International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 6 June 2021, pp: 132-140 www.ijaem.net ISSN: 2395-5252

An IOT Based Monitoring System For Determination Of Contamination In Milk.

Pragati Gayakwad1, Ashwini chaple2, Aishwarya wase3, Shweta Wankhede4, Priyanka lohote5

[1,2,3,4,5] *Student, Yeshwantrao Chavan College of Engineering, Nagpur, Maharashtra*

Submitted: 25-05-2021 Revised: 31-05-2021 Accepted: 03-06-2021

ABSTRACT: Milk may be a decent source of numerous essential nutrients, including calcium, protein, and ergocalciferol. Many folks see it as a significant a part of a diet. Others, however, cite various reasons for selecting to not consume it.Sources of milk and milk products include cows, sheep, camels, goats, and lots of others. Milk alternatives include soy milk, almond milk, flax milk, coconut milk, and hemp milk. Our Project target is to figure out on contaminated milk.

An infinite quite food products are fabricated from cows milk, like cheese, cream, butter, and yogurt.These foods are brought up as dairy or milk products and are a heavyan elements of fashionable diet. The nutritional composition of milk is very complex, and it contains almost every single nutrient that your body needs.One cup (240 ml) of whole cows milk with water - 87.7%,lactose (carbohydrate)- 4.9% ,Fat- 3.4% ,Protein- 3.3% ,Minerals- 0.7%.

The results of milk on weight appear to be documented, and therefore the conclusions of the overwhelming majority of published studies indicate that dairy consumption doesn't increase cardiovascular risk or the incidence of some cancers. milk and its derivatives might actually be beneficial to some population segments. Although future studies will help elucidate the role of milk and dairy products in human health, their use within a diet should be considered within the absence of clear contraindications.

Keywords: Internet of Things (IoT) based system, Arduino(ATmega 328)

I. INTRODUCTION

Milk is that the cornerstone of cheese. Humans are preserving milk for many years. Cows, sheep, goats, and sometimes buffalo are used round the world to make a plethora of cheeses. At the guts of it, milk is created of 4 components aside from water: fat, protein, lactose, and minerals. Additionally to require advantage of, several dairy products like cream, butter, yogurt, kefir, and cheese are produced and consumed worldwide for millennia. Therefore, the impact of milk and dairy products on human.[2] Using Internet of Things we can locate in real time the nearest location to dispose the milk before it gets spoiled. The driver of the milk delivery vehicle gets the notifications about the most optimal routes to deliver milk before spoilage.

Health is quantitatively relevant and has been the topic of several investigations, on both whole products and theirisolated components. particularly, the fat portion of milk (largely composed of SFAs) and some of its minorcomponents, notably calcium and oligosaccharides, are being actively researched for his or her potential health roles.

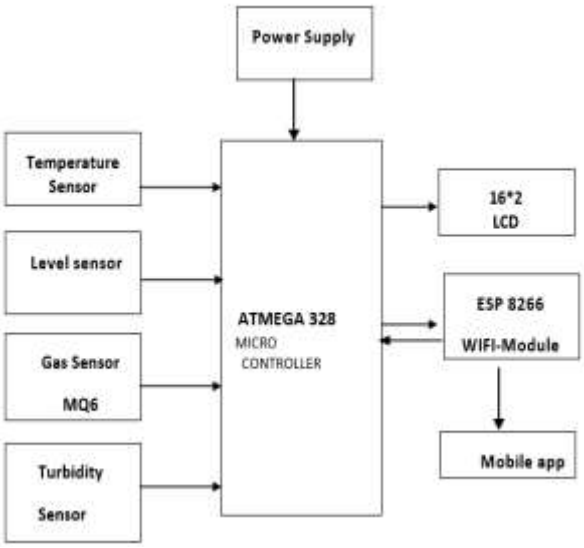
Milk can be a good indicator host for pathogenic microorganisms thanks to that exerts high water content, nearly neutral pH, and style of available essential nutrients. However, bacteria, yeasts, and molds are the common contaminants of milk with their ascension, particularly at high ambient temperature can cause marked deterioration within the quality of the milk and dairy products (FAO, 1989). The microbial load and bacterial contamination found in milk can influenced from different sources like air, milking equipment, storage, feed, soil, feces, sick animals and ambient temperature (Torkar and Teger, 2008).Dailyproduction and eventual marketing of milk require special consideration to make sure its delivery to the market in hygienic and acceptable condition (Kivari, et. al., 2006 and Gemechu, et. al., 2014).

