# PROJECT TITLE: SMART BREATHALYSER

## INTRODUCTION

After identifying the more common test that people take to identify a particular disease. We could collate a price of how much it would take to perform an individual test for each condition.

| **Test** | **Cost** |
|---|---|
| 1.Kidney Function Test | Rs.500 |
| 2.Stomach Cancer<br>CT Scan<br>PET Scan | <br>Rs.3000 to Rs.5000<br>Rs.2000 to Rs.6000 |
| 3.Asthma Spirometry Test | <Rs.7000 |
| 4.Diabetes Blood Sugar Test | Rs.100 to Rs.500 |
| 5.Organ Rejection Biopsy of organ | Rs.700 to Rs.1000 |
| 6.Helicobacter Pylori | Rs.1500 to Rs.4000 |
| 7.Malaria | Rs.750 |
| 8.Bacterial Overgrowth Syndrome | Rs 13,500 |

Table-1.1

Hence, we could conclude that individual tests are expensive. And since one has to go to a hospital to get it checked or pay more for someone to come home and conduct the test, it is very time-consuming and may be inconvenient for people with busy schedules. This may lead to them not getting regular checks. In fact, our survey shows that less than 50% of the target audience do

not get regular health checks but out of which a whopping 79% believe it is important to get their health checked.

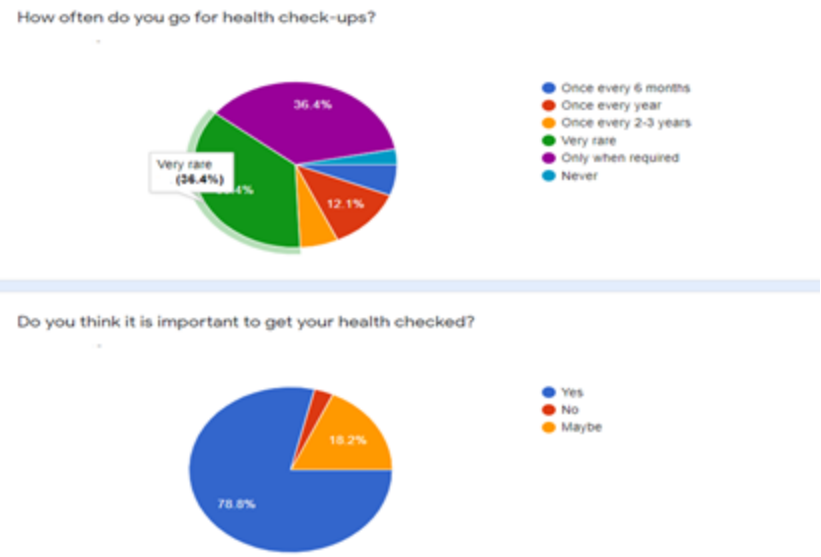



Figure-1.1

Therefore, with the rampant proliferation of technology in the healthcare industry, we want our product to be a portable, compact device that conducts such tests with ease. 87.9% of our audience agreed that they would take these tests more seriously if there was such a device available.

The key principle that we are using is the concentration of certain compounds in exhaled air. We came across many studies which could correlate the amount of a compound in the exhaled breath to a disease. More information about these studies will be included in the Literature Review.

Our survey helped us narrow down to 3 of the most prevalent disease which can be monitored by particles in a breath. These are Kidney Disease, Bacterial Overgrowth Syndrome and Diabetes.

**1.1 Kidney Disease**

www.kidney.org states that 10% of the population worldwide is affected by chronic kidney disease(CKD) and some of them may not even know until their conditions become fatal. It may be caused due to Diabetes or Hypertension. A very well known symptom of kidney disease is the excretion of ammonia either in faecal matter or through moisture escaping the body. This means exhaled breath will also contain ammonia if a person has CKD. When comparing levels of breath ammonia, we could easily identify that breath ammonia concentration was significantly elevated in patients that had issues with their kidneys (mean 4880 ppb; range 820 to 14700 ppb), when compared to normal patients (mean 960 ppb; range 425 to 1800). Hence, we can use an ammonia sensor to gauge the levels of ammonia and determine if the patient has symptoms of kidney disease or not.

### 1.2 Bacterial Overgrowth Syndrome

Better known as Small Intestine Bacterial Overgrowth (SIBO) Syndrome, it affects up to 80% of people with Irritable Bowel Syndrome (IBS). A person with SIBO may not be able to digest sugars and instead end up fermenting the sugar leading to a great deal of hydrogen that is produced. The sugar is converted to an organic acid when fermented and gives out hydrogen when decomposed. In healthy people, BOS has been described in 0-12.5% by the glucose breath test, 20-22% by the lactulose breath test, and 0-35% when the $^{14}$ C D-xylose breath test is used. Hence, by measuring the hydrogen levels in the exhaled air of a patient using a hydrogen sensor, the SIBO condition can be identified.

### 1.3 Diabetes

As of 2019, the number of adults that were living with diabetes came to a massive 463 million adults. When one contracts this condition, he or she has to make significant changes to their lifestyle to accommodate their condition to avoid fatal complications. Hence, the seriousness of getting diabetes cannot be emphasized more. Many recent incidents which will be included in the literature study have shown that alcohol sensors can be used to detect if a person has diabetes or not. Acetone, one of three primary ketone bodies generated in Diabetic Keto Acidosis (DKA) is notable as the cause of the hallmark fruity odour breath of DKA patients. In

this case, it is converted to isopropanol, an agent that is detectable by alcohol breathalyzers. Hence, an alcohol sensor can be used to determine if a patient has diabetes or not.

# CHAPTER 2

# BLOCK DIAGRAM

**Block Diagram:**

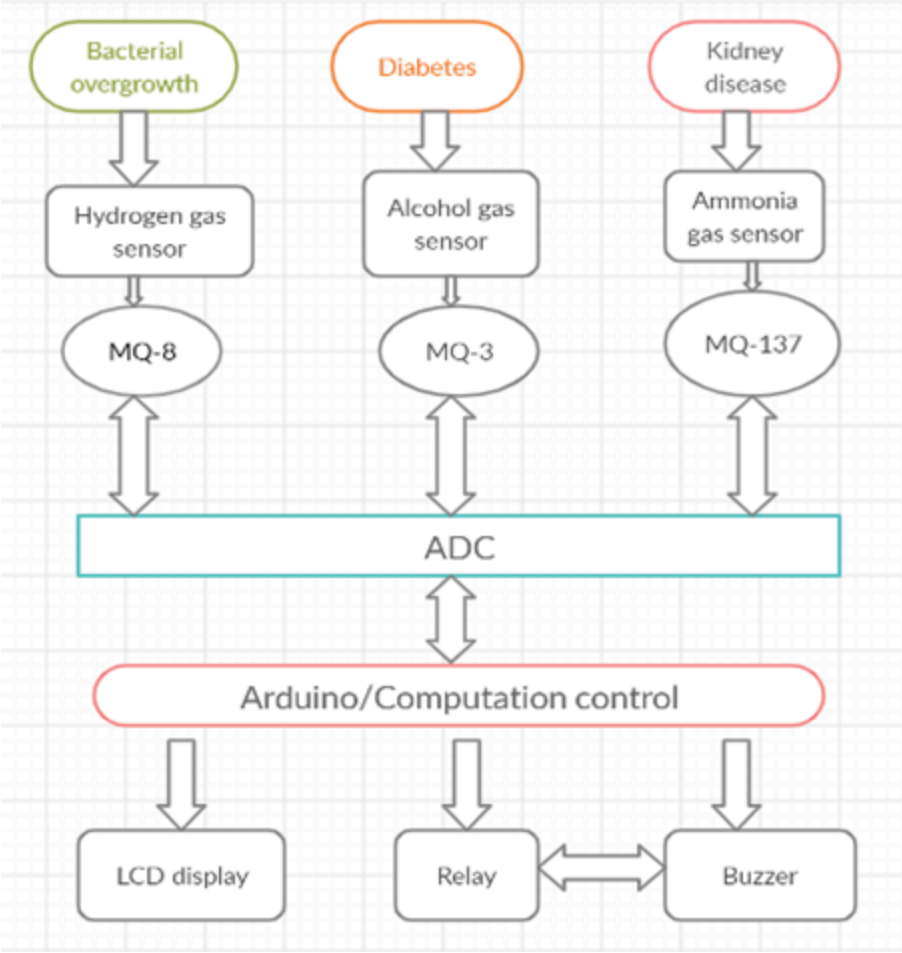



Figure-2.1

## 2.1 EXPLANATION OF EACH BLOCK

### 2.1.1 MQ-8 SENSOR:

Bacterial Overgrowth Syndrome or Small intestine bacterial overgrowth syndrome (SIBO) can be identified be using and MQ8 sensor. It is suitable for sensing hydrogen concentrations in air. The sensor can sense gas concentrations from 100-1000 ppm. The output of the sensor is an analog resistance. In the drive circuit we need to power the heater coil with 5v, add load resistance and connect the output to an ADC.

