IoT Based Food Spoilage Monitoring System

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Abstract—In our project, food quality monitoring device will be designed that will keep watch of environmental factors like temperature, humidity. The device is built on Arduino UNO which is a popular prototype board. The Arduino board is interfaced with various sensors like DHT-11 to monitor temperature and humidity, MQ4 to detect Methane gas. This is IoT device and sends the measured sensor data to an IoT platform. The ESP8266 Wi-Fi Modem is interfaced with the Arduino to connect it to the internet via Wi-Fi router. The sensor data is also displayed on a character LCD interfaced with the Arduino UNO. With the power of Internet of Things, the environmental factors affecting the food storage can be monitored from anywhere, anytime and from any device.

Key words: Internet of Things, Arduino, Android Application, Wi-Fi Module

I. INTRODUCTION

Now a days, the health security is very important, Internet Of Things (IOT) is internetworking of physical devices. It has ability to transfer data over network without requiring human to human interconnection. In this project our main focus is to maintain, monitor the parameters such as temperature and humidity by using DHT11 sensor and one more methane MQ4 sensor is used for detection of food spoilage. Food safety and hygiene is a major concern in order to prevent the food wastage. The Quality of the food needs to be monitored and it must be prevented from rotting and decaying by the atmospheric factors like temperature, humidity and dark. Therefore, it is useful to deploy quality monitoring devices at food stores. These quality monitoring devices keep a watch on the environmental factor that cause decay of the food.

There are many factors leading to food poisoning, typically changes in temperature and humidity are important factors. So the monitoring system capable of measuring temperature and humidity variability during transport and storage is of prime importance. Every product making firm just want to attract more and more costumers towards them their main motive is to sell the product anyhow like by adding more flavors, coloring chemicals and preservatives to increase the taste and appearance but they forget that these money making tactics are actually affecting the human health.

II. METHODOLOGY

The proposed System made of the various devices like Arduino UNO, DHT11 Sensor, MQ4 sensor, LCD display, ESP8266 module. Arduino requires the 5V power supply which can be given by the adapter. The Temperature and humidity sensor is directly connected to the digital pin of Arduino also MQ4 sensor is connected to digital pin of Arduino. The LCD display is connected to Arduino for display the sensor values. Arduino has Ethernet shield and Ethernet cable is to be connected to it for providing internet.

We have used MQ4 Sensor for detection purpose. Arduino has 28 pins to which different sensors can be connected. Wi-fi module is connected to Arduino through this sensor values are given to module. Here we use ThingSpeak cloud for getting information about temperature, humidity and spoilage of food.

III. HARDWARE PROTOTYPE:

A. Arduino UNO

Arduino is an open source hardware and software. The boards are equipped with sets of digital and analog input output pins that may be interfaced to various expansion boards and other circuits. Feature serial communications interfaces, including USB on some models, which are also used for loading programs from personal computers.

B. DHT11

The DHT11 is commonly used Temperature and humidity sensor. The sensor comes with dedicated NTC to measure temperature and 8-bit microcontroller to output the values of temperature and humidity as serial data. The sensor can measure temperature from 0°C to 50°C and humidity from 20% to 90%.
C. MQ4 Sensor

MQ4 series sensor uses a smell heater inside with an electrochemical sensor in order to measure different kinds of gases and are used indoors at room temperature. They can be analyzed more or less but a known concentration of the measured gas or gases is needed for that. The output is an analog signal and can be read with an analog input of the Arduino.

D. Node MCU (ESP8266)

Node MCU Development Board consists of ESP8266 WiFi chip. ESP8266 chip has GPIO pins, serial communication protocol. The ESP8266 is very user-friendly and low-cost device to provide internet connectivity to the project. The module can work both as a hotspot and connect to WiFi, hence it can easily fetch data and upload it to the internet making Internet of Things as easy as possible. It can fetch data from internet using API’s hence the project could access any information that is available in the internet. Another feature of this module is that it can be programmed using the Arduino IDE which makes it lot more user friendly.

IV. THINGSPEAK CLOUD

The system uses the Thingspeak cloud. Data can be sent and retrieved from the cloud by an Android application, Arduino, and various devices. By use of Android application data ‘1’ and ‘0’ are directed to the Thingspeak cloud and another Arduino is used to retrieve the data from the Thingspeak cloud for temperature, humidity, and methane value. The cloud has a specific channel ID and read, write API key by which the data is sent and retrieved from the cloud within few seconds.

V. HARDWARE IMPLEMENTATION

REFERENCES


