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IOT BASED FOOD MONITORING SYSTEM.

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ABSTRACT

In the technology advancement, everything requires monitoring and controlling. This paper proposes an IOT framework for facilitating food monitoring for protection of the food, so that it would not get contaminated due to surrounding conditions during storage and transportation. In present scenario, the work done is in terms of the sensed value that have been recorded and a detailed analysis has been performed but automated controlled alternatives are not present. The proposed solution analyzes temperature, moisture, light as these parameters affect nutritional values of food items such as fruits and vegetables, and makes the analysis results accessible to the user via a mobile application. Web servers are also used to store data values collected in real time and analyze the results. User is alerted via messages along with locations of the shipment whenever an emergency occurs in this solutions, heterogeneous sensors for various domains are employed for sensing the condition of food.

Key Words: IOT, MQ4, DHT11, Node MCU ESP8266

1. INTRODUTION

A food contamination can occur in the production process, but also a large part caused by the inefficient food handling because of inappropriate ambient conditions when the food is being transported and stored. 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. Today almost everybody is getting effected by the food they consume, it's not only about the junk food, but all the packed foods, vegetables, products consumed and used in daily life, as all of them do not offer quality since their temperature, moisture, oxygen content vary from time to time. Majority of consumers only pay attention to the information provided on the packaging, i.e. the amount of ingredients used and their nutritional value but they forget that they are blindly risking their

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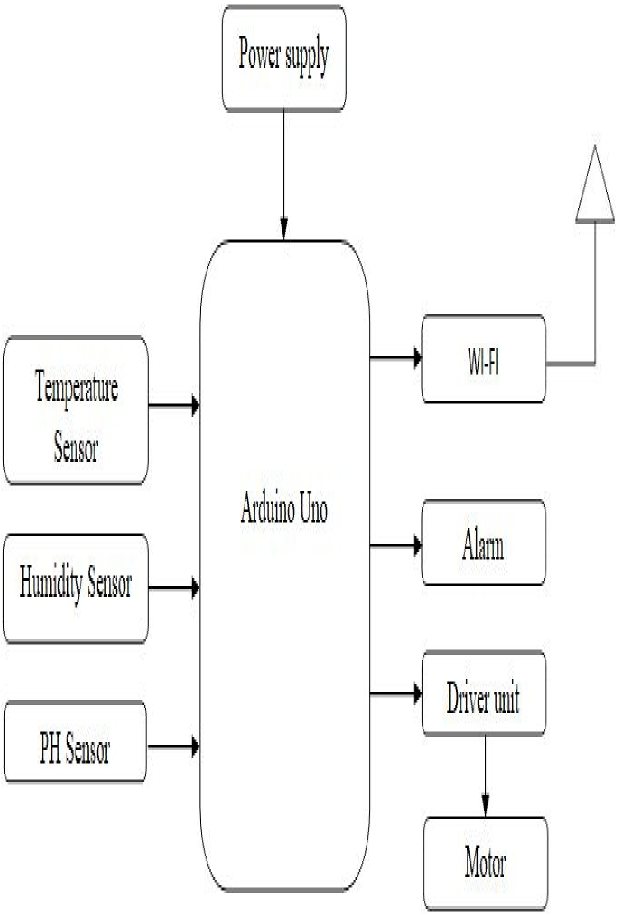
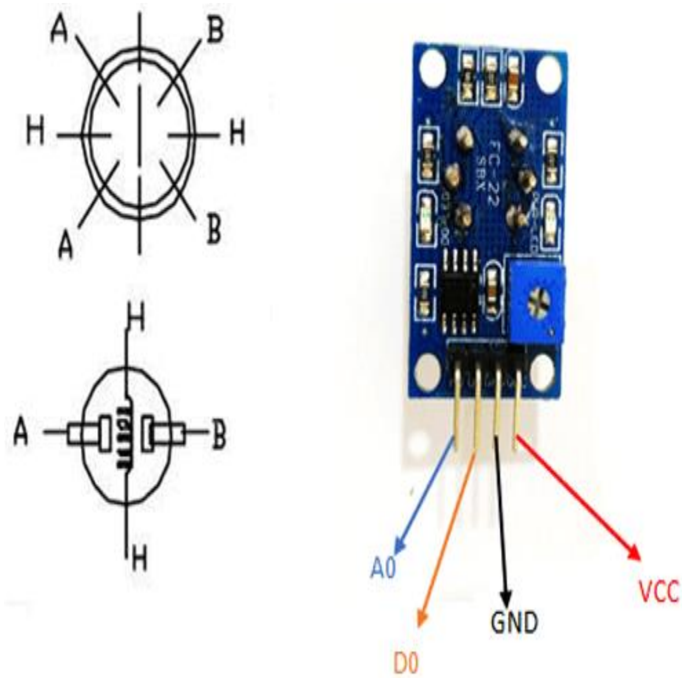
health by ignoring the environmental conditions to which these packets are subjected. Every product making firm just want to attract more and more .

