IOT PROJECT

COURSE CODE : COCSC20

TITLE : IOT BASED SMART SYSTEM FOR MEASURING HYDRATION LEVELS

SUBMITTED BY

Shirishti Jain - 2020UCO1649

Amogh Garg - 2020UCO1688

Mokshi Sharma - 202UCO1691

MOTIVATION

Dehydration is a significant problem in todays world

Dehydration can cause wide range of consequences and exacerbation of existing health conditions

No easy to use techniques for monitoring dehydration

Develop innovative solution to monitor hydration level based on IOT

PROBLEM STATEMENT

- Dehydration is a very widespread area of concern
- One should always stay hydrated and there should be mechanisms to monitor the level of hydration in real time.
- T**he current methods to monitor the hydration level not very convenient and accurate and more accurate laboratory methods are tedious to perform and time taking**.
- Need of expedient mechanism to monitor the level of hydration in real time

APPROACH AND METHODOLOGY

- The proposed system is designed to measure the hydration level of a user on a scale of 0-10
- The system uses an ultrasonic sensor and GSR sensor.
- Ultrasonic and GSR sensors are connected with Arduino Uno which processes the data
- The output like water intake is displayed on the LED.
- The user can also view the information about hydration levels, water loss, water intake in graphical format on their mobile phones or laptops for better understanding and analytical purposes.

LITERATURE REVIEW

- Current solutions focus on preventing dehydration by monitoring only the water intake of the users and reminding them to drink water at regular intervals.
- Lack of techniques which monitor the actual hydration level in real time by taking into account the water loss from the body.
- Although there are a few techniques to measure sweat rate like polymeric material based sensor and laboratory methods, but these are costly, inconvinient and time consuming.
- Need for an expedient mechanism to measure sweat rate in real time.

CONTRIBUTIONS

1. Worked on an expedient method to measure water loss in the form of sweat

2. Demonstrated the use of GSR sensor to measure sweat rate

3. Measuring hydration level in real time based on water intake as well as loss

ALGORITHMS

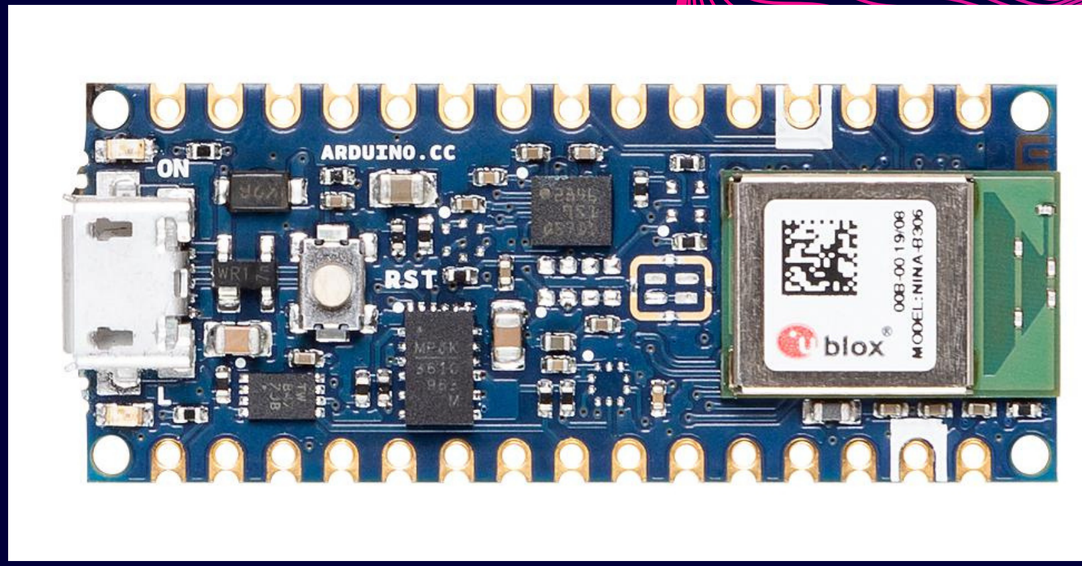
```
void gsr_read()
{
 int sensorValue = 0;
 int gsr_average = 0;
  long sum = 0;
  for (int i = 0; i < 10; i++)
  {
   sensorValue = analogRead(GSR);
   sum += sensorValue;
   delay(5);
  }
  gsr_average = sum / 10;
  int Human_Resistance =  ((1024 + 2 * gsr_average) * 10000) / (512 - gsr_average);
  Serial.println(Human_Resistance);
  Blynk.virtualWrite(V8, Human_Resistance);

  if (Human_Resistance < 0) {
     flag = flag + 1;
   }

 if(flag){
sc = -1000000/Human_Resistance;
 }
 else{
sc = 1000000/Human_Resistance;
 }

 swr =  sc;
 swr = 4.3 * swr - 3.5;
 Serial.println(swr);
}
```