### 2.1.2 MQ-3 SENSOR:

Diabetes can be identified using an alcohol sensor. We are using an MQ3 sensor which works by identifying the presence of Acetone in the breath. In this case acetone is converted into isopropanol detectable by alcohol breathalyzers. The patient breathes into the opening of the vacuum-like area and the exhaled breath is collected and exposed to various sensors. The sensor provides an analog resistive output based on alc concentration.

### 2.1.3 MQ-137 SENSOR:

As mentioned in the introduction, Kidney Disease is identified by the presence of ammonia. We will be using an MQ137 sensor which can determine the ammonia levels of a person's breath. The patient breathes into the opening of the vacuum-like area and the exhaled breath is

‘collected’ and exposed to the various sensors. This way the sensors will be able to come up with more accurate readings.

### 2.1.4 MICROCONTROLLER

The sensors pick up the amount of the compound they are searching for and send this information to the microcontroller. This information is then analyzed with the use of a simple code that involves if-else statements to determine if the levels lie above or below the threshold value.

### 2.1.5 LCD

This information is displayed on an LCD which the patient can read and look at their levels for each condition.

### 2.1.6 RELAY/BUZZER

If any of the values are in the range of risk of having the disease, the device intimates the patient by buzzing.

### 2.1.7 WEBSITE

The data is uploaded to a website every time the readings are taken.

# CHAPTER 3

# HARDWARE DESCRIPTION

## 3.1 ARDUINO UNO

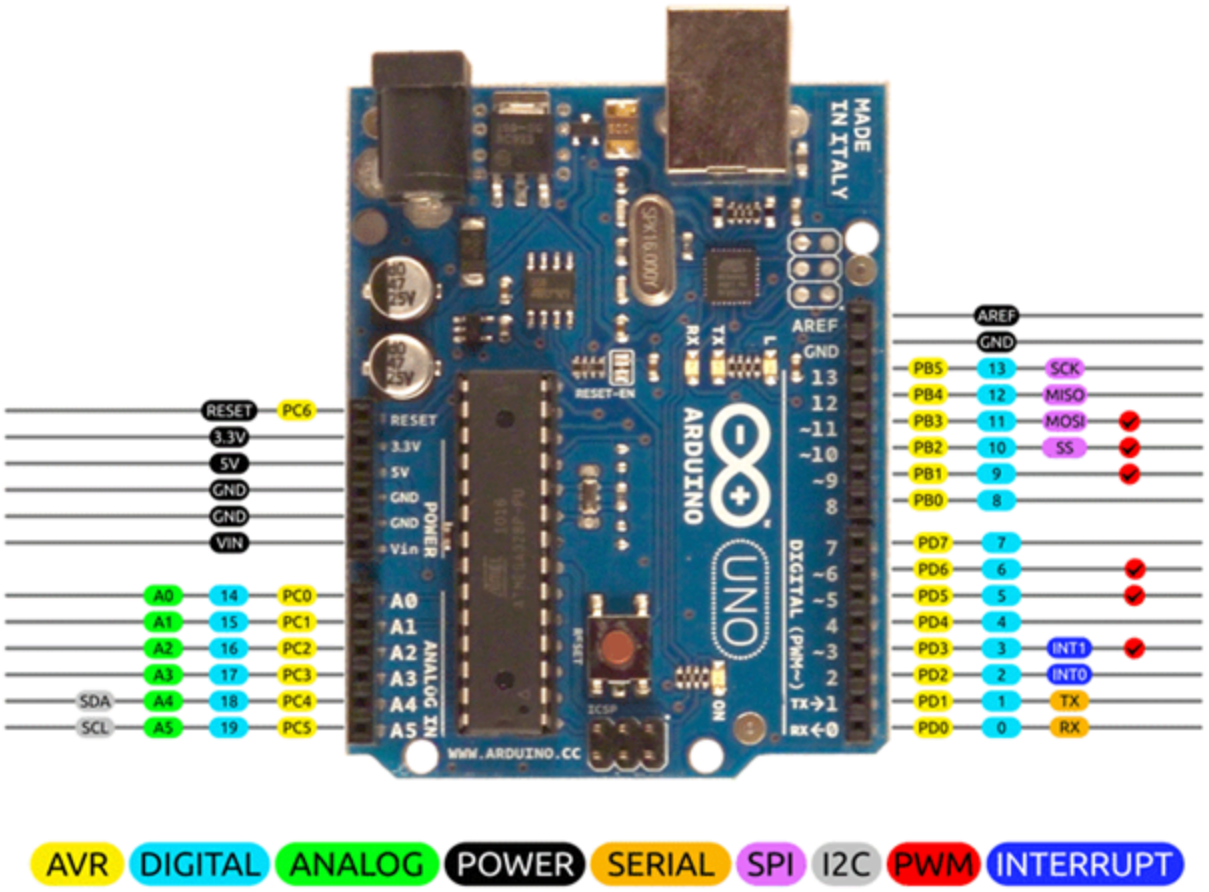



**Figure-3.1**

**Pin Description**

| ategory | ame | s |
|---|---|---|
| | /, GND, | nput voltage to Arduino when using an external power source.<br>egulated power supply used to power microcontroller and other onents on the board.<br>3.3V supply generated by on-board voltage regulator. Maximum t draw is 50mA.<br>ground pins. |

| | | |
|---|---|---|
| | | the microcontroller. |
| g Pins | A5 | o provide analog input in the range of 0-5V |
| Output Pins | l Pins 0 - | e used as input or output pins. |
| | 1(Tx) | o receive and transmit TTL serial data. |
| al Interrupts | | ger an interrupt. |
| | , 9, 11 | les 8-bit PWM output. |
| | (SS), 11<br>I), 12<br>)) and 13 | or SPI communication. |
| LED | | n on the inbuilt LED. |
| | SDA), A5 | or TWI communication. |
| | | vide reference voltage for input voltage. |

Table-3.1

**Arduino Uno Technical Specifications**

| | |
|---|---|
| Microcontroller | ATmega328P – 8 bit AVR family microcontroller |
| Operating Voltage | 5V |
| Recommended Input Voltage | 7-12V |
| Input Voltage Limits | 6-20V |
| Analog Input Pins | 6 (A0 – A5) |
| Digital I/O Pins | 14 (Out of which 6 provide PWM output) |
| DC Current on I/O Pins | 40 mA |
| DC Current on 3.3V Pin | 50 mA |
| Flash Memory | 32 KB (0.5 KB is used for Bootloader) |
| SRAM | 2 KB |
| EEPROM | 1 KB |
| Frequency (Clock Speed) | 16 MHz |

Table-3.2

**Overview**

**Arduino Uno** is a microcontroller board based on 8-bit ATmega328P microcontroller. Along with ATmega328P, it consists other components such as crystal oscillator, serial communication, voltage regulator, etc. to support the microcontroller. Arduino Uno has 14 digital input/output pins (out of which 6 can be used as PWM outputs), 6 analog input pins, a USB connection, A Power barrel jack, an ICSP header and a reset button.

The 14 digital input/output pins can be used as input or output pins by using pinMode(), digitalRead() and digitalWrite() functions in arduino programming. Each pin operate at 5V and can provide or receive a maximum of 40mA current, and has an internal pull-up resistor of 20-50 KOhms which are disconnected by default. Out of these 14 pins, some pins have specific functions as listed below:

- **Serial Pins 0 (Rx) and 1 (Tx):** Rx and Tx pins are used to receive and transmit TTL serial data. They are connected with the corresponding ATmega328P USB to TTL serial chip.
- **External Interrupt Pins 2 and 3:** These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.
- **PWM Pins 3, 5, 6, 9 and 11:** These pins provide an 8-bit PWM output by using AnalogWrite() function.
- **SPI Pins 10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK):** These pins are used for SPI communication.
- **In-built LED Pin 13:** This pin is connected with an built-in LED, when pin 13 is HIGH – LED is on and when pin 13 is LOW, its off.

Along with 14 Digital pins, there are 6 analog input pins, each of which provide 10 bits of resolution, i.e. 1024 different values. They measure from 0 to 5 volts but this limit can be increased by using AREF pin with analog Reference() function.

- Analog pin 4 (SDA) and pin 5 (SCA) also used for TWI communication using Wire library.

Arduino Uno has a couple of other pins as explained below:

- **AREF:** Used to provide reference voltage for analog inputs with analogReference() function.
- **Reset Pin:** Making this pin LOW, resets the microcontroller.

### 3.2 LCD

The liquid crystal display uses the property of light monitoring of liquid crystal and they do not emit the light directly. The Liquid crystal display is a flat panel display or the electronic visual display. With low information, content the LCD' s are obtained in the fixed image or the

arbitrary image which are displayed or hidden like present words, digits, or 7 segment display. The arbitrary images are made up of large no of small pixels and the element has larger elements.

