A Smart IOT Food Quality Monitoring System

Dwarakesh.N.K[1], Sanjai.R[2], Sarankanth.M[3], Sriram.J[4]

[1] Dwarakesh.N.K,Paavai Engineering College,Pachal,Namakkal.

[2] Sanjai.R,Paavai Engineering College,Pachal,Namakkal.

[3] Sarankanth.M,Paavai Engineering College,Pachal,Namakkal

[4] Sriram.J,Paavai Engineering College,Pachal,Namakkal

Abstract-**This project focuses on food monitoring, demonstrating the use of various sensors to effectively monitor and control food products. More precisely, the system has oil, temperature, light and humidity sensors that provide the basic information needed to evaluate the quality of the packaged or stored product. This information is sent wirelessly to the computer system providing the interface, and users can use IoT technology to monitor the evolution of product quality over time. In the next stage, the environment can be controlled with appropriate controls such as cooling and vacuum storage.**

Keywords—**ESP8266, ANN, Arduino Uno, Python Software, GSM/GPS module.**

I. INTRODUCTION

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Food contamination can occur during production, but is usually caused by poor food handling due to poor environmental conditions during food transportation and storage. There are many factors that contribute to food poisoning; The main changes in light intensity, temperature, alcohol content and humidity are important. Monitoring systems that can measure changes in temperature and humidity during transportation and storage are important. , the use and use of vegetables and food in daily life is not high due to the temperature, humidity and oxygen content changing from time to time.

Most consumers only focus on the information on the packaging, such as the ingredients used and nutritional values, but they forget that they are blind to their own health by ignoring the environment to which these packages are exposed. All manufacturing companies just want to attract more customers, their main goal is to sell the products smoothly, like adding more spices, cosmetics and antibiotics to add taste and beauty but they forget that these money making ideas are true affects consumer health.

Tissues that are more acidic are often killed by bacteria, while fruits and vegetables with a pH above 4.5 are more susceptible to bacteria. The color, taste and nutritional value of many foods also change when exposed to light. The extent of these changes depends on many factors, including food composition and light. Some types of yeast can also cause spoilage. Yeast actually metabolizes sugar to produce alcohol and carbon dioxide. This process is called fermentation. Therefore, the quality of food can be determined by analyzing its alcohol content.

II. LITERATURE REVIEW

Most grocery stores and warehouses still rely on manual control of grocery-related food quality. This requires some employees to regularly visit the store and check its condition and record these conditions at selected times. Routine inspections increase employee turnover and increase the risk of serious illness resulting in employee injury or harm.
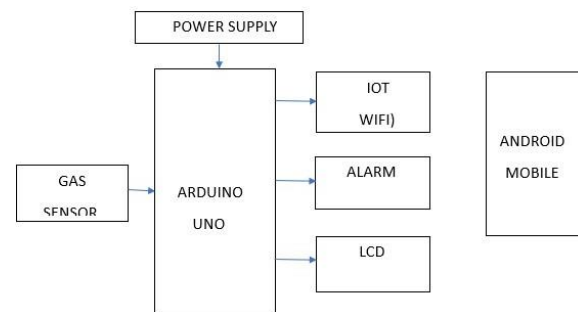

FIGURE 1. BLOCK DIAGRAM OF LIVER SEGMENTATION

III-These machines are improved versions of manual cleaning machines. Air conditioning equipment is installed in the store. But without SMS, people still need to go to the market to get information about the current weather and food [1]. Slow reading, equipment malfunction and equipment maintenance are some of the disadvantages of this system that will affect the quality of the food. This study proposes the use of multiple sensors for quality monitoring and control of food products. More precisely, the system has oil, temperature, light and humidity sensors that provide the basic information needed to evaluate the quality of the packaged or stored product. This information is sent wirelessly to the computer system providing the interface, and users can use IoT technology to monitor the evolution of product quality over time, many of which are used to predict liver diseases; for example, they may identify certain features or characteristics to evaluate. whether the patient has the disease. Odor sensors are used to monitor the amount of food. Temperature and relative humidity facilitate the development of

post-harvest pathogens. While tissues that are more acidic are often killed by bacteria, fruits and vegetables with a pH above 4.5 are more susceptible to bacteria. The color, taste and nutritional value of many foods also change when exposed to light. The extent of these changes depends on many factors, including food composition and light. Exposure to light can cause color and vitamin loss. Light also causes oxidation of fat. Some types of yeast can also cause spoilage. Yeast actually metabolizes sugar to produce alcohol and carbon dioxide. This process is called fermentation. Therefore, the quality of food can be determined by analyzing its alcohol content. PROPOSED METHODOLOGY