II. SYSTEMLEVEL ARCHITECHTURE

1. Here, IoT based Arduino Microcontroller (ATMEGA 328is drive by 5V DC supply.
2. The qualityof the milk is maintained by using the smart sensors.

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 6 June 2021, pp: 132-140 www.ijaem.net ISSN: 2395-5252

2.1- The temperature sensor helps in monitoring the temperature of the milk,
2.2- The gas sensor MQ6 used to detect the odour /smell of the milk.
2.3- The milk level sensor is employed to live quantity and level of milk.
2.4- Turbidity sensor detect the turbidity of milk means detects that milk is pure or not, if we've pure milk , then on LCD ,it will display ,Milk is adulterated and if milk isn't pure then it will display Not detected.
3. We use blynkaap to display sensor data.It can control hardware remotely,store data, vizualize it .
4. ESP 8266 are controlled from local Wi-Fi network or from the online WIÂ FI Module. of th ose statuses are shown



1)Atmega 328
ATmega-328 is largely a sophisticated Virtual RISC (AVR) micro-controller. It supports the info up to eight (8) bits.
[1] ATmega-328 has 32KB internal builtin memory. 4 MHz ceramic resonator, a USB connection, an influence jack, an ICSP header, and a reset button.
The Arduino Uno may be a microcontroller board supported the IoT ATmega328.
it's 14 digital input/output pins (of which 6 is used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator.Microcontroller: IoT Enable ATmega328.Operating Voltage: 5V.Input Voltage (recommended):7-12V

2) Level sensor:
[1]Level sensors sense the amount of fluid and other liquid and fluidized solids, that show a better free s urface.Material that flow becomes flat in their containers since of gravity while mainly mass solids mound at an angle of repose to a peak.

3) Gas sensor MQ6
[1] This sort of gas sensors is produced using tin dioxide (sno2) semiconductor which delivers a low conductivity in clean air. TGS 813 sensor is much touchy in nature to propane,Methane and furthermore butane. This kind of sensor is appropriate for checking LPG Gases and furthermore it reasonable in recognizing extensive variety of gases for mechanical applications. The huge preferred standpoint of this sensor is it is of minimal effort. MQ6 gas sensor instantly finds the focus in air where its basic electrical circuit changes over the conductivity charge in to a yield flag and its gas fixation relates thusly. This is a Figaro gas

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 6 June 2021, pp: 132-140 www.ijaem.net ISSN: 2395-5252

sensor which has images and sticks in the external body of the external circuit of sensor which is associated with yield over the heap resistor which increments quickly as protection Rs diminishes where it relies upon centralization of gas.

4) Turbidity sensor

TS-300B is a High Quality Turbidity Sensor with analog and digital interface for Arduino. This is the low cost Arduino Turbidity Sensor DIY Projects.

The tur bidity of water refers to the degree of turbidity caused by suspended matter such as sediment, clay, organic matter, plankton and microorganisms contained in water. Industrial grade turbidity sensors or turbidimeters are expensive and not costly in electronics design; therefore, we have chosen a turbidity sensor that is widely used in household appliances washing machines and dishwashers. (https://innovatorsguru.com/ts-300b-arduino-turbidity-sensor/)

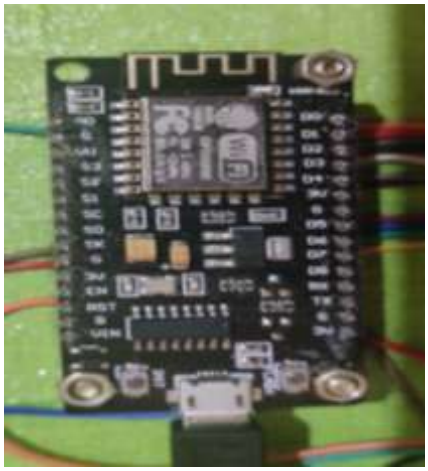
5) Mobile app

Here we have used **Blynk app**. It control hardware remotely, it can display sensor dataand store data, vizualizeit.