**Figure-3.2**

Pin diagram and description of each pin have explained in the following table.

| | **me** | **Pin Description** |
|---|---|---|
| n 1 | GND | is a ground pin and the LCD is connected to the Ground |
| n 2 | VCC | C pin is used to supply the power to the LCD |
| n 3 | VEE | is used for adjusting the contrast of the LCD by connecting the variable in between the VCC & Ground. |
| n 4 | RS | is known as register select and it selects the Command/Data register. To e command register the RS should be equal to zero. To select the Data the RS should be equal to one. |
| n 5 | R/W | is used to select the operations of Read/Write. To perform the write ns the R/W should be equal to zero. To perform the read operations the ould be equal to one. |
| n 6 | EN | a enable signal pin if the positive pulses are passing through a pin, then the tion as a read/write pin. |
| n 7 | to DB7 | 7 contains total 8 pins which are used as a Data pin of LCD. |

| | | |
|---|---|---|
| 15 | ED + | n is connected to VCC and it is used for the pin 16 to set up the glow of nt of LCD. |
| 16 | ED – | n is connected to Ground and it is used for the pin 15 to set up the glow of nt of the LCD. |

Table-3.3

The following schematic diagram shows the LCD module interfacing with the Arduino.

**Figure -3.3**

### 3.3 **16-Bit ADC - 4 Channel with Programmable Gain Amplifier**

### **ADS1115**

Figure-3.4

For microcontrollers without an analog-to-digital converter or when we want a higher-precision ADC, the ADS1115 provides 16-bit precision at 860 samples/second over I2C. We need high accuracy as we are determining medical conditions. Hence, amplifying the values obtained by the sensors help us get a better read of the results. The chip can be configured as 4 single-ended input channels, or two differential channels. As a nice bonus, it even includes a programmable gain amplifier, up to x16, to help boost up smaller single/differential signals to the full range. We like this ADC because it can run from 2V to 5V power/logic, can measure a large range of signals and its super easy to use. It is a great general purpose 16bit converter.

### **3.4 MQ3 ALCOHOL GAS SENSOR:**

**Figure-3.5**

**Description**

MQ3 GAS Sensor is a very easy to use and very handy sensor. It is suitable for sensing Alcohol gas concentration. MQ3 Alcohol GAS Sensor can detect Alcohol gas concentrations anywhere from 200 to 10000 ppm. The MQ3 GAS sensor has a very hight sensitivity to Alcohol gas. The sensitive material of MQ3 Sensor is SnO2, which has lower conductivity in clean air. When the target alcohol gas exist, the sensor"s conductivity is higher along with the gas concentration rising. MQ3 GAS sensor has high sensitivity to Alcohol, and good resistance to disturb of gasoline, smoke and vapour. The sensor could be used to detect alcohol with different concentration, it is with low cost and suitable for different application.

**Features**

- High sensitivity to Alcohol Rs (in air) Rs (0.4mg/l alcohol).
- Heater voltage = 5.0V

**Application of MQ3 Alcohol GAS Sensor**

- Drunk Driver detection system
- Portable alcohol detector

Pin Configuration:

| **Pin No:** | **Pin Name:** | **Description** |
|---|---|---|
| **For Module** | | |
| 1 | Vcc | This pin powers the module, typically the operating voltage is +5V |
| 2 | Ground | Used to connect the module to system ground |

| | | |
|---|---|---|
| 3 | Digital Out | You can also use this sensor to get digital output from this pin, by setting a threshold value using the potentiometer |
| 4 | Analog Out | This pin outputs 0-5V analog voltage based on the intensity of the gas |
| **For Sensor** | | |
| 1 | H -Pins | Out of the two H pins, one pin is connected to supply and the other to ground |
| 2 | A-Pins | The A pins and B pins are interchangeable. These pins will be tied to the Supply voltage. |
| 3 | B-Pins | The A pins and B pins are interchangeable. One pin will act as output while the other will be pulled to ground. |

Table-3.4

## INTERFACING MQ3 SENSOR WITH ARDUINO:

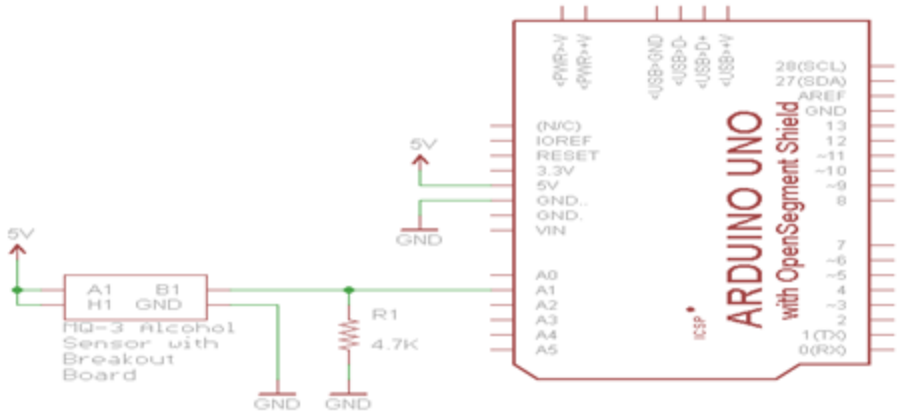



**Figure-3.6**

## 3.5 HYDROGEN SENSOR MQ8


**1 = Vcc**
**2 = AOUT**
**3 = DOUT**
**4 = GND**

**(bottom view)**

Figure-3.7

- Ø There 4 leads are Vcc, AOUT, DOUT, and GND.
- Ø The Vcc and GND leads establishes power for the hydrogen sensor.
- Ø The other 2 leads are AOUT (analog output) and DOUT (digital output). How the sensor works is the terminal AOUT gives an analog voltage output in proportion to the amount of methane the sensor detects. The more methane it detects, the greater the analog voltage it will output. Conversely, the less CO it detects, the less analog voltage it will output. If the analog voltage reaches a certain threshold, it will send the digital pin DOUT high. Once this DOUT pin goes high, the arduino will detect this and will trigger the LED to turn on, signaling that the methane threshold has been reached and is now over the limit. How you can change this threshold level is by adjusting the potentiometer to either raise or lower the level.

**INTERFACING MQ8 HYDROGEN SENSOR WITH ARDUINO**

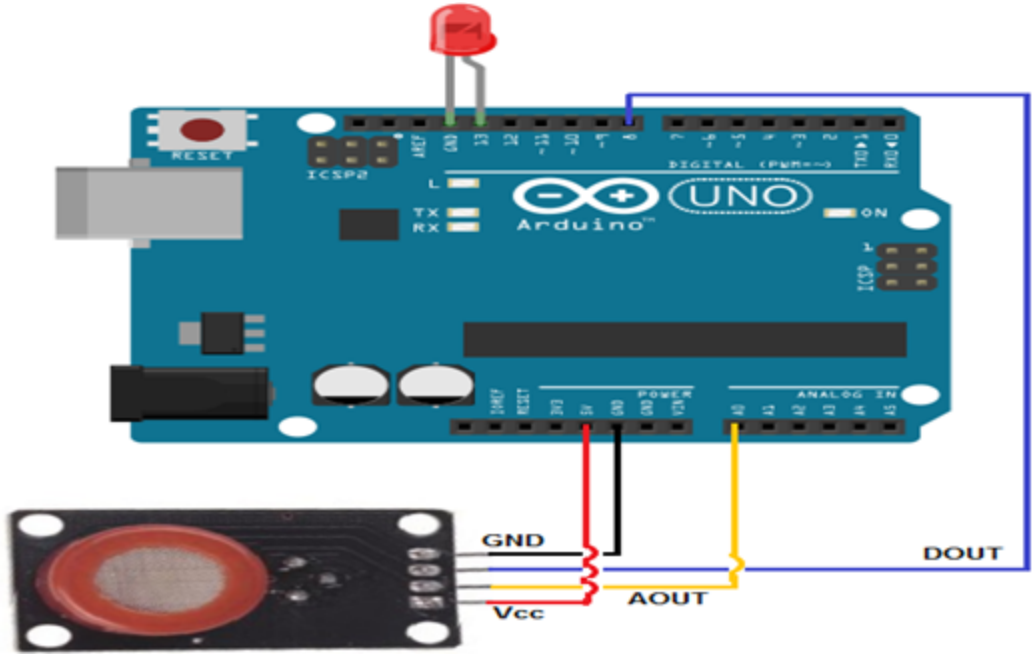
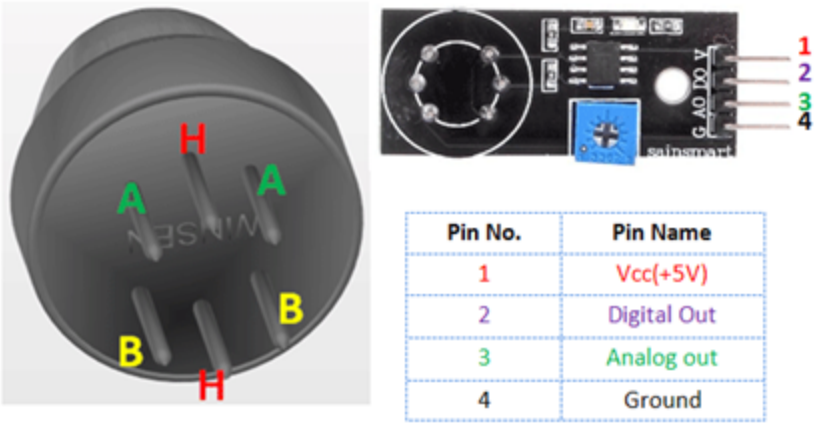



