Interactive Design Project
Pressure Power !

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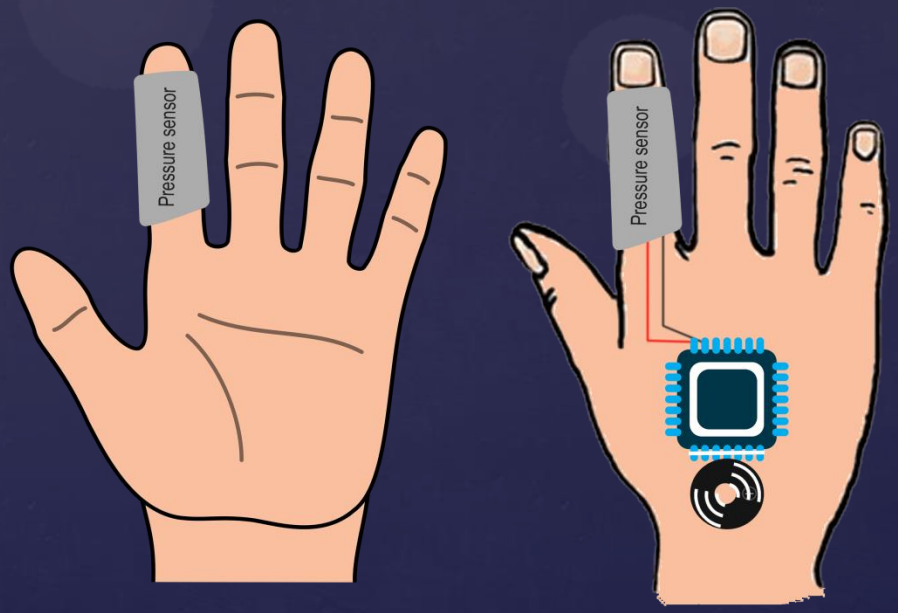
Initial project Idea:

Emergency button for patients:

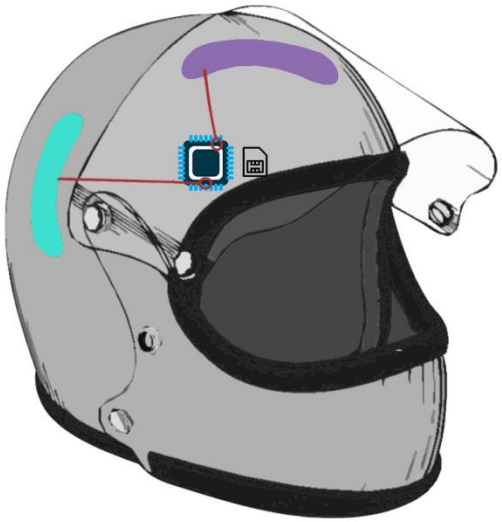
A pressure sensor can be also used in hospitals as an emergency switch.In many cases, there can be seen patients having sudden illness when there is no one around. Also, to call someone at that time is very hard. We can use a textile pressure sensor where it can be attached to the patient's hand or in the dress. And whenever a certain amount of pressure is given it will act as an emergency button and trigger an alarm so that the doctors can go immediately. It can also be from elderly patients at home. A sos system can also be implemented with the microcontroller.