costumers towards them their main motive is to sell the product anyhow like by adding more flavors, coloring chemicals and Although preservatives to improve taste and appearance, they forget that these money-making tactics actually harm the health of consumers.

2. Block Diagram:-

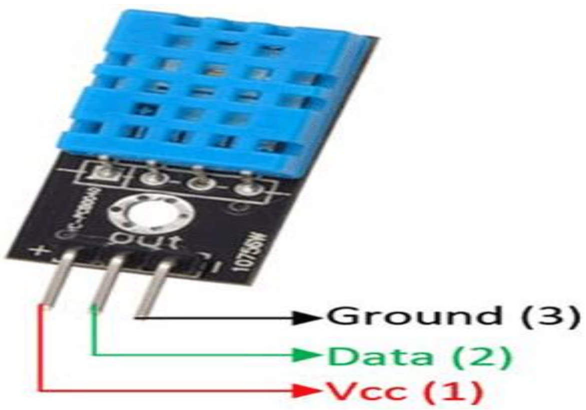


- MQ4 Gas Sensor



MQ4 is a gas sensing module, which is used to measure methane gas in the atmosphere. It contains Gas sensing layer, which is made up of SnO2. SnO2 is sensitive to gases like LPG, CH4, H2, CO, Alcohol, and smoke. As the decaying food emits methane gas (CH4), the MQ4 sensor can be used to measure this gas to monitor food quality. You can also check this project where we used a similar gas sensor to monitor air quality by measuring PPM.

Along with SnO_2, the sensor consists of an Al_2O_3 ceramic tube, measuring electrode, and heating element. The heating element provides the operating conditions required for the sensor to operate. MQ4 sensors are available on the market in two formats: modular or sensor. The sensor module has 4 pins and the project uses only 3 pins. They are VCC, GND and A0. Leave the D0 pin as it is, as it does not help in the calculation of ppm. The behavior of the MQ4 sensor is similar to that of the LDR (photo resistor). When the concentration of the methane gas is high, the module's resistance decreases, and when the concentration is low, the resistance increases.