**Figure -3.8**

**3.6 AMMONIA SENSOR MQ-137**




| Pin No. | Pin Name |
|---|---|
| 1 | Vcc(+5V) |
| 2 | Digital Out |
| 3 | Analog out |
| 4 | Ground |

**Figure—3.9**

MQ-137 Pin Configuration

| Pin No: | Pin Name: | Description |
|---|---|---|
| **For Module** | | |
| 1 | Vcc | This pin powers the module, typically the operating voltage is +5V |
| 2 | Ground | Used to connect the module to system ground |
| 3 | Digital Out | You can also use this sensor to get digital output from this pin, by setting a threshold value using the potentiometer |
| 4 | Analog Out | This pin outputs 0-5V analog voltage based on the intensity of the gas |
| **For Sensor** | | |
| 1 | H -Pins | Out of the two H pins, one pin is connected to supply and the other to ground |

| | | |
|---|---|---|
| 2 | A-Pins | The A pins and B pins are interchangeable. These pins will be tied to Supply voltage. |
| 3 | B-Pins | The A pins and B pins are interchangeable. One pin will act as output while the other will be pulled to ground. |

Table-3.5

MQ-137 Sensor Features

- Operating Voltage is +5V
- Can be used to Measure Ammonia, Carbon monoxide
- Analog output voltage: 0V to 5V
- Digital Output Voltage: 0V or 5V (TTL Logic)
- Preheat duration over 24 hours
- Can be used as a Digital or analog sensor
- The Sensitivity of Digital pin can be varied using the potentiometer

**INTERFACING MQ-137 WITH ARDUINO:**

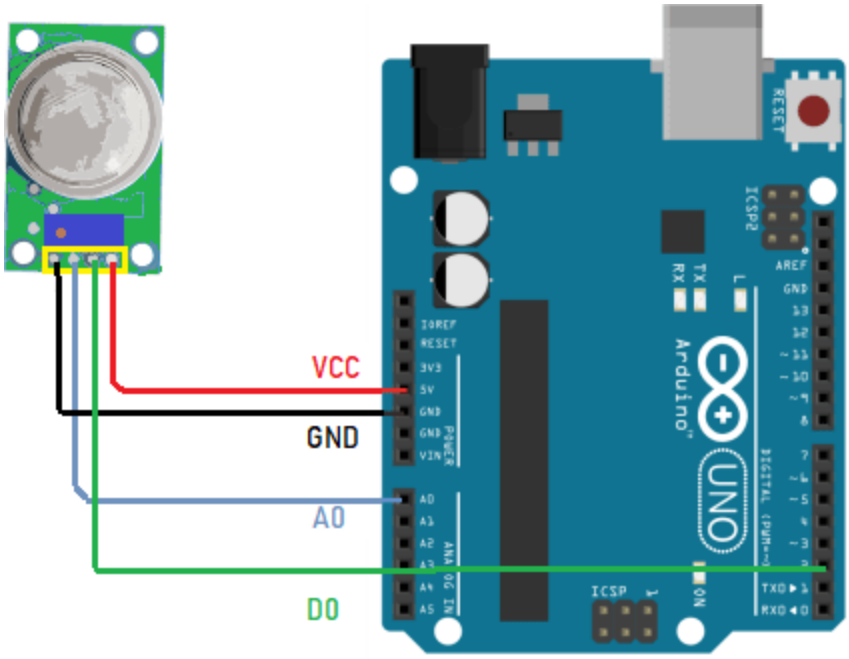



**Figure -3.10**

### 3.7 Vacuum Chamber

Once a person blows, the breath exhaled is contained in a Vacuum chamber. This chamber is preferably a vacuum chamber because even the slightest impurity in the air or anything other than the person's breath will have an impact on the accuracy of the result.

This Vacuum chamber has all of the three sensors. This chamber is where the three sensors take the reading of the person's breath. This is to ensure the breath is in the purest form.

Vacuum, space in which there is no matter or in which the pressure is so low that any particles in the space do not affect any processes being carried on there. It is a condition well below normal atmospheric pressure and is measured in units of pressure (the pascal). A vacuum can be created by removing air from a space using a vacuum pump or by reducing the pressure using a fast flow of fluid, as in Bernoulli's principle

Bernoulli's theorem is the principle of energy conservation for ideal fluids in steady, or streamline, flow and is the basis for many engineering applications.

Create a mini vacuum pump to create a vacuum in the chamber by having the following requirements:

Ø A pipe

Ø A balloon

Ø A single use syringe

Ø 3 EP-2 one-way valve

HOW TO DO:

Create a small hole on top side of the syringe to connect the tube through the one way valve


Figure-3.11

Fit the valve to the hole then put a small piece of tube on the top opening of the syringe then put a valve to the other end of the small tube like this

Figure-3.12

The one side of glass chamber is connected to the sensors and the other end is to blow for patient

Now create a hole in the chamber to that connect a EP-2 valve and now connect one end of the tube to the gas chamber valve and the other to the valve connected to the small tube in syringe.

Figure-3.13

Blow little air into the ballo0n and keep it inside the chamber and seal it now when we press the syringe the pressure variation occurs and vacuum will be created in the chamber.

Figure-3.14

**PRINCIPLE:**

The reducing of pressure creates vacuum as per Bernoulli's theorem this setup creates low pressure than outside so the vacuum will be created

# CHAPTER 4

# SOFTWARE DESCRIPTION

## 4.1 Software used: Arduino IDE

- Arduino IDE is an open source software that is mainly used for writing and compiling the code into the Arduino Module.
- It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process.
- It is easily available for operating systems like MAC, Windows, Linux and runs on the Java Platform that comes with inbuilt functions and commands that play a vital role for debugging, editing and compiling the code in the environment.
- A range of Arduino modules available including Arduino Uno, Arduino Mega, Arduino Leonardo, Arduino Micro and many more.
- Each of them contains a microcontroller on the board that is actually programmed and accepts the information in the form of code.
- The main code, also known as a sketch, created on the IDE platform will ultimately generate a Hex File which is then transferred and uploaded in the controller on the board.
- The IDE environment mainly contains two basic parts: Editor and Compiler where former is used for writing the required code and later is used for compiling and uploading the code into the given Arduino Module.
- This environment supports both C and C++ languages.

**How to Download Arduino IDE**

[dt_gap height="10" /]You can download the Software from Arduino main website. As I said earlier, the software is available for common operating systems like Linux, Windows, and MAX, so make sure you are downloading the correct software version that is easily compatible with your operating system.

- If you aim to download Windows app version, make sure you have Windows 8.1 or Windows 10, as app version is not compatible with Windows 7 or older version of this operating system.

The IDE environment is mainly distributed into three sections

- **1. Menu Bar**
- **2. Text Editor**
- **3. Output Pane**

**4.2 IMPLEMENTATION CODE :**

**Configuring the Arduino with Alcohol and Hydrogen sensors the following code is executed to measure the alcohol and hydrogen content level in breadth.**

```
//Alcohol

const int AOUTpin=0;//the AOUT pin of the alcohol sensor goes into analog pin A0 of the arduino

const int DOUTpin=8;//the DOUT pin of the alcohol sensor goes into digital pin D8 of the arduino

const int ledPin=13;//the anode of the LED connects to digital pin D13 of the arduino


//Hydrogen

const int H_AOUTpin=1;//the AOUT pin of the hydrogen sensor goes into analog pin A0 of the arduino

const int H_DOUTpin=9;//the DOUT pin of the hydrogen sensor goes into digital pin D8 of the arduino

const int H_ledPin=12;//the anode of the LED connects to digital pin D13 of the arduino


int limit;

int value;


int H_value;

int H_limit;


void setup() {

Serial.begin(115200);//sets the baud rate

pinMode(DOUTpin, INPUT);//sets the pin as an input to the arduino

pinMode(ledPin, OUTPUT);//sets the pin as an output of the arduino
```

```
pinMode(H_DOUTpin, INPUT);//sets the pin as an input to the arduino

pinMode(H_ledPin, OUTPUT);//sets the pin as an output of the arduino

}


void loop()

{

value= analogRead(AOUTpin);//reads the analaog value from the alcohol sensor's AOUT pin

limit= digitalRead(DOUTpin);//reads the digital value from the alcohol sensor's DOUT pin


H_value= analogRead(H_AOUTpin);//reads the analaog value from the hydrogen sensor's
AOUT pin

H_limit= digitalRead(H_DOUTpin);//reads the digital value from the hydrogen sensor's DOUT
pin


Serial.print("Alcohol value: ");

Serial.println(value);//prints the alcohol value

//Serial.print("Limit: ");

//Serial.print(limit);//prints the limit reached as either LOW or HIGH (above or underneath)

delay(100);

Serial.print("Hydrogen value: ");

Serial.println(H_value);//prints the hydrogen value

//Serial.print("Limit: ");

//Serial.print(H_limit);//prints the limit reached as either LOW or HIGH (above or underneath)
```