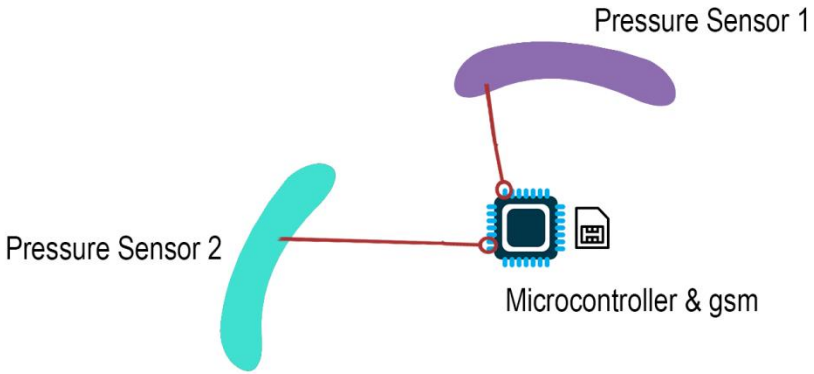


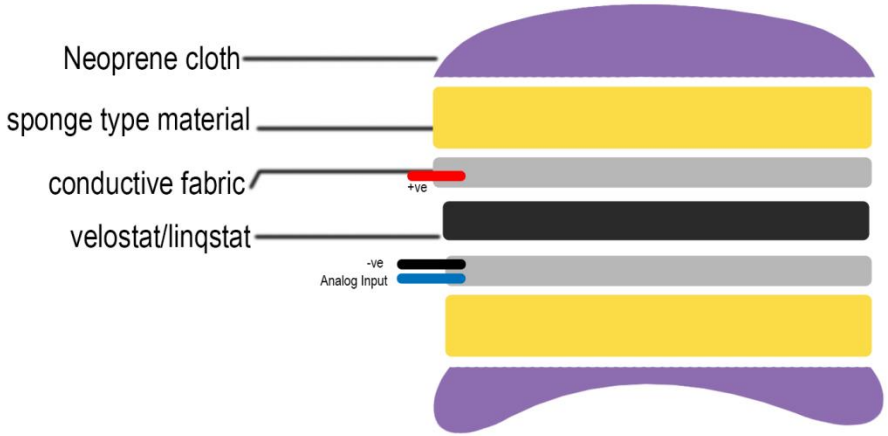
Refined & updated project Idea:

Biker emergency :

Bikers ride their bikes from small distance to a very long distance. In that period of time, they need to pass some places where there is no people, not urban or maybe in between deserted areas and mountain trails. From the emergency button idea, we can construct a refined idea where some pressure sensors are connected to a bikers helmet. The pressure sensor can be connected with a microcontroller and with that a GSM module can be connected. When a biker faces an accident and faces a high impact the sensor will trigger the mechanism. As a biker might fall an trigger the mechanism we can set a system that if a certain pressure is copiously applied on any sensor (resembles a biker is laying or not moving) then the machine can trigger. The mechanism can be such that a gsm module sends an emergency message and the geolocation to any emergency number. For the prototype, we can test several mechanisms of the pressure sensor to finalize one with accurate results. Then the mechanism triggering can be shown by an led.




Pressure Sensor 1
Pressure Sensor 2
Microcontroller & gsm


Neoprene cloth
sponge type material
conductive fabric
+ve
velostat/linqstat
-ve
Analog Input

Prototype Tasks:

- Implementing Pressure sensor using different materials
- Finding best possible sensor suitable for the project
- Improving the handling of the sensor
- Creating project prototype and making the code

Prototype output:

- Measuring the input pressure from a user and showing the graph.
- Checking the impact by calculating the applied pressure over the sensor.
- Detecting the impact and triggering the emergency action for the prototype an led/buzzer can be added.

Future:

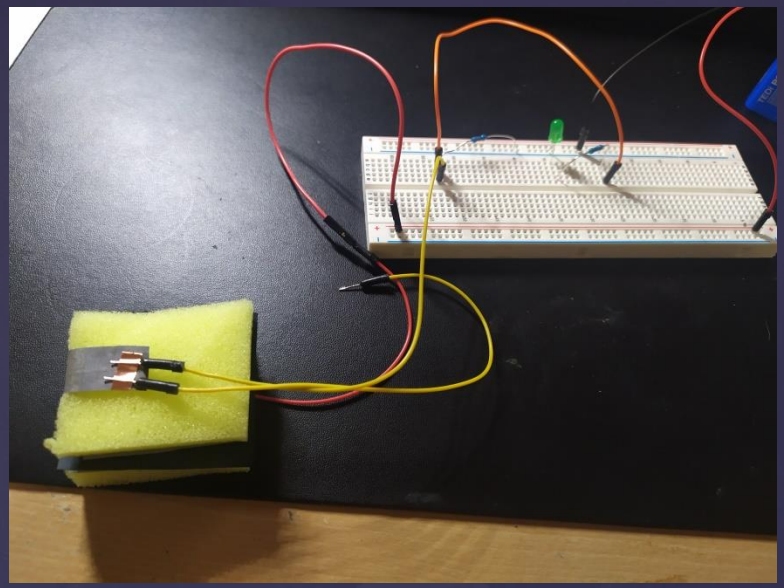
- Working with GSM & GPS module for arduino.
- Incorporating the emergency message option with the users current location to an urgent number.
- Using Bluetooth to get the location data from user mobile without using any separate gps module.
- Try to apply ESP8266 to transfer the message to a online platform.

