iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** XII **Month of publication:** December 2022

DOI: https://doi.org/10.22214/ijraset.2022.48087

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com

Food Spoilage Detection System using ESP-8266

Atharva Joshi[1], Abhishek Bokil[2], Ashish Chhajed[3], Tejas Choudhari[4], Atharva Kalamkar[5]
Vishwakarma Institute of Technology, Pune
S.Y. Production (A.Y. 2021-22)

Abstract: ***In the modern era of technology and with increasing dependency on smart techniques like mobile phone, there is requirement of solving daily life tasks in a quick and easy ways. The smart technology is becoming the need of hour to take control over the different tasks at home and industries. This paper is based on food detection system using Arduino. The system proposed is based on detection and recognition algorithms The main function of the algorithm is to automatically detect the smell and generates message to user that the food is spoiled. The paper deals with the technologies that use Arduino which employs the programming and sensors. The key feature of computer vision is Arduino for reasons like marketability & law-abiding apps. and secondly after lot of research the accessibility of practical technologies. This area of research finds an important place among different type of researchers and scientists like computer, food & different organizations. The microcontroller panel has the capability to perform functions which include interpreting inputs and outputs and make the sensor to activate. Generally, food is stored in the refrigerator that lowers down the bacteria rate of production. Certain items which are perishable or not used for long term storage are to be detected and informed to the user. This paper is basically discussed to solve the food spoilage through sensors by continuously sensing the signals from the food and also sending the alert message to the registered mobile phone.***

I. INTRODUCTION

The ESP8266 primarily based totally fuel line sensors had been capable of feel the spoilage which include horrific odour from the meals. The degree of emitted fuel line may be correlated with how a good deal meal is degraded. The device which incorporates embedded device at the side of sensors are touchy to feel low emissions of the gases like ammonia and methane emitted due to spoilage of meals article. The degree of gases emitted will range relying at the decay of meals. The detection of these gases may be used to manipulate the decay of meals. The humidity sensors may be hired to feel the humidity content material withinside the meals. Various different sensors like temperature, pressure, moisture and so on also can be used to stumble on horrific virus and bacterial boom withinside the meals.

This system can be extremely useful in food storage warehouses.

II. LITERATURE REVIEW

There are several techniques by which food spoilage can be detected like inspection of quality and monitoring using group of sensors on a plate [1].The other technique is using Internet of Things [2] by measuring the features of product. There are similar technique based on IoT along with Microcontroller i.e. using some sensitive resistor based on force [3] which detects the absence of important condimentin pantry.

III. METHODOLOGY

The electronics of the system is an embedded system based on microcontroller like Arduino UNO which is a prototyping board. The Arduino board is interfaced with gas sensors like MQ315 to distinguish smell. The web switch which is a web modem connects the ESP8266 board to web net. The microcontroller board ESP8266 along with food detection sensor MQ315 senses the gases coming out from the rotten food. The signal is transferred through a Wi-Fi device ESP 8266 AS. The signals are sent to the user through a server. In working of our project gas sensor detect the level of gas like NH3, CO2, etc. This signal is sent to Node MCU (ESP8266) and then processed through the code saved in it. After reaching a threshold value it sends signal to buzzer and gives alarm to user about food spoilage, this also simultaneously displays message on LCD screen “Food Spoilage Detected”.

All this data also can be seen in Blynk IOT app and website. Proper graph of gas detection verses time is displayed on website. By using Wi-Fi and Blynk IOT library we can achieve this.

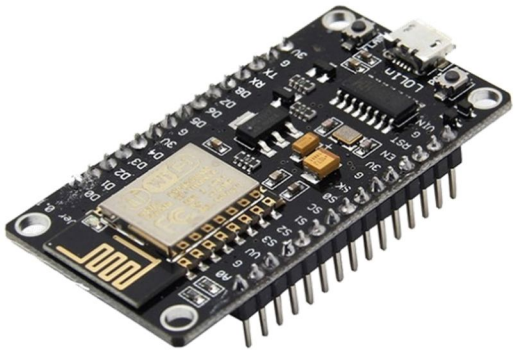
The working principle of gas sensors is related to conductivity of sensor in fresh air and polluted air. Conductivity of sensor increases in polluted air and hence we can detect the presence of gas.

We have tested average area of sensor coverage which comes out to be $50m^2$ for each sensor.