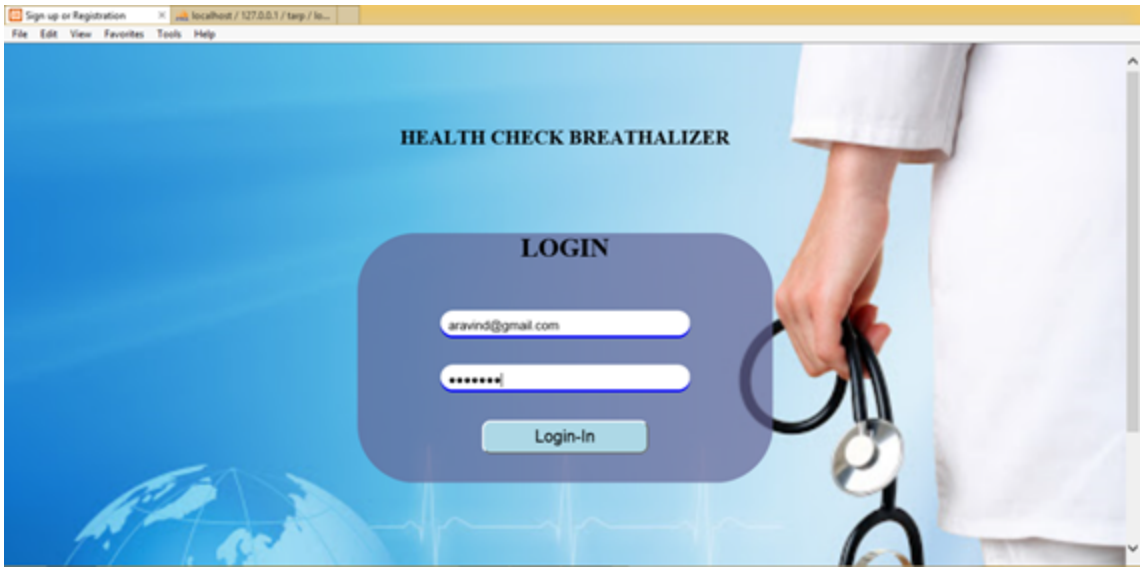
```
Serial.print("\n");

delay(2500);


if (value <= 180){

digitalWrite(ledPin, HIGH);//if limit has been reached, LED turns on as status indicator

}

else{

digitalWrite(ledPin, LOW);//if threshold not reached, LED remains off

}

}
```

**The software set up for developing a website :**

The patients to have track of their medical records and diagnosis through the breadth tests are uploaded in the website handled by an administrator. Each user(patient) signs up and is assigned a login credentials, where they patients can view their record.

The Admin stores the data base of all the patients and their medical history and has control over the records.

**LOGIN**



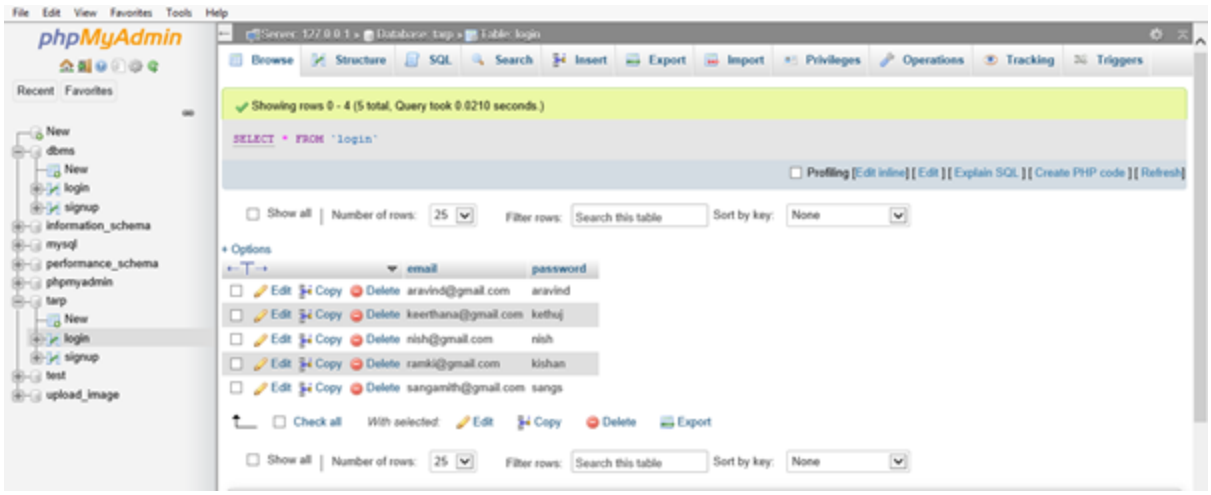

```
<html>
<head>
<title> Sign up or Registration </title>
        <style>
        .topic{
        text-align: center;
        border-top: 200px;
        margin-top: 100px;
        }
        .start{
        width: 500px;
        height: 300px;
        text-align: center;
```

```
margin: 100 auto;
background-color: white;
border-radius: 70px;
margin-top: 100px;
background: rgba(100, 100, 150, 0.7);
}
.bg{
background-image: url(img.jpg);
background-size: cover;
}
.txtbox{
margin-top: 35px;
background: white;
text-align: start;
font-size: 15px;
font-family: Arial;
height: 30px;
width: 300px;
padding: 10px;
border: none;
border-radius: 15px;
box-shadow: 0 3px 0 blue;
```

```
        }
        .txtbox:hover{
        background-color: aqua;
        }
        .btn{
        width: 200px;
        height: 40px;
        border-radius: 10px;
            font-size: 20px;
        background-color: lightblue;
        }

        </style>
</head>
<div class = "topic">
<h2> HEALTH CHECK BREATHALIZER </h2>
</div>
<body class = "bg">
<div class = "start">
        <h1>LOGIN</h1>

        <form action = "connectlogin.php" method = "POST">
```

```
        <input type = "email" name = "email" class = "txtbox" placeholder = "Enter Mail ID"
/><br>

        <input type = "password" name = "password" class = "txtbox" placeholder = "Password"
/><br><br><br>


        <input type = "submit" name = "login" class = "btn" value = "Login-In"/>


        </form>


</div>




</body>


</html>
```

**LOGIN UI CONNECTING TO DATABASE**




```
<?php

$email = $_POST['email'];

$password = $_POST['password'];


$connection = new mysqli('localhost','Aravind','Aravind@123','tarp');

if($connection->connect_error){

        die('Connection Failed : '.$connection->connectlogin_error);

}

else{



        $stmt = $connection->prepare("insert into login(email, password)

        values(?, ?)");

        $stmt->bind_param("ss",$email, $password);
```

```
        $stmt->execute();
        echo "Registration Successfully...";
        $stmt->close();
        $connection->close();
}
?>
```