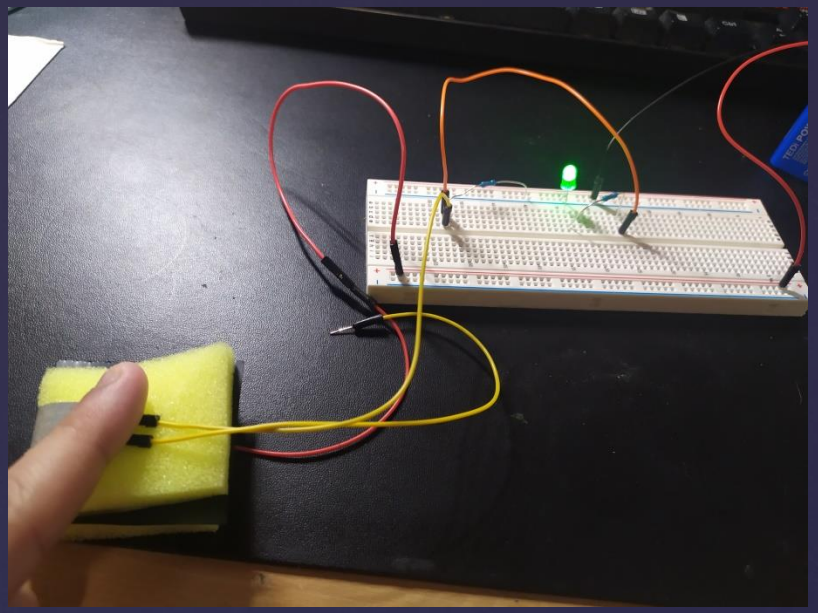
Challenges:

- Understanding the structure and methods of building a sensor from scratch.
- Use of different materials and building up the sensor.
- Trying multiple sensor approach and finding the best possible one.
- Getting the proper data and visualization.
- Applying the final prototype onto a test object.
- Finding volunteers to test the project.

Current status:

- Designed different approach to create a pressure sensor.
- Made a basic sensor with household materials (aluminum foil).
- Created a basic textile sensor with conductive fabric, velostat. Found potential drawback and improved the design.
- Applied the improved design and tested the sensor. Got the data and visualized it in a simple plotter.