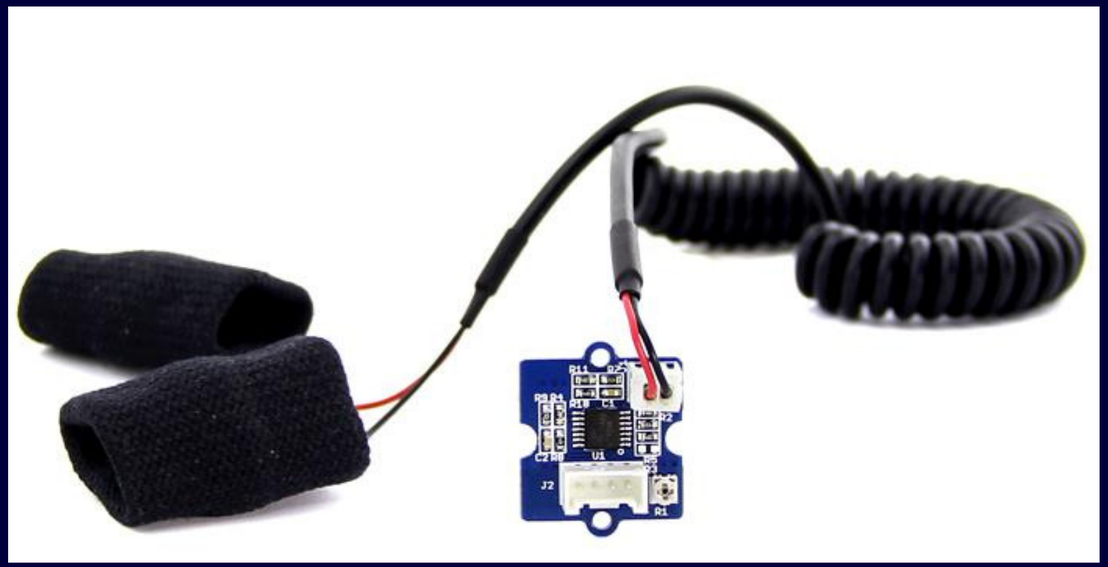
```
int readPing() {
 long duration, cm;
 pinMode(pingPin, OUTPUT);
 digitalWrite(pingPin, LOW);
 delayMicroseconds(2);
 digitalWrite(pingPin, HIGH);
 delayMicroseconds(10);
 digitalWrite(pingPin, LOW);
 pinMode(echoPin, INPUT);
 duration = pulseIn(echoPin, HIGH);
 cm = duration / 29 / 2;
 if (cm > 20) {
  cm = 0;
 }
 cm = 20 - cm;
 Serial.print(cm);
 Serial.print("cm");
 Serial.println();
 return cm;
}
gsr_read();
 twlh = swr * 2/1000;
 twl = twl + twlh;
 twl=twl/10;
 hl = twi - twl;
 hp = (hl / 1.6) * 100;
 hlev = hp/10;
```