SIGNUP UI

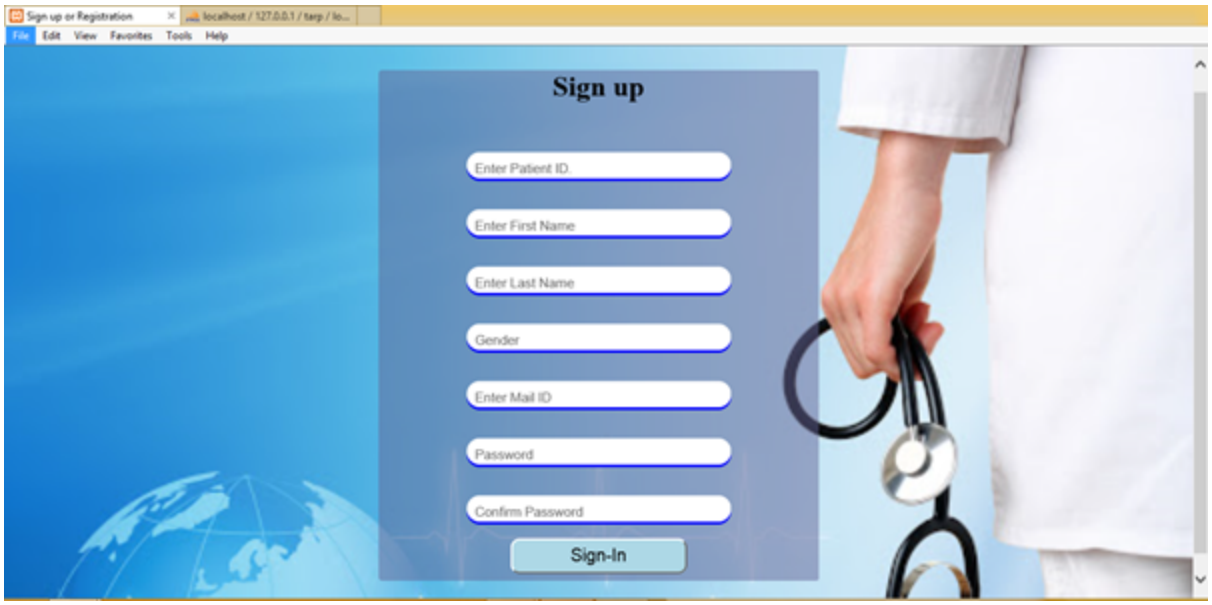
```
<html>
<head>
<title> Sign up or Registration </title>
        <style>
        .start{
        width: 500px;
        height: 580px;
        text-align: center;
        margin: 0 auto;
        background-color: white;
        border-radius: 04px;
        margin-top: 50px;
            background: rgba(100, 100, 150, 0.5);
        }
        .bg{
```

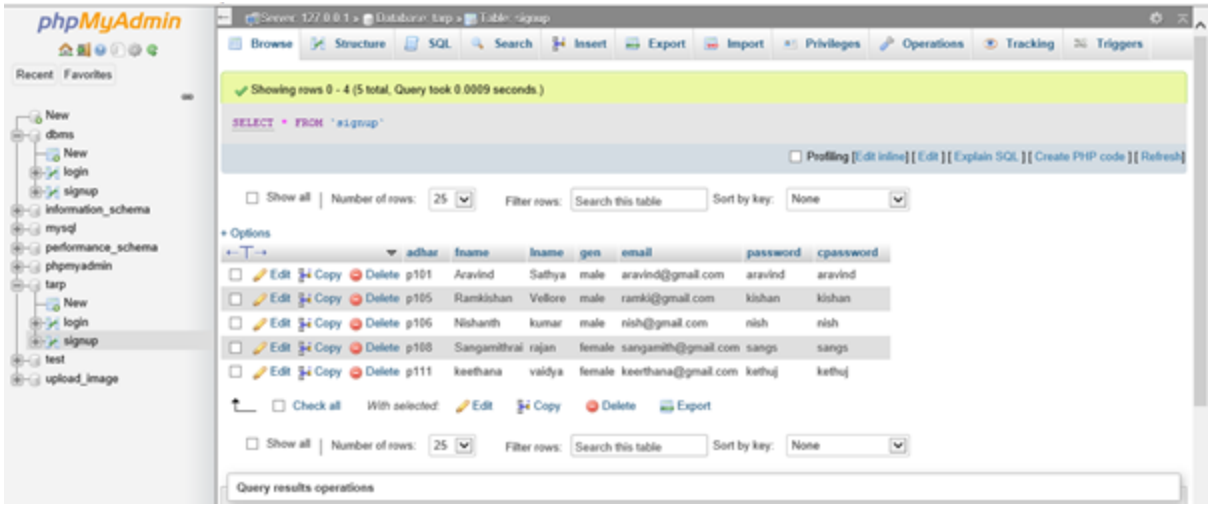
```
background-image: url(img.jpg);
background-size: cover;
}
.txtbox{
margin-top: 35px;
background: white;
text-align: start;
font-size: 15px;
font-family: Arial;
height: 30px;
width: 300px;
padding: 10px;
border: none;
border-radius: 15px;
box-shadow: 0 3px 0 blue;
}
.txtbox:hover{
background-color: aqua;
}
.btn{
width: 200px;
height: 40px;
```

```
        border-radius: 10px;
        font-size: 20px;
        background-color: lightblue;
        }

        </style>
</head>
<body class = "bg">
<div class = "Start">

        <h1> Sign up </h1>

        <form action = "connectsignup.php" method = "POST">

        <input type = "number" name = "adhar" class = "txtbox" placeholder = "Enter Patient ID." /><br>
        <input type = "text" name = "fname" class = "txtbox" placeholder = "Enter First Name" /><br>
        <input type = "text" name = "lname" class = "txtbox" placeholder = "Enter Last Name" /><br>
        <input type = "gen" name = "gen" class = "txtbox" placeholder = "Gender" /><br>
        <input type = "email" name = "email" class = "txtbox" placeholder = "Enter Mail ID" /><br>
```

```
        <input type = "password" name = "password" class = "txtbox" placeholder = "Password" /><br>

        <input type = "password" name = "cpassword" class = "txtbox" placeholder = "Confirm Password" /><br><br>


        <input type = "submit" name = "login" class = "btn" value = "Sign-In"/>


        </form>


</div>


</body>


</html>
```

**SIGNUP UI CONNECTING TO DATABASE**




<?php

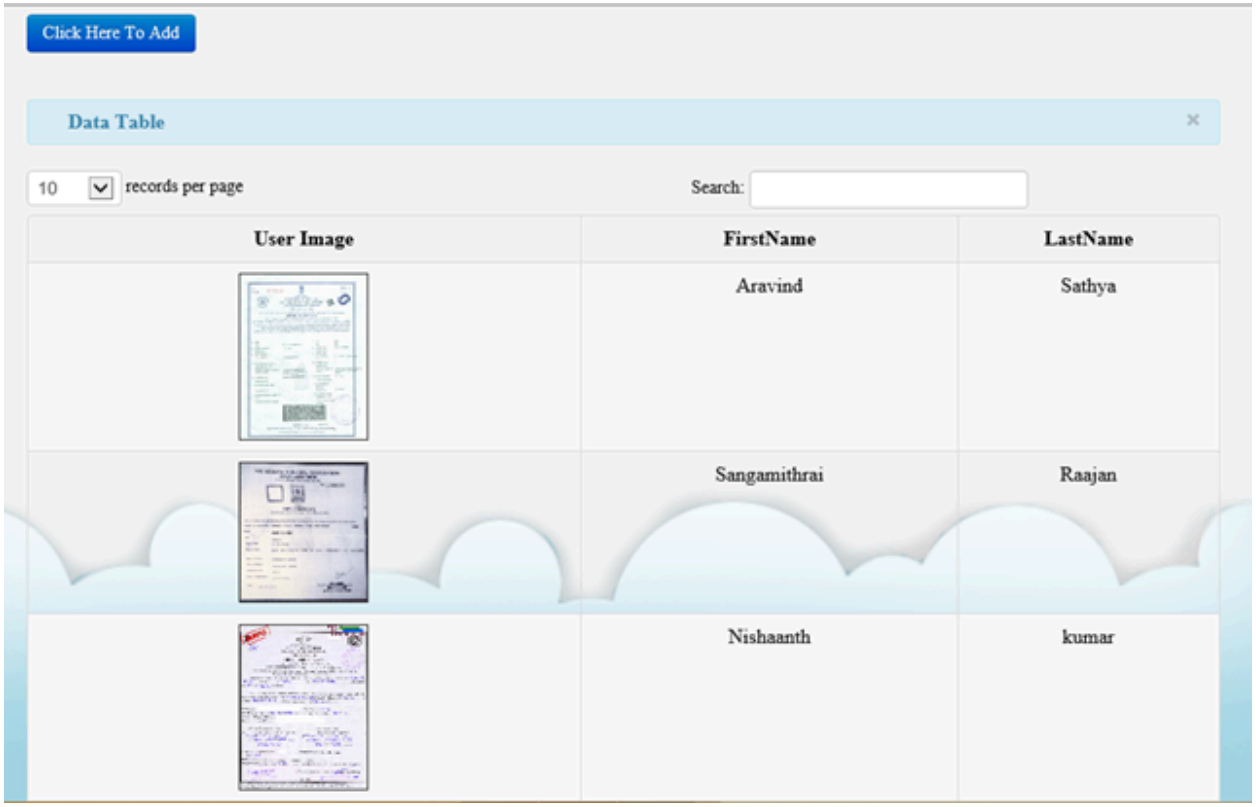
$adhar = $_POST['adhar'];

$fname = $_POST['fname'];

$lname = $_POST['lname'];

```
$gen = $_POST['gen'];

$email = $_POST['email'];

$password = $_POST['password'];

$cpassword = $_POST['cpassword'];


$connection = new mysqli('localhost','Aravind','Aravind@123','tarp');

if($connection->connect_error){

        die('Connection Failed : '.$connection->connect_error);

}

else{



        $stmt = $connection->prepare("insert into signup(adhar, fname, lname, gen, email,
password, cpassword)

        values(?, ?, ?, ?, ?, ?, ?)");

    $stmt->bind_param("isssss",$adhar, $fname, $lname, $gen, $email, $password, $cpassword);

        $stmt->execute();

        echo "Registration Successfully...";

        $stmt->close();

        $connection->close();

}

?>
```