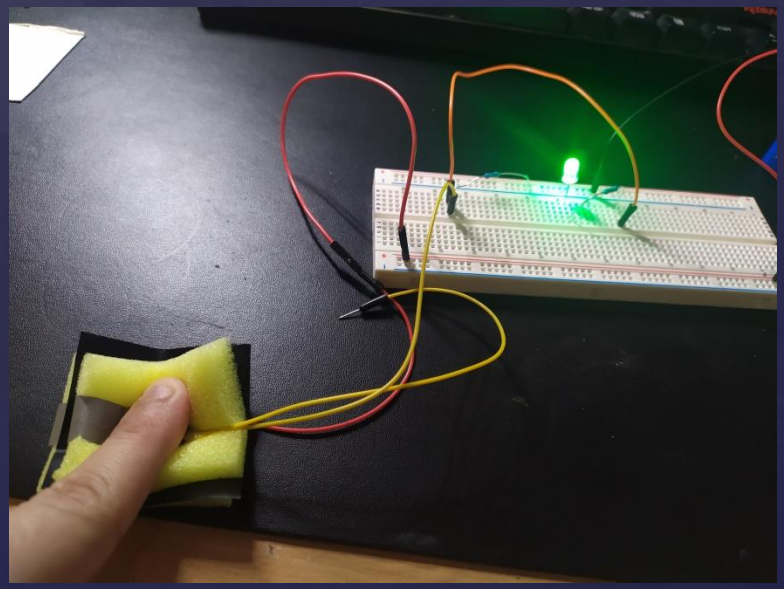


Image : Output of the pressure sensor on different pressure levels

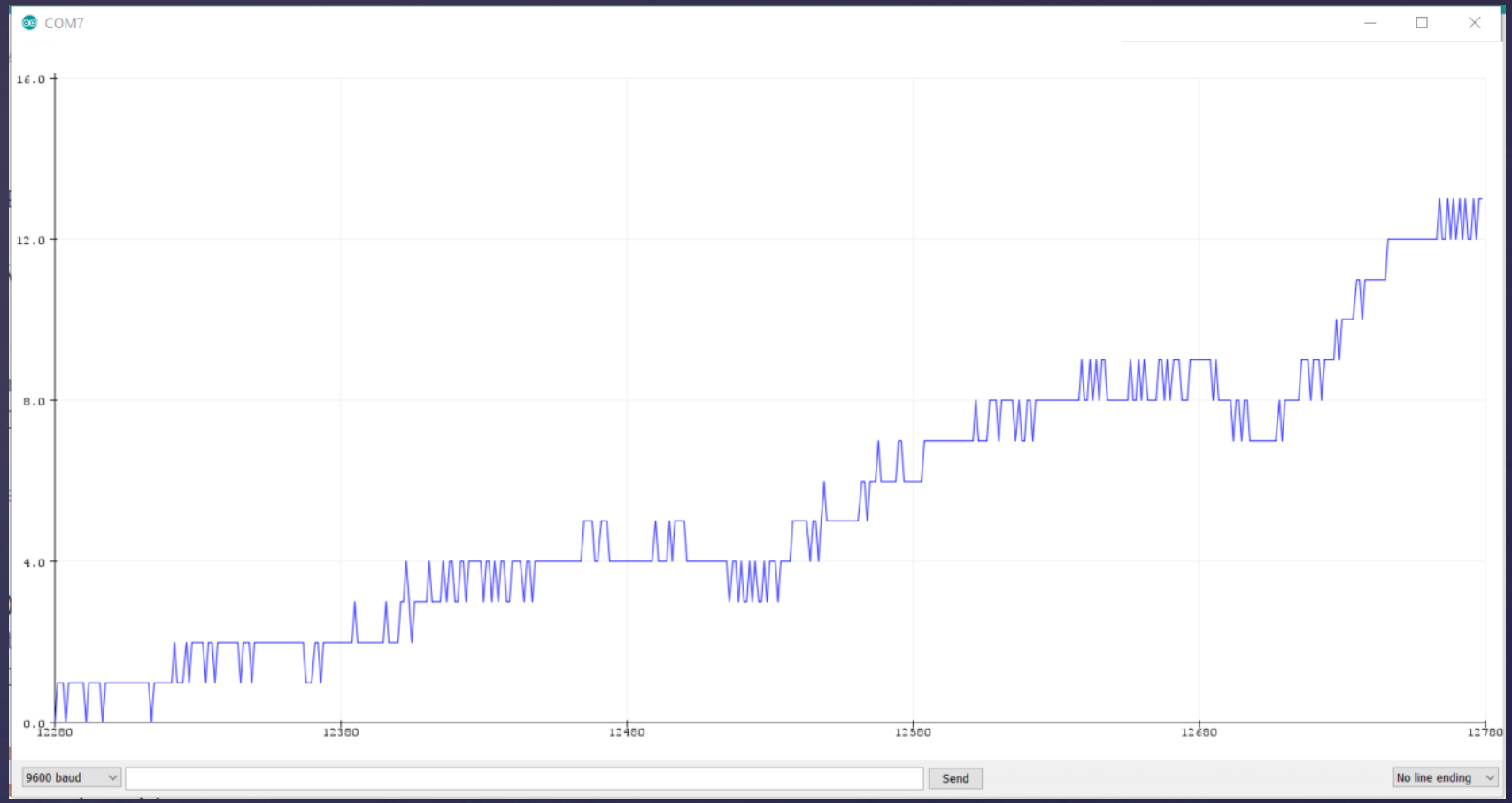


Image : Output of the pressure sensor in graph