This project presents a process for analyzing the environment for storing and transporting food. Solutions find the temperature, humidity, alcohol content and light of the environment because these parameters affect the nutritional value of the food. The system uses storage facilities with multiple electronic devices that can read parameters affecting the food. After that, the environmental conditions are cooling, vacuum, etc. can be controlled by methods. Thanks to the power of the Internet of Things, the environment affecting food storage can be monitored from any device, anytime and anywhere.
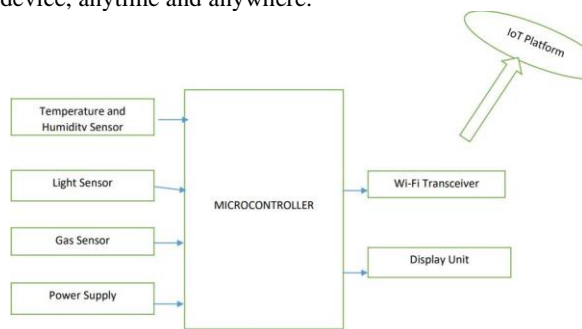

Figure 3. Block diagram of our proposed model

A. DHT11/DHT22 Working Principle

There is a humidity sensor, an NTC temperature sensor (or thermistor), and an IC behind the sensor. Therefore, as the humidity changes, the conductivity of the substrate changes or the resistance of the electrodes changes. This change in resistance is measured and processed by the IC, thus making it readable by the microcontroller. The difference between a thermistor and a resistor is that it changes as the temperature changes [2]. These sensors are made by sintering semiconductor materials such as ceramics or polymers to provide large changes in performance in response to small changes in temperature. The word "NTC" means "negative temperature coefficient", which means that the resistance does not decrease when the temperature increases.

B. Light Sensor

A reflector is a passive device that converts "light energy" in the visible or infrared portion of the spectrum into electrical signal output. A light sensor is often called an "optoelectronic element" or "photosensor" because it converts light energy (photons) into electrons (electrons).).

C. Buzzer

A buzzer is an electronic device that produces a sound when external power is applied. When the pressure is higher than normal pressure, this will be indicated by a buzzer.

D. MQ - 5 Gas Sensor

The MQ5 sensor detects ethanol gas emissions. If food/fruit spoils, they will release ethanol gas. The MQ5 sensor can detect carbon monoxide concentration and provide an analog voltage output proportional to the gas concentration. Analog

The output is passed to the analog pin of the Arduino, which has a built-in ADC that converts the analog value to digital value. It can detect gases in the range of 10 to 10,000 ppm. The sensor output is an analog resistor..

I. Python Software

The Python compiler plays an important role in the Python programming ecosystem because it converts human-readable Python source code into low-level machine code or bytecode. Unlike the Python interpreter, which runs line by line, the compiler creates a collection of code capable of improving performance. Understand and interpret the contract when necessary. Although generally classified as a programming language, Python includes many implementations, such as C Python and Iron Python. C Python converts procedures to bytecode according to the standard version, which often leads to misunderstandings about what Python is defined as. The Python virtual machine then converts the by tecode into machine code.

IV. Result

Deep ANN and atlas-based methods have been shown to have high performance (mean $0.87 < DSC < 0.95$, 1.8 mm $< MSD < 3.8$ mm, 7.9 mm $< 95\%$ HD < 11 mm). Information about the patient's heart condition and a brief summary of the doctor's name and hospital address. Accuracy is determined by the number of predictions made by the model.

V. CONCLUSION

Using liver patient datasets and ANN algorithms for prediction effectively reduces the burden on doctors. Our recommendation is to use machine learning techniques to provide a comprehensive assessment of the patient's overall mood. Our research focuses on using deep learning to predict liver disease. Future efforts to improve the accuracy of liver disease prediction and classification models include integration of multiple data sources. More, Combining multiple machine learning methods can improve the accuracy of liver disease prediction and classification. The incidence of liver disease can be predicted by training learning models with specific characteristics of individuals.

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