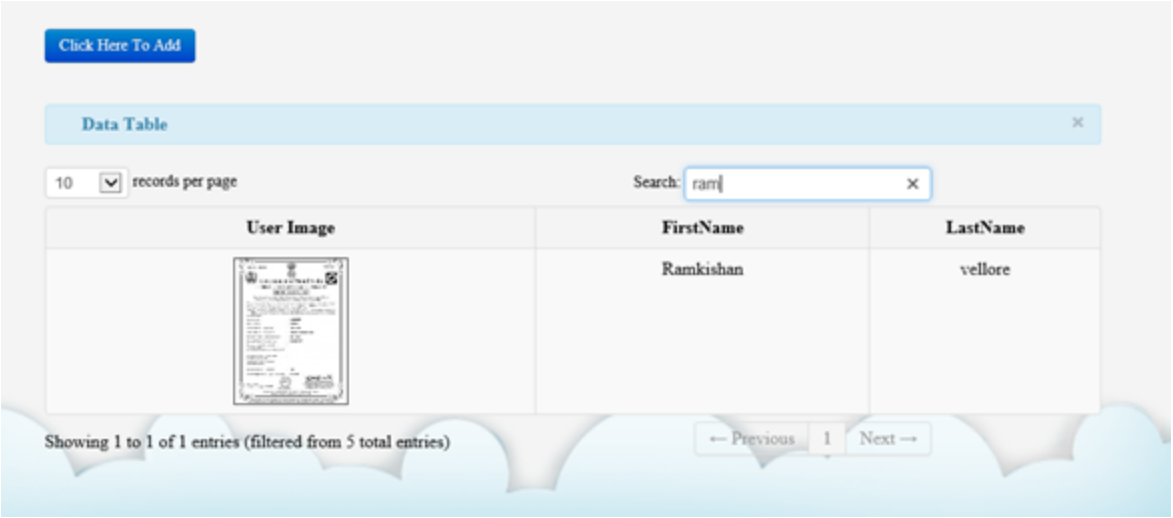
ADMIN PORTAL UI -




```
<?php include('header.php'); ?>

<body>



        <div class="row-fluid">

        <div class="span12">



        <div class="container">
```

```
<?php include('modal_add.php'); ?>


                    <table cellpadding="0" cellspacing="0" border="0" class="table table-striped table-bordered" id="example">

                        <div class="alert alert-info">

                        <button type="button" class="close" data-dismiss="alert">&times;</button>

                    <strong><i class="icon-user icon-large"></i> Data Table</strong>

                        </div>

                        <thead>

                        <tr>

                            <th style="text-align:center;">User Image…
```

ADMIN SEARCH MODAL -

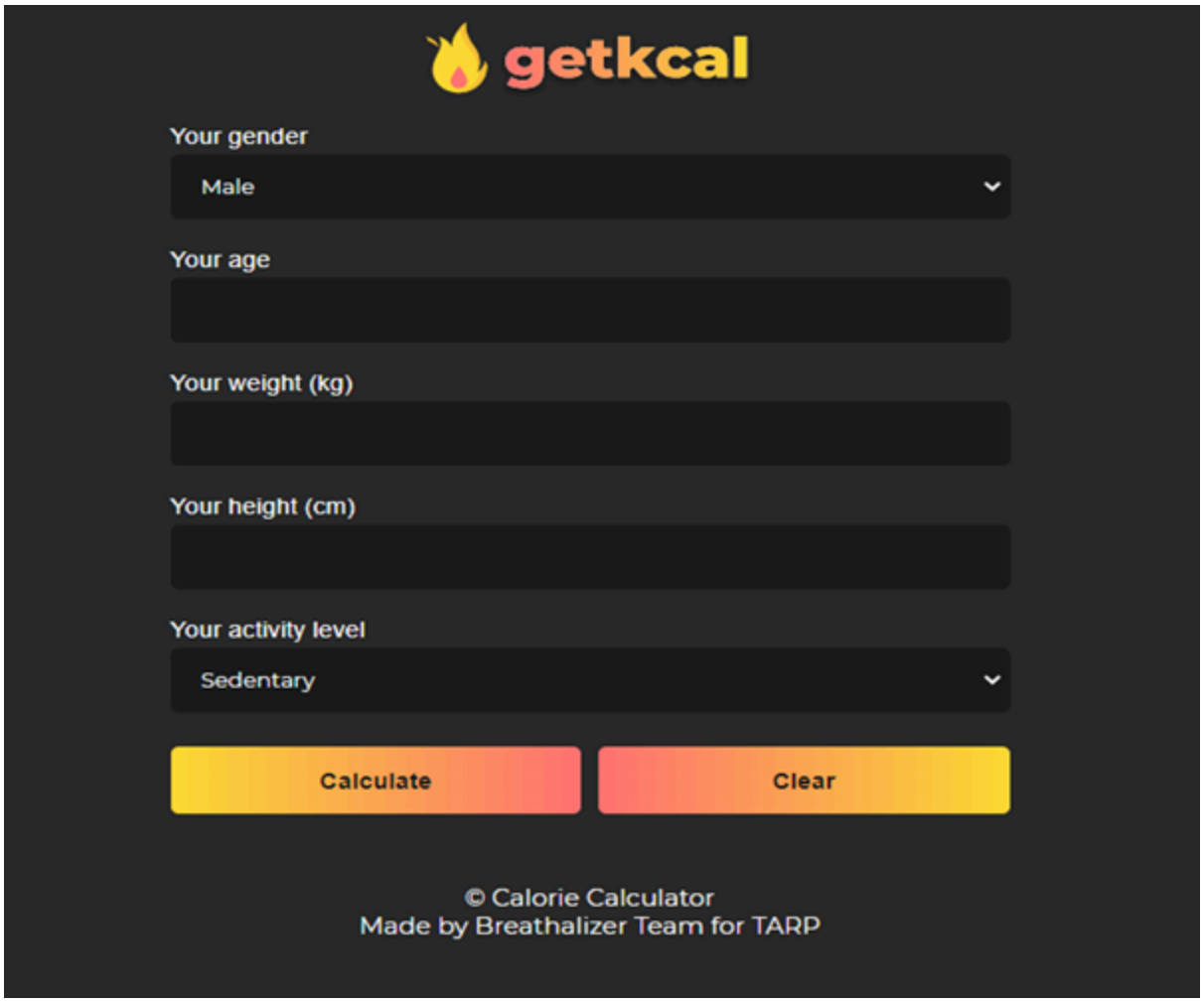



```
<!-- Button to trigger modal -->
```

```
	<a class="btn btn-primary" href="#myModal" data-toggle="modal">Click Here To Add</a>

	<br>

	<br>

	<br>

<!-- Modal -->

<div id="myModal" class="modal hide fade" tabindex="-1" role="dialog" aria-labelledby="myModalLabel" aria-hidden="true">

<div class="modal-header">


<h3 id="myModalLabel">Add</h3>

</div>

<div class="modal-body">

<form method="post" action="upload.php"  enctype="multipart/form-data">

<table class="table1">

	<tr>

		<td><label style="color:#3a87ad; font-size:18px;">FirstName</label></td>

		<td width="30"></td>

		<td><input type="text" name="first_name" placeholder="FirstName" required /></td>

	</tr>

	<tr>

		<td><label style="color:#3a87ad; font-size:18px;">LastName</label></td>

		<td width="30"></td>
```

