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IOT Based Fruits Spoilage Detection using IOT

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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. This project is based on food detection system using Arduino. 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 bacteriarate of production. Certain items which are perishable or not used for long term are to be detected and informed to theuser.
This project is basically discussed to solve the food spoilage through sensors by continuously sensing the signals from the food and by displaying the ph value of methane on the 16*2 LCD panel along with buzzer and LED and also sends the alert message to the registered mobile phone.
Keywords: Spoiled food detection, Arduino, MQ4 Methane gas sensor, LCD display, Wi-Fi ESP 8266, Alertmessage, LED.

I. INTRODUCTION

The food we take can affect in any form of impurity that may happen due to storage or chemical changes within the food. In some countries, majority of people struggles on daily basis for food, due to preservation of foods and use of chemicals to artificially increase the time span of food causes people illness.
It is mandatory to grow a system that can assist people to identify the elegance of food or quality of food items. The quality of the food should checked to prevent it from spoiling under different environment conditions like temperature, humidity, vegetable/fruit characteristics , which will be helpful to check quality through different techniques.
The sensor senses the food quality through change in its colour. There are various signal processing and pattern recognition techniques to detectfood intake time through sensors.
The rottedor not fit for usage food causes a major food related illness called as food poisoning, this is one of the diseases along with various other such diseases related to spoiled food. One of the main objectives of the food spoiler detector is that it will detect the gas released from the spoiled food and tell the user that the food is spoiled and take a look over food. Generally food is stored in the refrigerator that lowers down the bacteria rate of production. Certain items which are perishable or not usedfor long term are to be detected and informed to the user.
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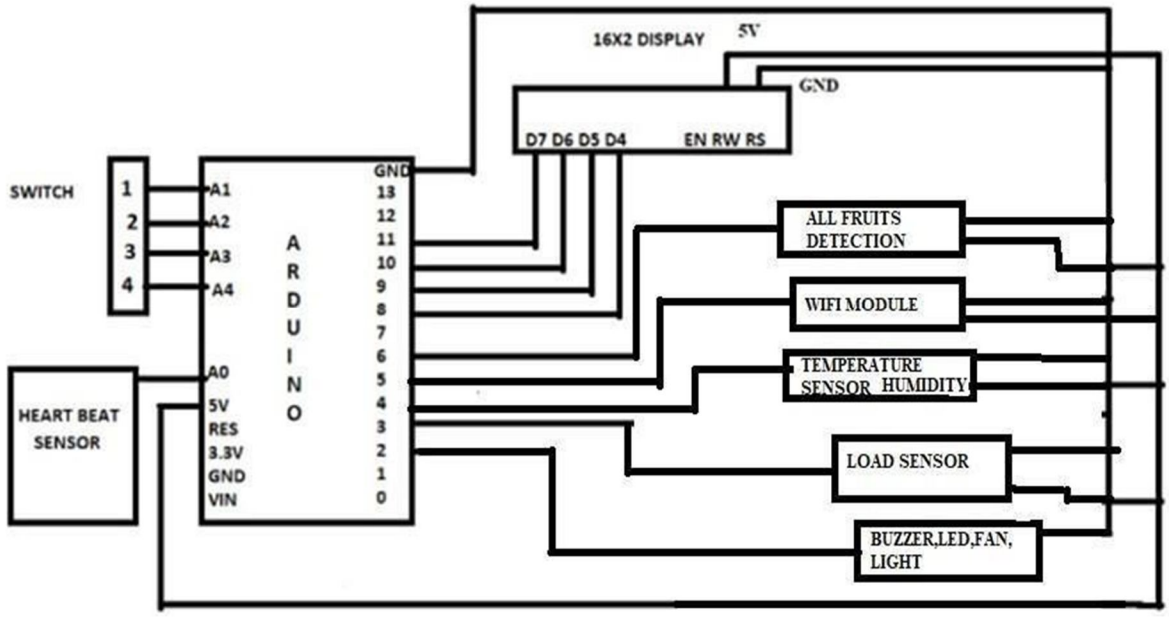
II. WORKING

The technique for detection of spoiled food is much easier using two approaches. There are different approaches for the detection of the various gases that are released from food.
The proposed system is based on Arduino UNOwhich is a recognized prototyping board which is interfaced with gas sensors like MQ4 to distinguish smell.
The web switch which is a web modem connects the Arduino board to web net. The microcontroller board Arduino Uno along with food detection sensor MQ4 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. The buzzer, LED and LCD panel will also show the output from the sensor which is connected with the Arduino board.