6) ESP8266 Wi-Fi module

The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFinetwork.The ESP8266 is capable of either hosting an application or offloading all WiFi networking functions from another application processor. Each ESP8266 module comes pre-programmed with an AT command set firmware, meaning, you can simply hook this up to your Arduino device and get about as much WiFi-ability as a WiFi Shield offers (and that's just out of the box)! The ESP8266 module is an extremely cost effective board with a huge, and ever growing, community.(https://www.hackster.io/alinan/a-wifi-enabled-cord-switch-with-the-esp8266-in-10-minutes-6fa700)

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 6 June 2021, pp: 132-140 www.ijaem.net ISSN: 2395-5252



7) Temperature Sensor

[1]The voltage yield of a LM335 increments by roughly 10 mV for each 1 degree Kelvin of ascend in temperature. 1 degree Kelvin is equal to 1 degree Celsius. In the circuit, the output of the LM335 is fed into a 741 op-amp which is configured as a voltage follower. The primary capacity of the operation amp, consequently, is simply to buffer the LM335 yield with the goal that it isn't influenced by whatever heap is associated with this temperature sensor circuit .

Final Setup of project

III. EXPERIMENTATION

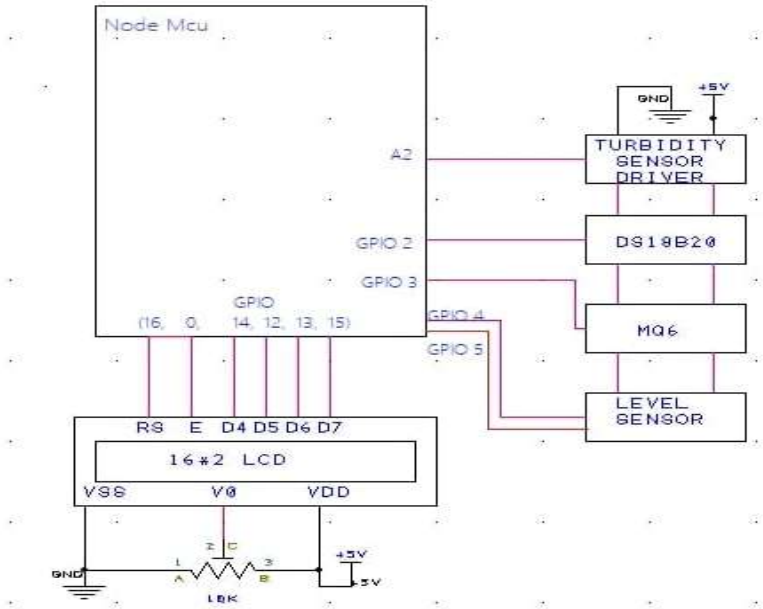
Here, Power supply,LCD(16*2) , ESP 8266 Wi-Fi module and sensors are connected to Atmega 328 (Microcontroller).We connect Node Mcu to LCD , means connect GPIO 16 connect to RS,GPIO 0 to E and GPIO 14 to D4,GPIO 12 to D5,GPIO 13 to D6 and GPIO 15 to D7.
And Pins od LCD VSS, V0, VDD connected to Ground , LQK and 5V supply respectively.

A2 connects to Turbidity sensors GPIO 2 connects to temperature sensors,GPIO 3 connects to mQ6 and GPIO 4,5 connects to level sensors.

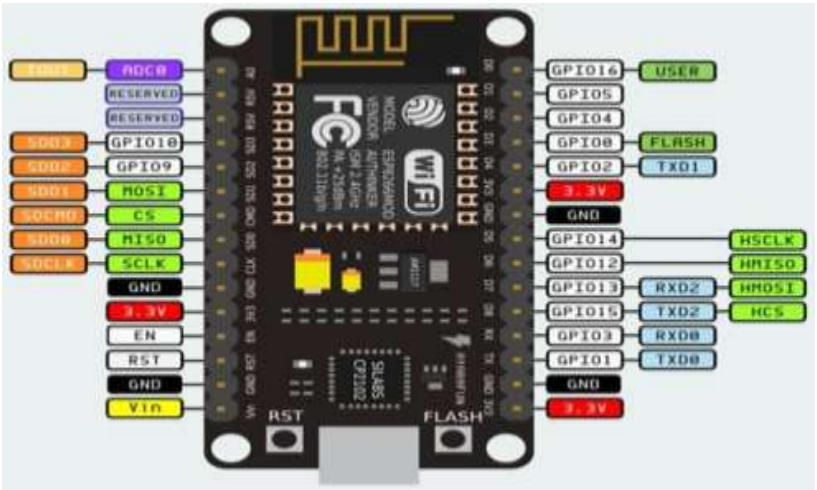
A Regulated 5V DC power supply is feed to Arduino board First we have ti import Library for LCD, Wi-Fi module and sensors after that we have to put token of Blynk application on program to