<td><i…

**CALORIE CALCULATOR –**

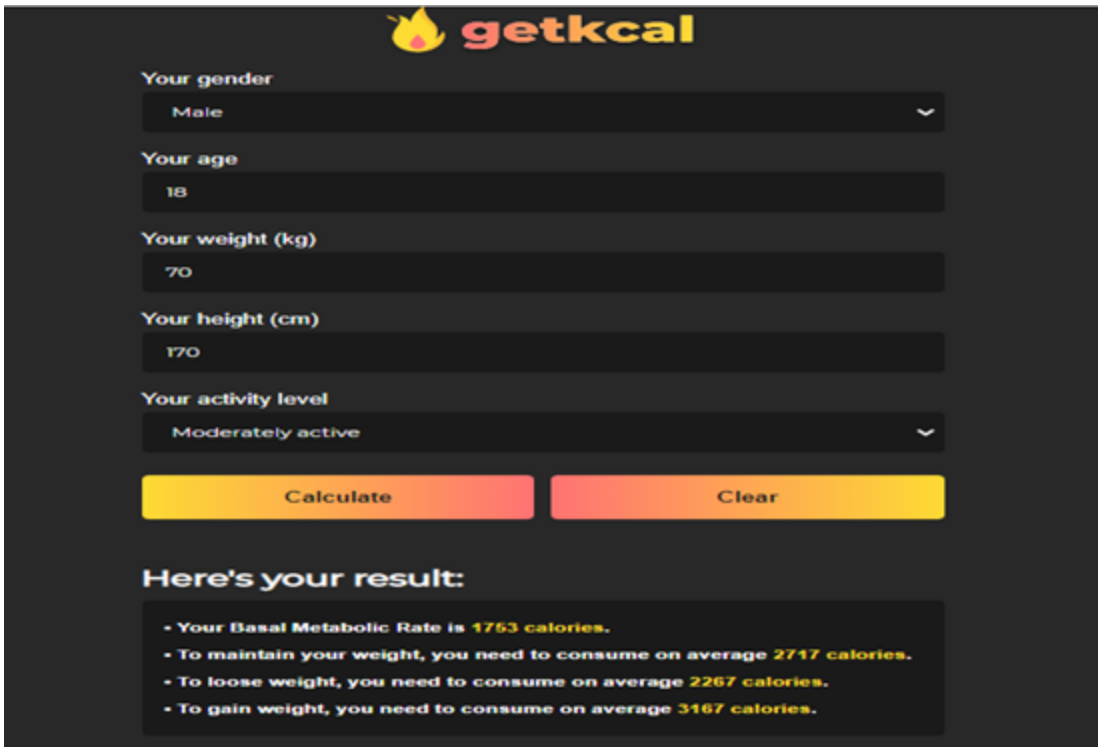



```
<!DOCTYPE html>
<html lang="en">
 <head>
        <meta charset="UTF-8" />
        <meta name="viewport" content="width=device-width, initial-scale=1.0" />
        <title>Breathalizer - Calorie Check</title>
```

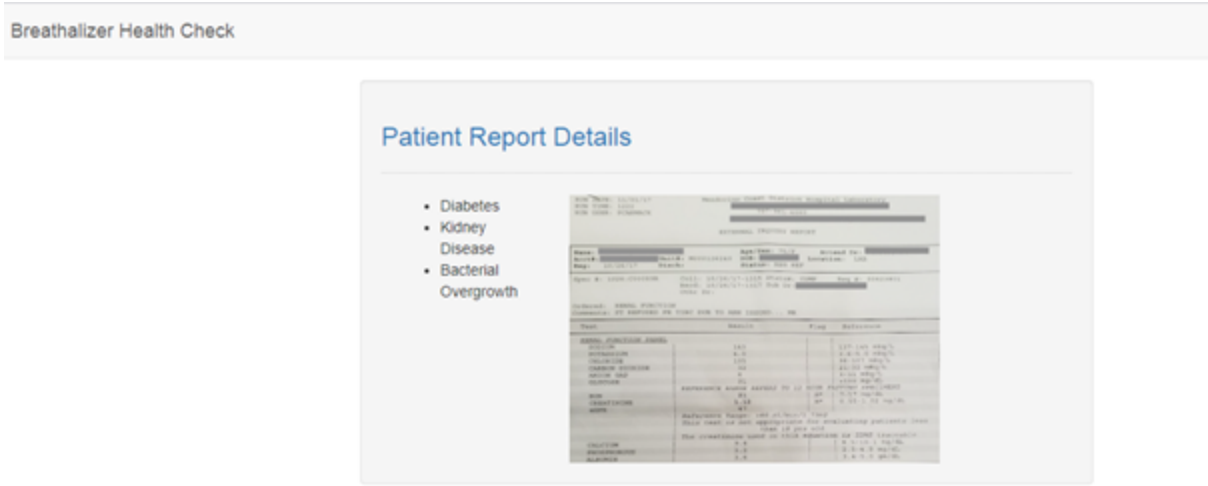
```
        <link rel="shortcut icon" href="assets/images/favicon.ico" />
        <link href="assets/css/styles.css" rel="stylesheet" />
</head>

<body>
        <div class="container">
        <header>
        <img src="assets/images/logo.svg" alt="getkcal" />
        </header>

        <div class="content">
        <form id="form">
        <div class="form-group">
        <label for="gender">Your gender</label>
        <select id="gender" required>
        <option value="male">Male</option>
        <option value="female">Female</option>
        </select>
        </div>
        <div class="form-group">
        <label for="age">Your age</label>
        <input type="number" id="age" required />
```

```
</div>
<div class="form-group">
<label for="weight">Your weight (kg)</label>
<input type="number" id="weight" required />
</div>
<div class="form-group">
<label for="height">Your height (cm)</label>
<input type="number" id="height" required />
</div>
<div class="form-group">
<label for="activity_level">Your activity level</label>
<select id="activity_level" required>
<option value="1.2">Sedentary</option>
<option value="1.375">Lightly active</option>
<option value="1.55">Moderately active</option>
<option value="1.725">Vigorously active</option>
<option value="1.9">Extremely active</option>
</select>
</div>

<div class="form-group-btn">
<button class="btn-submit" type="submit">Calculate</button>
```

```
        <button class="btn-reset" type="reset">Clear</button>
        </div>
        </form>
        <div class="result-container" id="result"></div>
        </div>

        <footer class="form-group footer-container">
        &copy; Calorie Calculator <br />
        Made by Breathalizer Team for TARP
        </footer>
        </div>

        <script src="assets/js/script.js" type="text/javascript"></script>
  </body>
</html>
```




**PATIENT REPORTS AFTER LOGIN**




<!DOCTYPE html>

<html lang="en">

<head>

```
        <meta charset="UTF-8" name="viewport" content="width=device-width,
initial-scale=1"/>

        <link rel="stylesheet" type="text/css" href="css/bootstrap.css"/>

    </head>

<body>

    <nav class="navbar navbar-default">

        <div class="container-fluid">

            <a class="navbar-brand" href="https://sourcecodeter.com">Breathalizer
Health Check</a>

        </div>

    </nav>

    <div class="col-md-3"></div>

    <div class="col-md-6 well">

        <h3 class="text-primary">Patient Report Details</h3>

        <hr style="border-top:1px dotted #ccc;">

        <div class="col-md-3">

            <ul>

                <li style="cursor:pointer;"
onclick="displayImage('diabetes');">Diabetes</li>

                <li style="cursor:pointer;"
onclick="displayImage('kidney');">Kidney Disease</li>

                <li style="cursor:pointer;"
onclick="displayImage('bacterialgrowth');">Bacterial Overgrowth</li>

            </ul>
```

```
            </div>
            <div class="col-md-7">
                <div id="result">
                    <center><h1>Patient Report Available</h1></center>
                </div>
            </div>
        </div>
<script src="js/script.js"></script>
</body>
</html>
```

**4.5 RESULTS AND INFERENCE:**

Taking the primary tests with people and their diagnosis been classified according to the clinical parameters for the alcohol content in breath for diabetes, hydrogen content in breath for Bacteria Overgrowth Syndrome and Ammonia content in breath for Chronic Kidney Disease.

These results are recorded, viewed, and accessed through the website created. Therefore, creating a user interface for easier utilization of the device.

With the results, the nutrition and the calorie content that has to be monitored for the patient with each specific diagnosis can be checked in the Caloriecal section. Thus, giving an overall insight on the diagnosis.

# CHAPTER 5

# CONCLUSION

## 5.1 Conclusion

An idea evolving from the misinterpreted cases of drunken drive and type 1 diabetes, the smart Breathalyzer for Diabetes, Chronic Kidney Disease and Bacterial Overgrowth Syndrome has been designed serving as a non-invasive method of laboratory tests for convenient diagnosis of diseases. Accompanies by a website that provides a friendly user interface for accessing their clinical reports and tracking the health of the body calorically.

## 5.2 Future Scope of Project

- Hydrogen breath tests are widely used to explore the pathophysiology of functional gastrointestinal disorders.

- Small intestinal bacterial overgrowth and carbohydrate malabsorption are disorders detected by hydrogen breath tests that have been proposed to be of great importance for symptoms in, for instance, irritable bowel syndrome.
- The Breathalyzer has been designed and constructed to be low-cost such that it can be used for early detection and prevention of tooth decay (ammonia).
- The device is expected to provide clinically accurate, real time information to patients and clinicians.
- These Breathalyzers help to identify children with new diabetes.
- Colorectal Cancer can be encountered using breath test and also be able to distinguish between cancer patients and healthy patients with 75% accuracy.
- Lung cancer can be found as it identifies a unique chemical in the breath of lung cancer patients.
- It helps to find a type of bacteria that may be involved in both weight and levels of gas in the breath (obesity).
- In addition to this a Breathalyzer can discover the following diseases.

    1. Asthma detection by exhaled nitric oxide
    2. Diagnosis of bad breath
    3. Organ rejection
    4. Carbon Monoxide poisoning
    5. Smoking cessation
    6. Measurement of endogenous metabolic processes

**5.3 References**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