©IJRASET: All Rights are Reserved

A. Components Used

1) NodeMCU (ESP8266): NodeMCU is an open-source Lua based firmware and development board specially targeted for IoT based Applications. It includes The NodeMCU ESP8266 development board comes with the ESP-12E module containing the ESP8266 chip having Tensilica Xtensa 32-bit LX106 RISC microprocessor. This microprocessor supports RTOS and operates at 80MHz to 160 MHz adjustable clock frequency. NodeMCU has 128 KB RAM and 4MB of Flash memory to store data and programs. Its high processing power with in-built Wi-Fi / Bluetooth and Deep Sleep Operating features make it ideal for IoT projects. NodeMCU can be powered using a Micro USB jack and VIN pin (External Supply Pin). It supports UART, SPI, and I2C interface. firmware that runs on the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware which is based on the ESP-12 module.



2) Wires: For Connecting all components to each other.

3) Bread Board: To Mount NodeMCU and gas sensor.



4) Gas Sensor MQ-135: MQ135 Gas Sensor is an air quality sensor for detecting a wide range of gases, including NH3, NOx, alcohol, benzene, smoke and CO2. Ideal for use in office or factory. MQ135 gas sensor has high sensitivity to Ammonia, Sulfide and Benzene steam, also sensitive to smoke and other harmful gases. It is with low cost & particularly suitable for Air quality monitoring application.

Features

a) High sensitivity to Ammonia, Sulfide and Benzene.
b) Stable and Long Life.
c) Detection Range: 10 - 300 ppm NH3, 10 - 1000 ppm Benzene, 10 - 300 ppm Alcohol.
d) Heater Voltage: 5.0V.
e) Dimensions: 18mm Diameter, 17mm High excluding pins, Pins - 6mm High.
f) Applications:
g) Domestic air pollution detector.
h) Industrial air pollution detector.
i) Portable air pollution detector.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

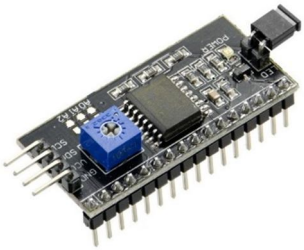
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue XII Dec 2022- Available at www.ijraset.com



5) *LCD Screen:* To display the information.



6) *I2C:* To minimize the number of wires of LCD Display.



7) *Buzzer:* To give out the Sound signal.



IV. RESULTS AND DISCUSSION

The ESP8266 based gas sensors were able to sense the spoilage such as bad smell from the food. The level of emitted gas can be correlated with how much food is degraded. The system which includes embedded system along with sensors are sensitive to sense low emissions of the gases like ammonia and methane emitted due to spoilage of food article. The level of gases emitted will vary depending on the decay of food. The detection of these gases can be used to control the decay of food. The humidity sensors can be employed to sense the humidity content in the food. Various other sensors like temperature, pressure, moisture etc can also be used to detect bad virus and bacterial growth in the food.

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |

V. CONCLUSION

The early detection of the gases from different food items like ammonia, methane etc can help the The gas sensor are able to detect gas emission from food items even before the presence of any visible sign of spoilage. The consumer gets the information about the food item wherein he can monitor the perish ability of that food item. This will help in maintenance of health and prevents the consumer from consuming bad food. The use of technology helps in food processing industry wherein they can mention the duration of perish ability of the food item on the packet so that proper control on consumption can be done. The monitoring and detection of the food items is very necessary as most of the consumers buy packed food from the malls wherein date of expiry is important parameter.

We can use one sensor in every $50m^2$ of area for effective results.

VI. FUTURE SCOPE

The scope of the proposed system can be increased by including more products like dairy, fruits. The system can incorporate different other sensors like pressure, temperature, moisture etc. Different other techniques like nano technology, artificial neutral network can be also be used for further improvement in result. These techniques can use this data for better result in future about food spoilage.

REFERENCES

[1] Sumathi MS, Thejaswini S, Pranav Kashyap, ShahinaAnjum, Shashi Shanker, Shreya GK "IoT based project for food quality and monitoring" International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 3 Issue: 5 3172 – 3174

[2] Fatima Mustafa and Silvana Andreescu *Department of Chemistry and Biomolecular Science, Clarkson University, Potsdam, NY 13699 USA Chemical and Biological Sensors for Food-Quality Monitoring and Smart Packaging