COMPONENTS

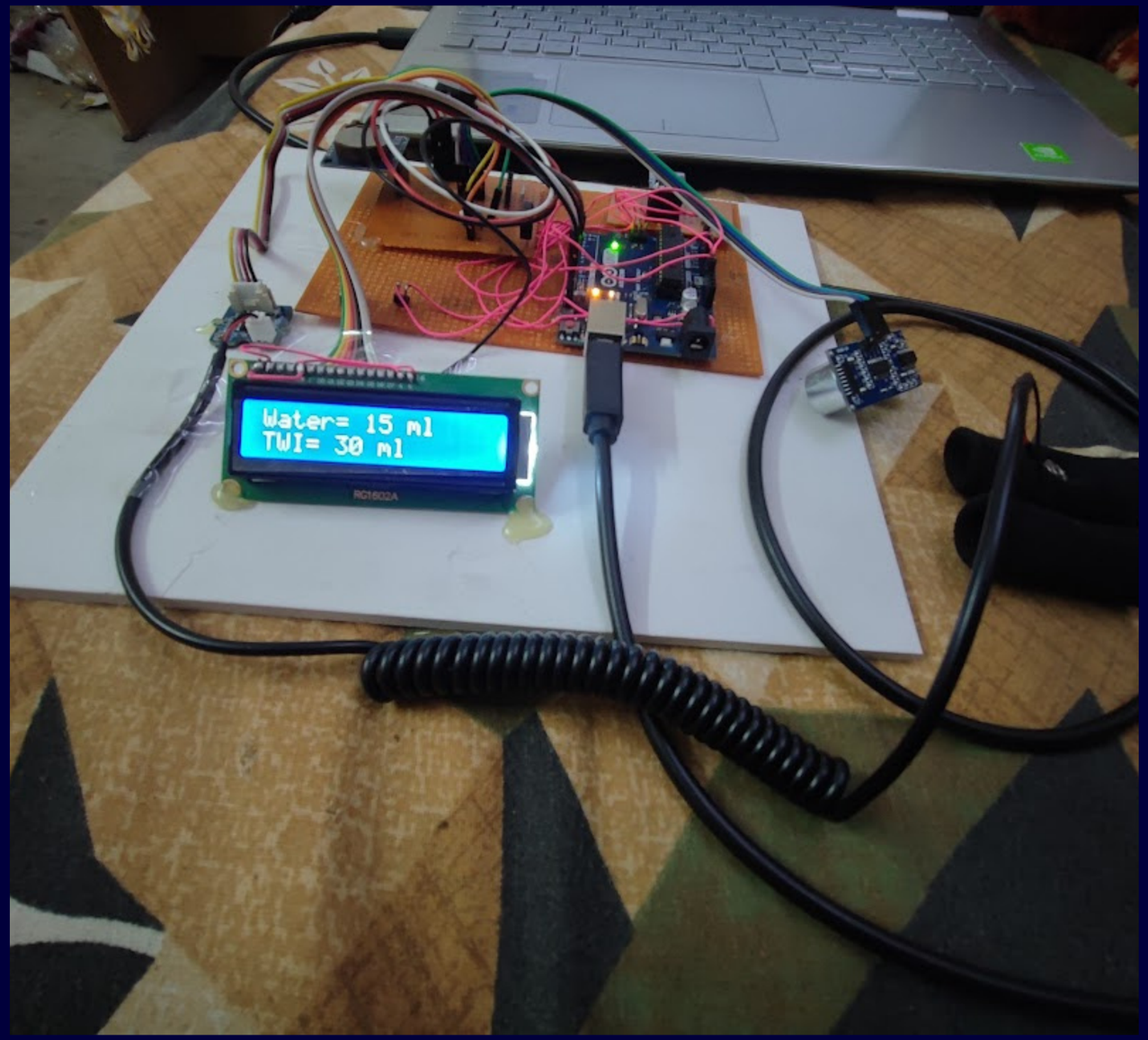
Hardware and Software components used

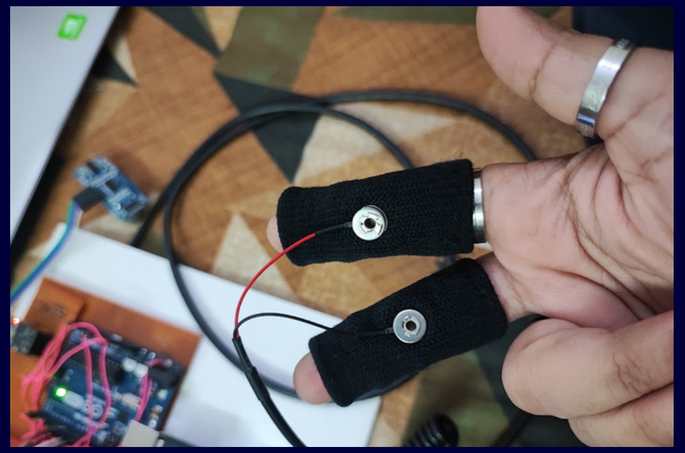
1. **Arduino Uno and IDE**
2. **GSR(Galvanic Skin Response) Sensor**
3. **Ultrasonic Sensor**
4. **LED**
5. **Wifi Module**
6. **Blynk IOT App**





