analog to Digital converters. So that we don't need to add the Analog to Digital converters externally. In our proposed system We are monitoring the parameters like body temperature, atmospheric temperature, atmospheric pressure, heart rate, oxygen level of blood and the location of the soldier.

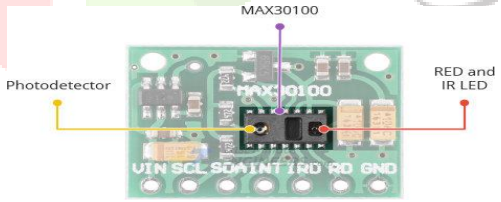
## IV.MEHODOLOGY:



## V. BLOCK DIAGRAM:




Block diagram of interfacing sensors with ESP32 The designing methodology of system contain soldier unit. Soldier unit which is positioned on the soldier's body and this unit consist of different parts like Temperature, GPS, MAX30100, emergency push button sensors, ESP-32. We interfaced all the sensors with ESP-32. The Sensor max30100 is a Digital SP02& Temperature Sensor which gives Serial Digital information to the ESP-32. Arduino Programming consists of MAX30100 Library & BMP180 adafruit Library for interfacing max30100 & bmp180. ESP-32 continuously read Temperature & heartrate and oxygen level from the Sensor & and through server display in the blynk app. An emergency push button is used to alert the base station if the soldier is in emergency. The entire programming is done in c++. Arduino has the blynk library which helps to connect the controller to the Blynk.

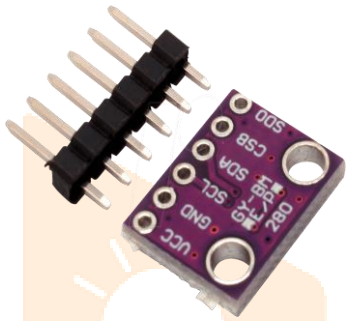



MAX30100

Max30100 is a pulse oximeter sensor ,that measures the heart rate,spo2 and temperature of the body.here the three parameters of a human can be measured, it uses the i2c protocal for the communication with the controller it has the scl and sda pins ,which communicates serially with the controller,it has the red and IR led ,blood has the property to absorb the light ,based on the light absorbtion it calculates and the heart rate and spo2 level.

Neo -7M GPS Module

GPS Module is used to track the location of the soldier ,it works on the trilateration algorithm atleast three satellites are required to track the location in 3D.based on the centriod formula the location is found the gps module has the RX and TX pins which are connected to the TX and RX pins to the controller which uses the UART communication protocal to communate with the controller and viceversa.



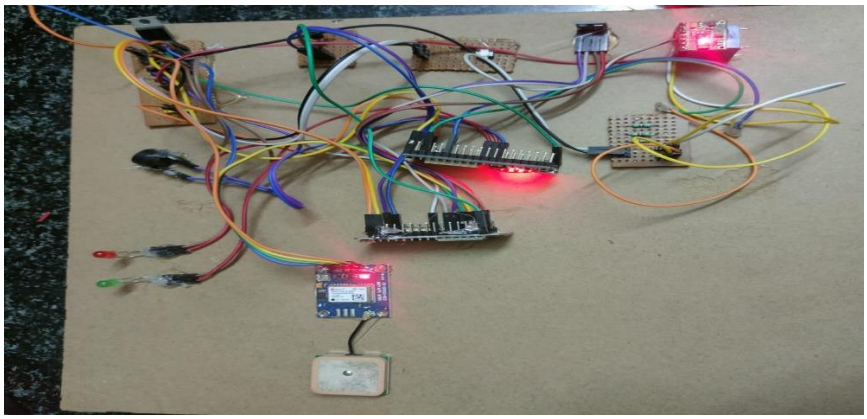

BMP 180

BMP 180 is a barometric pressure sensor which is used to calculate the atmospheric pressure,temperature and altitude of that location,it uses the i2c protocal for communication with the controller and sensor it has the sda and scl pins it takes the power of 3.3v ,which very low power.

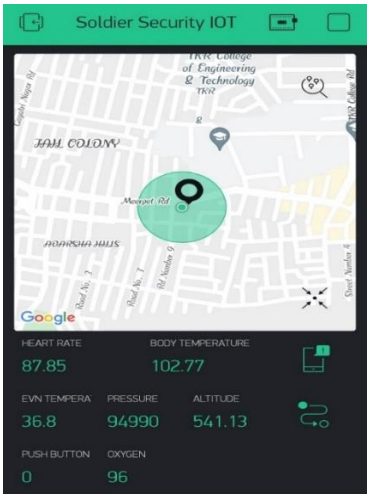
Buzzer

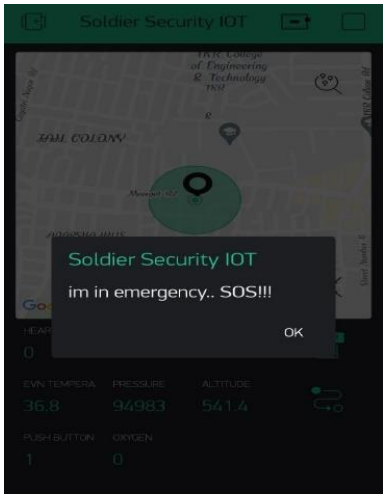
Buzzer is used for beeper sound ,if any emergency situation occur then it gives the buzzer sound,it has the two terminals ,it is used to alert the soldier that some abnormality is found and alert notifications can be received at the base station.

## VI.RESULT AND DISCUSSIONS:



This is the outlook of the project ,where all the sensors are interfaced with controllers




The figures show the location of soldier base station and live readings of sensors, and long with the alerting message in an emergency situation


This are graphical representation of the sensor values

## VI. CONCLUSION:

The design turned out to be far more successful than we had anticipated when we began our project. In the design and implementation of the project, we attempted to follow ethical guidelines. We won't claim that our circuit was 100 percent efficient because there was some variation that we were able to reduce to some level. The good news is that we discovered that this project has a lot of room for improvement. Our system is designed to accommodate only one soldier. It is possible to establish contact among soldiers. The defence system of our country gains strength from this system. As a result, we may conclude that these tactics are quite beneficial in ensuring troop security.

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