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 6 June 2021, pp: 132-140 www.ijaem.net ISSN: 2395-5252

communicate with it. After that initialize the LCD pins(RS ,E ,D4 ,D5 ,D6 ,D7 ,VSS ,V0 ,VDD).Setup sensors pins in void setup.In void loop where we put continuous function then we check the input from sensors i.e, temperature, level,gas, and turbidity sesnsors. And sendit over LCD display as well as on mobile app, if Adulteration of milk found then alert notification will gets recived on mobile.wehave used blynk application.



Circuit Diagram of setup



PIN DIAGRAM

International Journal of Advances in Engineering and Management (IJAEM)
Volume 3, Issue 6 June 2021, pp: 132-140 www.ijaem.net ISSN: 2395-5252

IV. SOURCE CODE:

```
#define BLYNK_PRINT Serial

#include <OneWire.h>
#include <DallasTemperature.h>
#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#define TRIGGERPIN 5
#define ECHOPIN    4

#definemqSen 3

#include <LiquidCrystal.h>

#definers 16
#defineen 0
#define d4 14
#define d5 12
#define d6 13
#define d7 15

LiquidCrystallcd(rs, en, d4, d5, d6, d7);

char auth[] = "oq52uMExdVdzNpGizBdHztmwLPikEV1X";

// Your WiFi credentials.
// Set password to "" for open networks.
char ssid[] = "project9";
char pass[] = "123456789";
SimpleTimer timer;



#define ONE_WIRE_BUS 2 // DS18B20 on arduino pin2 corresponds to D4 on physical board "D4 pin on the
ndoemcu Module"
OneWireoneWire(ONE_WIRE_BUS);
DallasTemperature DS18B20(&oneWire);
float temp;

WidgetLCD lcd1(V3);
WidgetLCD lcd2(V0);
int sensorPin=A0;

int milkLevel=0;
void setup()
{
lcd.begin(16, 2);
lcd.setCursor(0, 0);
  // print the number of seconds since reset:
lcd.print("     WEL-COME    ");
delay(3000);
  // Debug console
  //Serial.begin(9600);
lcd.setCursor(0, 0);
  // print the number of seconds since reset:
lcd.print("                ");
```

```
lcd.setCursor(0, 0);
lcd.print("Connecting to   ");
lcd.setCursor(0, 1);
lcd.print("     WI-FI      ");
pinMode(TRIGGERPIN, OUTPUT);
pinMode(ECHOPIN, INPUT);
Blynk.begin(auth, ssid, pass);
  // You can also specify server:
  //Blynk.begin(auth, ssid, pass, "blynk-cloud.com", 8442);
  //Blynk.begin(auth, ssid, pass, IPAddress(192,168,1,100), 8442);
pinMode(mqSen, INPUT);
  lcd1.clear(); //Use it to clear the LCD Widget
  lcd1.print(0, 0, "Distance in cm");
// use: (position X: 0-15, position Y: 0-1, "Message you want to print")
  lcd2.clear();
timer.setInterval(1000L, getSendData);
lcd.setCursor(0, 0);
  // print the number of seconds since reset:
lcd.print("                ");
lcd.setCursor(0, 1);
  // print the number of seconds since reset:
lcd.print("                ");
lcd.setCursor(0, 0);
  // print the number of seconds since reset:
lcd.print("   Connected    ");
delay(2000);
lcd.setCursor(0, 0);
  // print the number of seconds since reset:
lcd.print("                ");
lcd.setCursor(0, 1);
  // print the number of seconds since reset:
lcd.print("                ");
}

void loop()
{
  int sensorValue = analogRead(sensorPin);
Serial.println(sensorValue);
if(sensorValue> 55 &&sensorValue< 100){
    lcd1.clear();
  lcd1.print(0, 0, "   Milk is");
  lcd1.print(0, 1, "   not adulterated ");
}if(sensorValue< 55){
    lcd1.clear();
  lcd1.print(0, 0, "     Milk is ");
  lcd1.print(0, 1, "   adulterated ");
}if(sensorValue> 100){
    lcd1.clear();
  lcd1.print(0, 0, "Milk is not");
  lcd1.print(0, 1, "   detected  ");
  }
   // use: (position X: 0-15, position Y: 0-1, "Message you want to print")
  int duration, distance;
digitalWrite(TRIGGERPIN, LOW);
delayMicroseconds(3);
```

```
digitalWrite(TRIGGERPIN, HIGH);
delayMicroseconds(12);

digitalWrite(TRIGGERPIN, LOW);
  duration = pulseIn(ECHOPIN, HIGH);
  distance = (duration/2) / 29.1;
milkLevel=(10-distance)*10;

Blynk.virtualWrite(V1,milkLevel);
lcd.setCursor(0, 0);
  // print the number of seconds since reset:
lcd.print("               ");
lcd.setCursor(0, 1);
  // print the number of seconds since reset:
lcd.print("               ");
lcd.setCursor(0, 0);
  // print the number of seconds since reset:
lcd.print("Milk Lvl: ");
lcd.setCursor(10, 0);
  // print the number of seconds since reset:
lcd.print(milkLevel);
lcd.setCursor(14, 0);
  // print the number of seconds since reset:
lcd.print("%");
lcd.setCursor(0, 1);
  // print the number of seconds since reset:
lcd.print("Temp : ");
lcd.setCursor(7, 1);
  // print the number of seconds since reset:
lcd.print(temp);
lcd.setCursor(11, 1);
  // print the number of seconds since reset:
lcd.print(" C");

mqSenData();
Blynk.run();
timer.run();
delay(1000);


}
void getSendData()
{
  DS18B20.requestTemperatures();
  temp = DS18B20.getTempCByIndex(0); // Celcius
  //Serial.println(temp);
Blynk.virtualWrite(V2, temp); //virtual pin V3


}
void mqSenData(){
  if(digitalRead(mqSen)== 0){
  lcd2.clear();
  lcd2.print(0, 0, "High Gas Level");
  lcd2.print(0, 1, "   detected  ");
}else{
```

```
 lcd2.clear();
 }

}
```