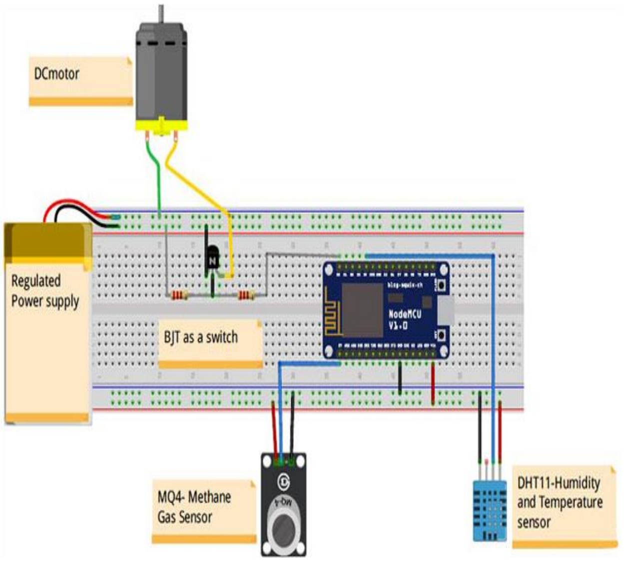


DHT11 Sensor Module

The **DHT11 Sensor Module** consists of a resistive type humidity measurement and NTC temperature measurement components along with an 8 bit-microcontroller. We guarantee quality, quick response, anti-interference capability and cost effectiveness. The calibrated data is stored in OTP memory and used by the sensor's internal signal recognition process The calibrated data is stored in OTP memory and used by the sensor's internal signal recognition process The calibrated data is stored in the OTP memory, which is used by the sensor's internal signal detecting process. It consists of a single wire serial interface for sending data from the sensor to the microcontroller.

The DHT11 sensor can be used as a sensor or module. The only difference is that you need to manually add filter capacitors and pull-up resistors to the sensor. If you have a sensor module, you do not need to add any components because they are built into the sensor module. The sensor can measure from 0C to 50C and humidity from 20% to 90% with an accuracy of ±1°C and ±1%. For communication between the sensor and the microcontroller, the full data transfer is 40 bits. The sensor sends higher data first. The data format for transmitting data is 8-bit integrated RH data + 8-bit RH data + * bit T data + 8-bit decimal T data + 8-bit checksum data. If the data transfer is okay, the checksum should be the last 8 bits. The figure below shows the pinout of the DHT11 sensor. Sensors are very popular and I used to use the DHT11 elsewhere.

Circuit Diagram



The power to the motor is given by the regulated power supply. The positive electrode of RPS is Engine; the negative electrode of the motor BIPOLAR JUNCTION TRANSISTER. The emitter terminal of the BJT is grounded, and the base terminal of the BJT is connected to the D0 pin of the MCU with a current limiting resistor 1K. The base terminal of the BJT is connected to ground with a resistor whose value is greater than the current limiting resistor. This resistor acts as a push-down resistor to the BIPOLAR JUNCTION TRANSISTER. The VCC and GND of the MCU are connected to the one side of the power rails as shown in the fig below. The positive terminal and GND terminal of both the sensors are connected to the VCC and GND power rails as shown in the figure above. The A0 pin of the gas sensor is connected to the A0 pin of the MCU while the data of the DHT11 sensor is connected to the D4 The two main important sensors here are the MQ-4 Gas Sensor and the DHT11 Control And Humidity Center Let's look into the detail of them. If you do not want the explanation, you can directly scroll down to the bottom of this page to get the complete code of this project.

Hardware Required

1) Node MCU ESP8266
2) MQ3 Sensor Module
3) DHT11 Sensor module
4) DC motor
5) BC547-BJT
6) Battery
7) Connecting wires
8) RPS

SOFTWARE REQUIREMENT

1) Embedded C
2) Arduino Sketch
3) Thing speak

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APPLICATION:

4) Can use this system in agriculture farm.
5) Can use this system in flower shops.

Conclusion-

The integrated IOT-based online monitoring approach using smart logistics can address the critical needs of reducing food waste, increasing transportation efficiency, and tracking food contamination. The emerging MI-based communications technology appears well suited for local communications in this environment; however, there are several challenges to making the technology work reliably in the highly dense and dynamic environment of real-world logistics operations. Further advances are needed to derive actionable intelligence from the collected data in real-world conditions, such as the presence of faulty modules or patchy cellular communications. Real-world logistics operations also have other complexities that make flexible distribution challenging, such as delivery contracts, party-specific distribution policies, and specific data-privacy needs. We hope this article will spur further research and result in solutions to many of these issues.

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