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III. BLOCK DIAGRAM



Block Diagram of fruits spoilage detection

IV. MODULES OF THE PROJECT

A. Arduino UNO

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontrollerand developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery thoughit accepts voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo.



B. MQ4 Methane Gas Sensor

MQ4 Methane Gas Sensor detects the concentration of methane gas in the air and outputs its reading as an analog voltage. The concentration sensing range of 300 ppm to 10,000 ppm is suitable for leak detection. For example, the sensor could detect if someone left a gas stove on but not lit.

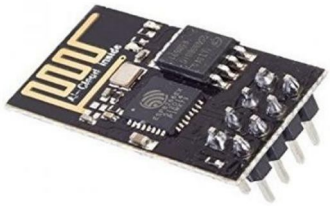


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C. ESP8266 Wifi Module

The ESP8266 Wi-Fi Module is a self-contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. Analog sources of Wi-Fi ESP 8266 module can host number of applications and is cheap in terms of cost which can make the task of connecting the Wi-Fi easy through different commands.



D. 16x2 LCD Display

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.



E. Buzzer

An audio signaling device like a beeper or buzzer main function of this is to convert the signal from audio to sound. It is provided through DC voltage and used in timers, alarm devices, etc. Based on the various design it can generatedifferent sound.



F. LED

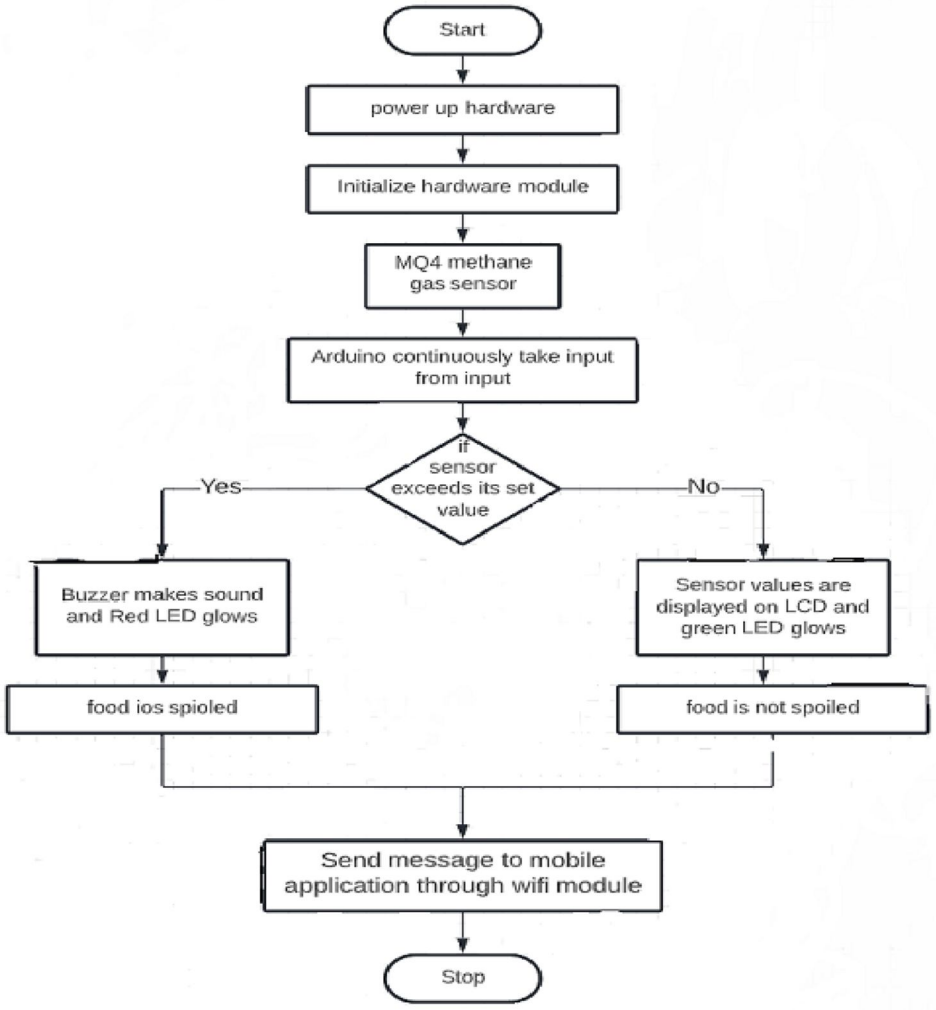
The lighting emitting diode is a p-n junction diode. It is a specially doped diode and made up of special type of semiconductors. When the light emits in the forward biased then it is called a light emitting diode.