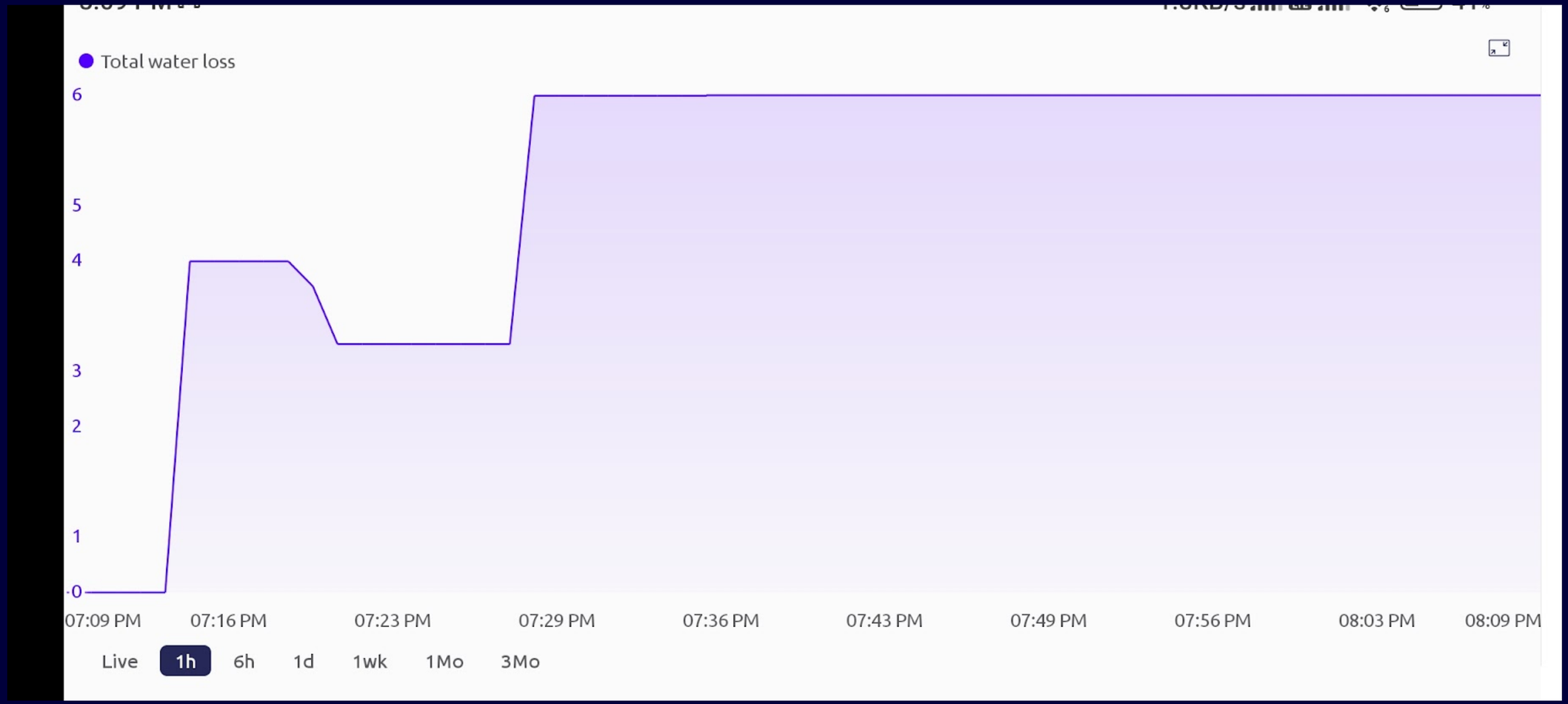
PROTOTYPE



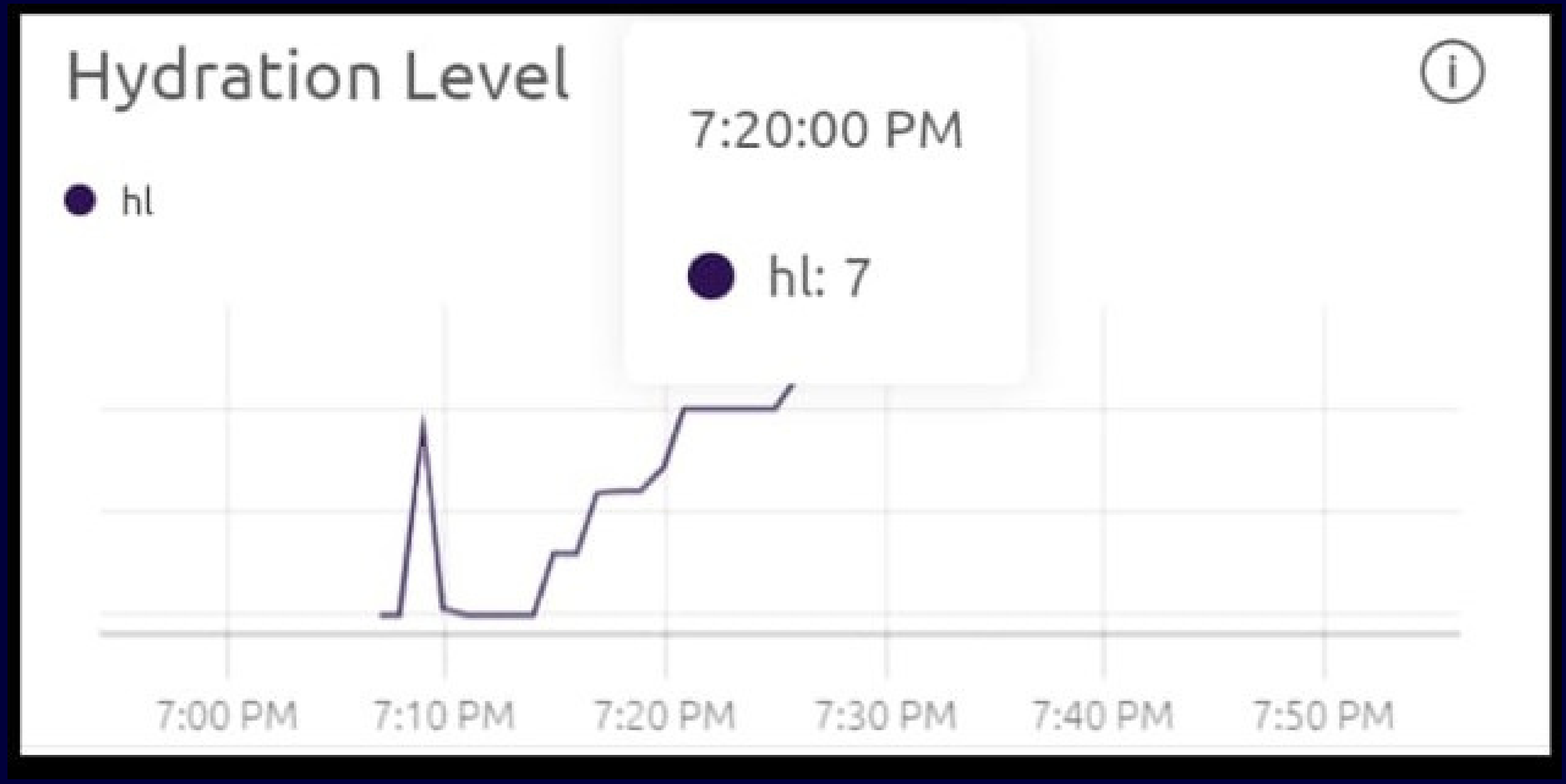


RESULTS AND GRAPHS

Water loss vs Time

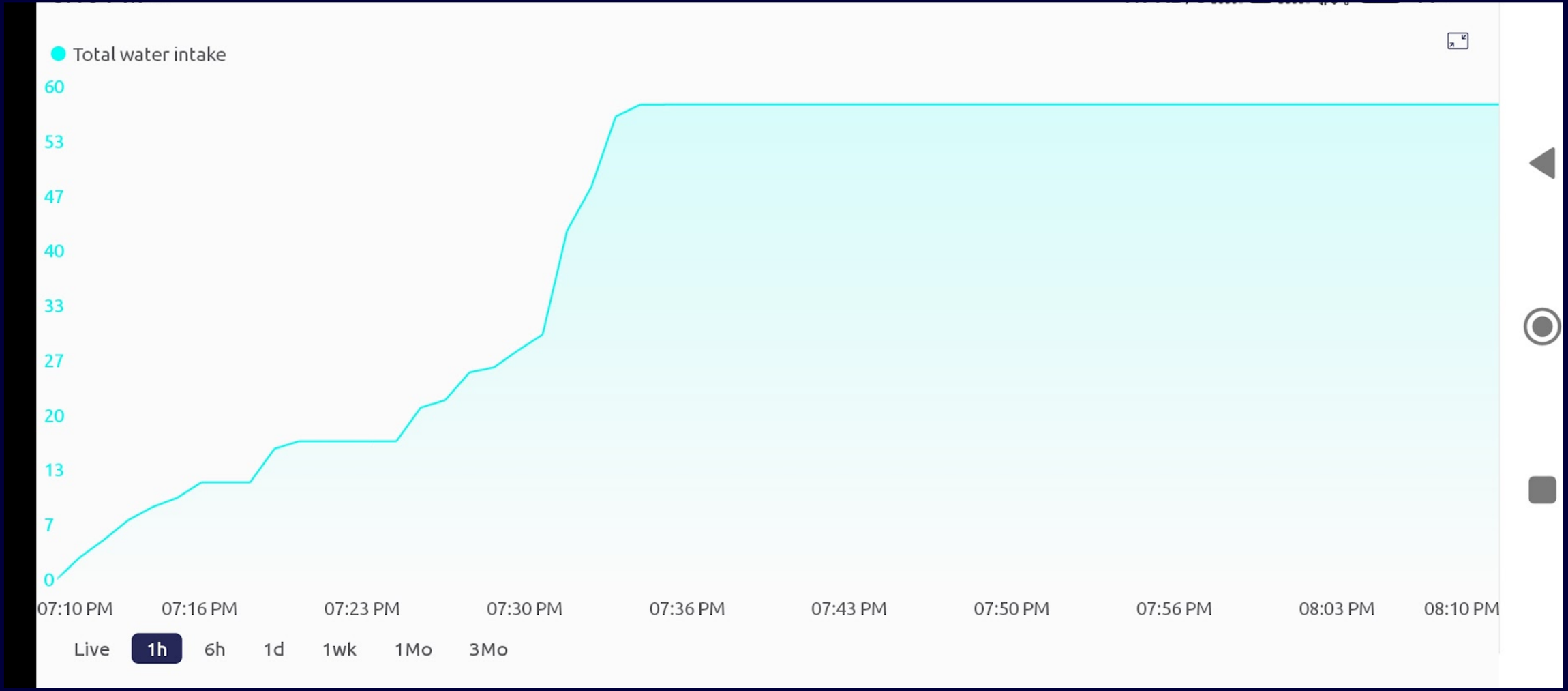


Hydration level vs Time



Sweat Rate vs Time

Total water intake vs Time



INFERENCES

The ultrasonic sensor successfully measured the water intake of the users at regular intervals of time. However, beyond a certain range ultrasonic sensors had difficulty giving accurate measurements

GSR sensor can be used to measure the water loss in the form of sweat by converting the skin conductance value to sweat rate.

Real time hydration level was successfully calculated and the result were displayed on the LED and on the smart phones and laptops in graphical format for better analysis purposes.

CONCLUSION AND FUTURE WORK

- In this research project, we have proposed an easy to use, fast and cost effective method to measure the personal hydration level in real time.
- Current studies focus on the prevention of dehydration in a person by constantly reminding them to drink water, whereas there no convenient mechanisms to actually measure the hydration level of the person.
- Our approach aims to provide a continuous and accurate measurement of the hydration level of the user
- However, some trade-offs are made to maintain the prompt, cost-effective and easy to use nature of the system.
- Laser sensor may be used in place of ultrasonic sensor to improve accuracy and also to increase the range in which the readings can be taken.
- We believe future work on making this system more compact and portable will prove advantageous from business point of view.

Link to Code/Github Repository

https://github.com/shirishti/IOT-based-smart-system-for-measuring-dehydration-levels

TOTAL COST DISTRIBUTION

- Arduino UNO - 320
- GSR Sensor - 1000
- Ultrasonic Sesnor - 270
- Wifi Module - 419
- LED Display - 280
- Wires - 120
- Miscellaneous - 200

Thank you