V. CONCLUSION

[1] During this paper, we developed an IoT based system which supplies faster and accurate results. In our proposed system, Microbial activity is decided using gas sensor. The turbidity measure by turbidity sensor and level of the milk will be measured by employing a level sensor and temperature can measured by temperature sensor.

VI. RESULT

[1] It shows the implementation results, which finally shows the different aspects of the milk. The whole process is controlled by an Arduino(Atmega 328) board. The analog data is sent to the Arduino using different sensory system.

It is used to detect milk adulteration, milk level ,milk temperature ,milk odour and early microbial activity by continuously monitoring the milk using various techniques and its showing result on Blynk app as well as on LCD. If we have pure milk then it will display on LCD as "Milk is adulterated" and if milk is not pure then it will display "Not detected".

VII. SOME OF THE ADVANAGES FROM THE ABOVE RESULTS

1. This project is developed so as to assist each and every person who enthusiastic about milk.
2. By this technique,we will be ready to monitor maximum aspects of milk like adulteration, quality etc.
3. Accordingly, this work helps in early identification of dangerous substances in milk to maintain A strategic distance from entanglements in the underlying stage for a decent last item
4. It helpto detect all impurities in milk.

REFERENCES

[1]. IoT BASED MILK MONITORING SYSTEM FOR DETECTION OF MILK ADULTERATION Volume 118 No. 9 2018, 21-32 ISSN: 1311-8080 (printed version); ISSN: 1314-3395 (on-line version).

[2]. An Internet of Things (IOT) based Monitoring System for Efficient Milk Distribution Conference Paper · December 2017 DOI: 10.1109/ICAC3.2017.8318780