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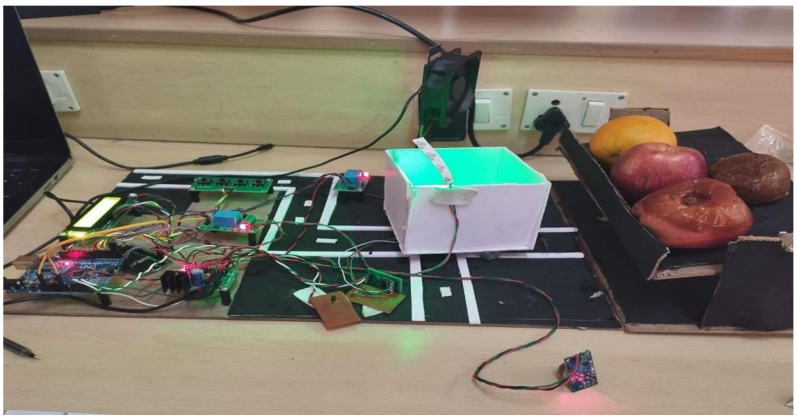
V. FLOW CHART



VI. RESULT

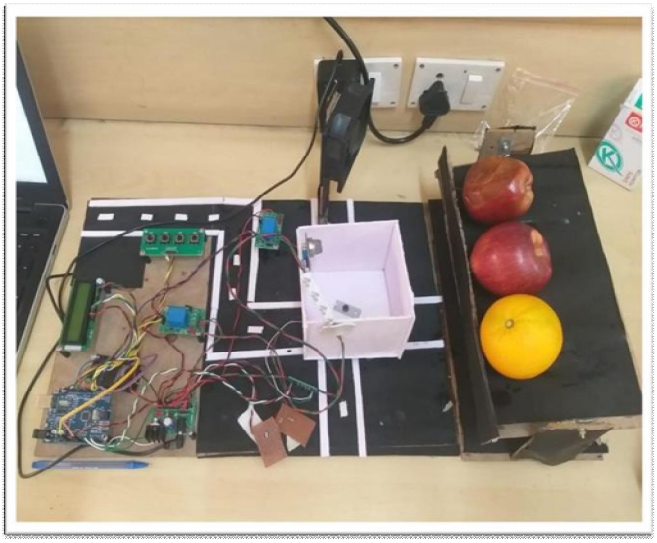
The microcontroller board Arduino Uno along with food detection sensor MQ4 senses the gases coming out from the rotten food. The signal is transferred through a Wi-Fi device ESP 8266 as the signals are sent to the user through a server and displays the ph value of methane on the 16*2 LCD display along with the buzzer and LED to the user as an output.

Picture of Project with Power Supply



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Results of Fruits Spoilage detection





Selection of Fruits



Fruits Spoilage Detected



VII. CONCLUSION

The early detection of the gases from different food items like ammonia, methane etc. can help the gas sensor 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.

