WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Food Freshness Detector

Ms. J. Sofia[1] , Dr. G. Abel Thangaraja[2].

[1] UG scholar , Department of Computer Technology, Sri Krishna Adithya College Of Arts And Science
[2] Assistant professor , Department of Computer Technology ,Sri Krishna Adithya College Of Arts And Science
[1] 20bsct136sofiaj@skacas.ac.in, [2]abelthangaraja@skacas.ac.in

ABSTRACT:

Food freshness detection refers to the process of identifying and determining the quality of food products by analyzing various factors such as appearance, texture, and odour. The goal of food freshness detection is to ensure that consumers are provided with safe and high-quality food products. Different food products have different characteristics.Therefore, it is important to develop specific methods for different types of food products. It helps to reduce food waste, improve food safety, and increase consumer satisfaction. By ensuring that only fresh and high-quality food products are sold, food freshness detection can also help to increase the profitability of food businesses. Overall, food freshness detection is a critical process in the food industry that helps to ensure that consumers are provided with safe and high-quality food products.

1. INTRODUCTION

The ability of equipment and systems to track and gauge the state of freshness of diverse food products is referred to as food freshness detection. We may evaluate the quality and freshness of food goods using the detection, confirming their suitability for eating. Food freshness detection has become an important part of contemporary food production and consumption because to the rising need for healthy living and an environmentally sustainable food supply. Systems for determining the freshness of food rely on a number of technologies, including image processing, temperature and pressure sensors, pressure sensors, and gas sensors. To evaluate the freshness of food goods, a number of variables are tracked, including temperature, humidity, pH levels, and bacterial growth. These systems can extract results from data and find patterns with the use of AI and ML.

2. SYSTEM SPECIFICATION

System specifications for a food freshness detector depend on a number of factors, including the specific features of the device, the intended use case, and the technical capabilities required. Here are some basic specifications that may be included in a food freshness detector:

A food freshness detector would require a combination of different sensors or sensing mechanisms, which could include gas sensors, temperature sensors, sensors, and The exact combination of sensors would depend on the food material being monitored.

In the food material, allowing for the detection of changes to the freshness, taste, and quality of the material within a specific range. The device would require a processing unit or a microcontroller that can execute translate the raw data from the sensors into meaningful data using machine learning, artificial intelligence, or some other algorithm to allow for accurate detection and classification .Also can be equipped with wireless communication standards such as Wi-Fi, to transmit data and the device require a reliable power source

2.1 HARDWARE SPECIFICATION

- Nodemcu
- ESP8266(WIFI)
- LCD display
- Moisture sensor (M4 series)
- Gas sensor (MQ-4)
- PH sensor

2.1.1 NODEMCU

NodeMCU is a microcontroller board that is often used in Internet of Things (IoT) applications due to its Wi-Fi connectivity and ease of programming. One possible application of NodeMCU in the food industry is for food freshness detection. One way to detect the freshness of food is by measuring the concentration of gases such as ammonia, carbon dioxide, and ethanol that are released by decaying organic matter. NodeMCU can be used to measure the concentration of these gases using gas sensors and transmit the data to a server or cloud-based platform for analysis.

2.1.2 ESP8266 (WIFI) .

The food freshness detector may communicate with servers, data centres, and other network-connected devices by connecting to a local network or the internet using an ESP8266 WiFi module. Real-time data regarding the freshness of the food being monitored is sent by the module via wireless data transmission over WiFi to a server or a smartphone.

2.1.3 LCD DISPLAY

An LCD (Liquid Crystal Display) device can be added to a food freshness detector as an output display option, read by the sensors. It can have a user interface providing the user with the opportunity to input and save certain preferences. it can be used to facilitate easy calibration of the freshness detector's sensors. It is cost-effective and relatively easy to interface. It is easier to check the freshness of food but it also ensures food safety and easy monitoring of storage conditions.

2.1.4 MOISTURE SENSOR (M4 SERIES)

A moisture sensor like the M4 series can be incorporated into a food freshness detector to monitor the moisture content in food and determine the freshness level. Moisture content is a crucial parameter for determining the freshness of food since it influences the quality, taste, and overall lifespan of the material. It would be able to detect too much moisture or too little moisture within the food.