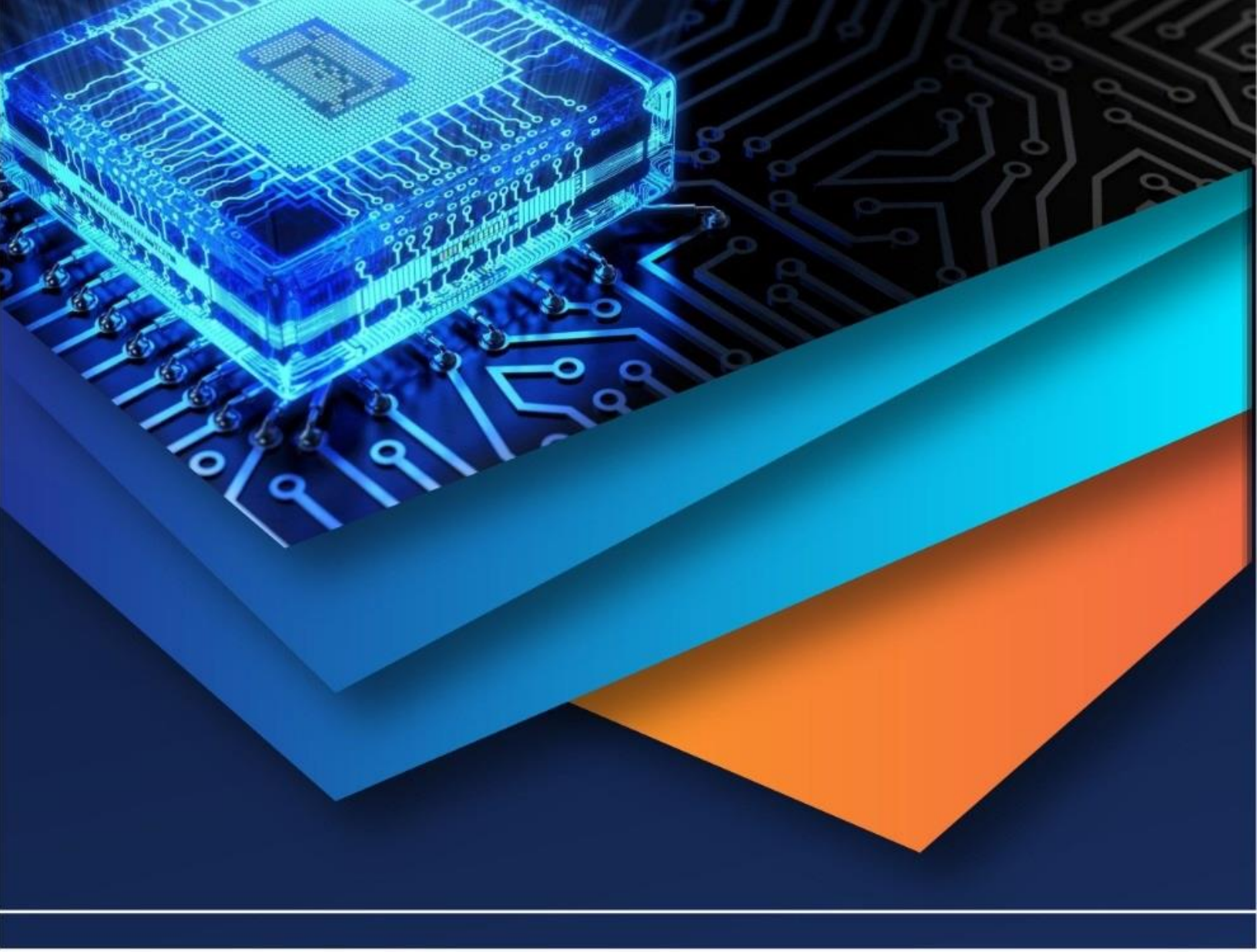
[3] https://create.arduino.cc/projecthub/taifur/drs-enabledsmart pantry8d2f8b?ref=tag&ref_id=iot&offset=42"Smart storage of food based on IoT"

[4] Mr.A.Venkatesh,T.Saravanakumar, S.Vairamsrinivasan, A.Vigneshwar, M.Santhosh Kumar."A Food Monitoring System Based on Bluetooth Low Energy and Internet of Things". Mr.A.Venkatesh et al. Int. Journal of Engineering Research and Application www.ijera.com ISSN: 2248- 9622, Vol. 7, Issue 3, (Part -6) March 2017, pp.30-34.

[5] Samaneh Matindoust, Majidbaghei-Nejad, Mohammed Hadishahrokh Abadi, ZhouZou, Li-Rongzheng. "Food quality and safety monitoring using gas sensor array in intelligent packaging".

[6] Ashish Kumar Singh and Neelam Verma, ”Quartz Crystal Microbalance Based Approach for Food Quality” Current Biotechnology, 2014, 3, 000-000

©IJRASET: All Rights are Reserved | SJ Impact Factor 7.538 | ISRA Journal Impact Factor 7.894 |



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)