VIII. FUTURE SCOPE

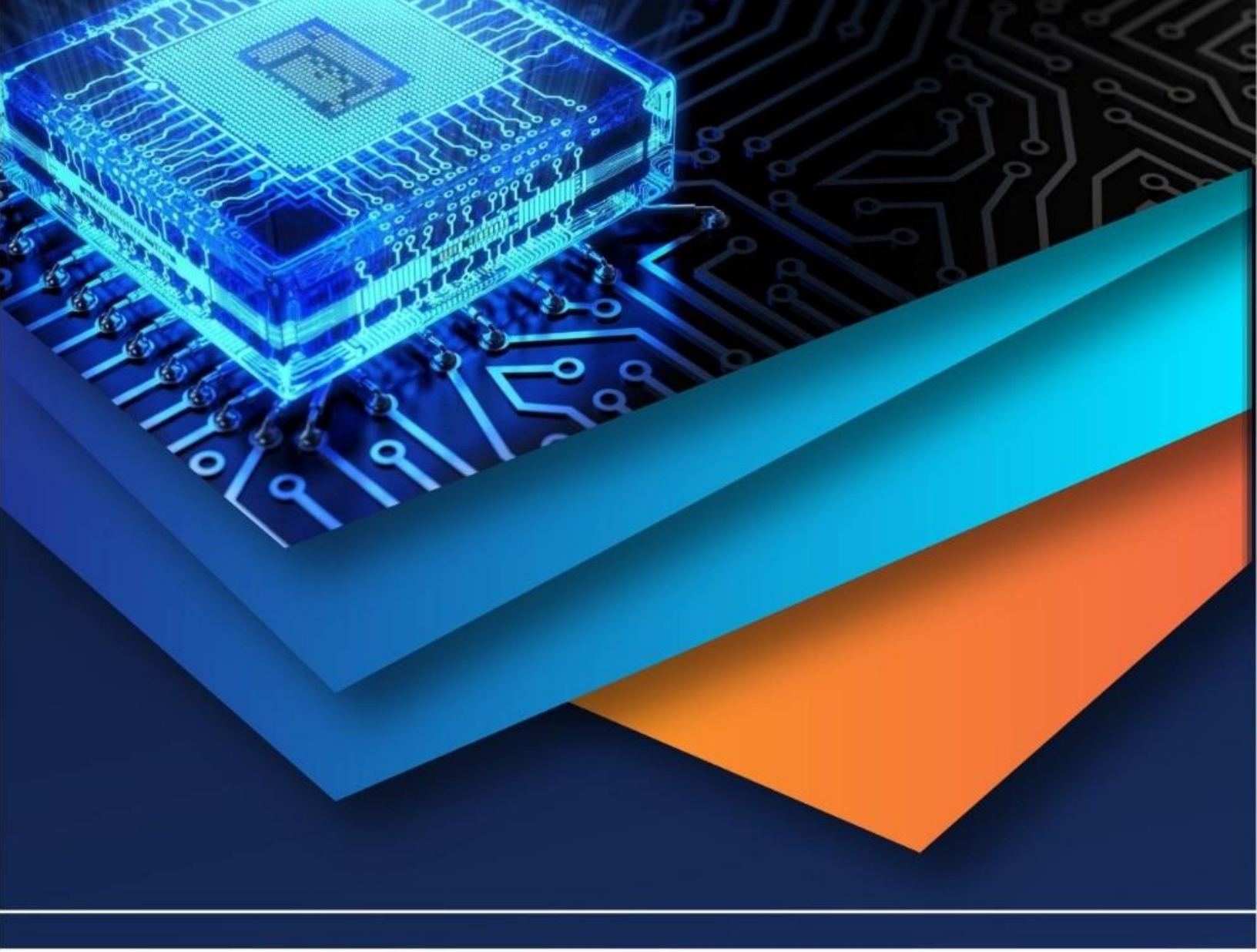
The scope of the proposed system can be expanded by including more products like dairy, fruits etc. The system can incorporate different other sensors like pressure, temperature, moisture etc. Different other techniques like nano technology, artificial neutral network can be also be used for further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

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