2.1.5 GAS SENSOR (MQ SERIES)

A gas sensor shows composition and concentration of gases in food and determine the freshness level. It can detect various gases such as carbon dioxide, methane, and ammonia among others. These gases form an essential part of food degradation and spoilage and hence provide information on the freshness status of the food material.

2.1.6 PH SENSOR

A pH sensor can be incorporated into a food freshness detector to monitor the acidity or alkalinity levels in food materials and determine the freshness level. The freshness of food declines with its increasing acidity levels, attributable to microbial activities or chemical reactions.

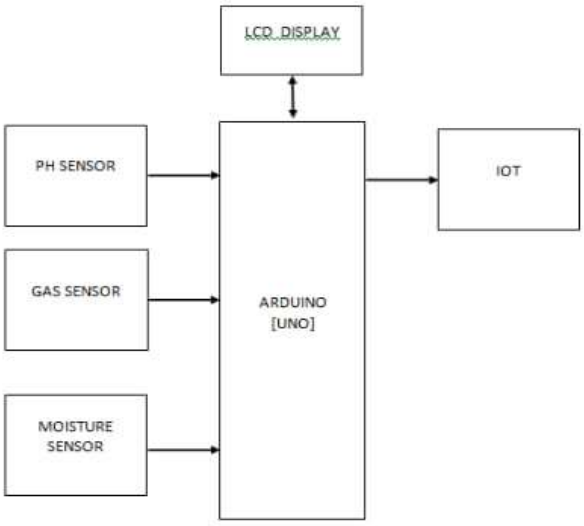


Figure1.1 Block Diagram of Food Freshness Detector

3. SYSTEM STUDY

3.1 EXISTING SYSTEM

Food freshness systems face four main challenges, these are high cost of ownership, inflexibility, poor manageability and difficulty in achieving food quality monitoring. In earlier days, chemical based and image based detection. Sight, smell and touch are the surefire ways to make sure that picking up something fresh which can't determine freshness based on the single parameter.

3.1.1 DRAWBACKS

• It's time - consuming while testing.

• It less reliable due to the possible human errors.

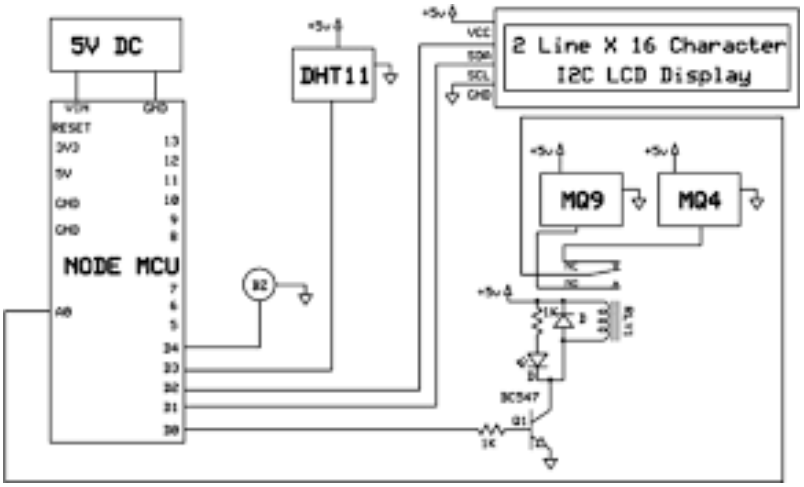
• Its more expensive in the long run.

• Testing is a repetitive process.

• It's not suitable for large scale testing.

3.2 PROPOSED SYSTEM

The suggested system includes both the hardware component and a software implementation. The hardware implementation consists of parts like an Arduino, a humidity sensor, and a gas sensor. Using the Arduino IDE, the coding for Arduino is completed. This method can only measure the value and not directly identify wasted food. The system connects the nodemcu-ESP8266 for data transfer through an Arduino IDE. The values that are observed are continuously displayed on an LCD monitor. Sensing devices are linked to the sensors are connected to the arduino IDE along with nodemcu and powered to detect any emission from the spoiled fruits and vegetables. This proposed system is designed keeping in mind a healthy future.



3.2.1 FEATURES

• Faster execution and more reliable.

• Identification and detection is accurate.

• Detect spoiled food items before packaging (Freshness level)

• Ensures the reach of good quality food items to the customers.

The various application of food freshness detector includes various sectors to minimize their loss and increase efficiency in increasing productivity.

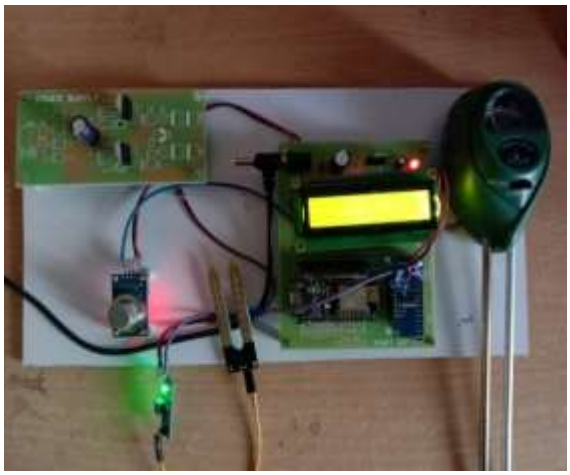
• **Industrial Use:** Because multiple categories of food items may be examined, this model will function efficiently in the food processing industries, consuming less time and manpower.

•**Super Malls/Markets:** This model can be used in super markets, helping employees, removing rotten products from the stock, and adding fresh items.

• **In the dairy sector:** If the employees are aware of the product lifespan, they will immediately use it, minimizing losses brought on by ruined food, which happens on a big scale in the dairy industry.

4. WORKING METHODOLOGY

It is a device that uses various sensors such as moisture, gas, and pH sensors to monitor the freshness of food materials. It collect data from the food materials. The microcontroller processes the data and converts them into a format that can be displayed on an output device. The processed data is displayed on an output device such as an LCD display. The user can analyze the data displayed on the output device to monitor the freshness level of the food material. They can use the data to make decisions about the storage and use of the food materials. The food freshness detector works by providing the user with real-time data on the freshness level of the food material. It presents the user with accurate information to make informed decisions about storing and utilizing the food material to minimize waste while improving quality control.



5. CONCLUSION

Food safety is crucial to both a nation's economy and its citizens' health. Application are managed and controlled in large part by WSN, which is when connected with IoT that allows for remote monitoring. To sum up, a food freshness detector is a technologically sophisticated tool that uses a variety of sensors to keep track of the freshness of food components. It gives the user precise information on the freshness status of the food by continuously collecting data and processing it in real-time. With this knowledge, the user may utilise and store food products in a way that minimises waste and enhances quality control.

As the world becomes more ecologically conscious and health conscious, accurate and precise monitoring of food freshness is becoming more and more crucial. Users can anticipate even better solutions for food preservation and quality control in the future as the technology, effectiveness, and diversity of the food freshness detector's design continue to advance.

REFERENCE

1. CoiNet Technology solutions LLP, LPC2148 ARTIST Instruction

Manual http://www.coineltech.com/USER_MANUAL_LPC2148_ARTIST.pdf

2. https://datasheet.octopart.com/A000066-Arduino-datasheet-38879526.pdf

3. https://content.instructables.com/ORIG/FTZ/2B2J/KIUA7VIG/FTZ2B2JKIUA7VIG.pdf

4.https://www.researchgate.net/publication/301215704_How_can_we_improve_foodborne_disease_surveillance_systems_A_comparison_through_EU_and_USA_systems

5.https://www.researchgate.net/publication/305253204_RFID_and_Sensor_Network_Automation_in_the_Food_Industry_Ensuring_Quality_and_Safety_through_Supply_Chain_Visibility

6. "Intelligent Food Refrigeration and Chilling Applications: Transformation of Knowledge into Products" by Victoria F. Samanidou, Athanasios A. Taoukis, and Stergios M. Logothetidis

7. "Sensor Technologies for Foods and Beverages" by R. S. S. Lakshmi and G. Srinivasan

8. "Smart Sensors for Real-Time Water Quality Monitoring" by Subhas Chandra Mukhopadhyay and Liang Zhang

9.https://www.appliancedesign.com/articles/94235-how-a-smart-fridge-can-help-reduce-food-waste