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ARUDINO BASED SMART IOT FOOD QUALITY DETECTION TECHNOLOGY

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Abstract - *In India most of the diseases caused by food borne illness, resulting in more number of hospitalizations and deaths are happened. For this reason we are designing a project called food detection system using iot. It is used to test a freshness food like meat, fruits. Different sensor are used to testing a food quality like, temp sensor used to sense a food temperature level, ph sensor is used to test a salt content of food and normal ph value is stored in IOT server and compared to that food. The pollution sensor is used to check the gas level of food it will alert food normal or abnormal condition. The fruit freshness is nested using image processing testing color of food and testing food freshness. In this way we are checking food quality in an effective way to avoid food borne illness and buy a healthy food and make a human wealthy.*

Key Words: ph sensor, temparture sensor, gas sensor, wifi, internet of things, ardunio uno.

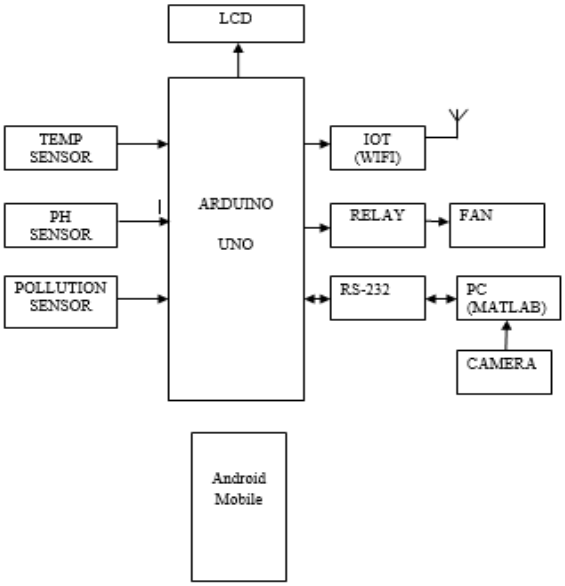
1. INTRODUCTION

The food we consume can affect in any form of contamination that may occur due to storage or chemical reaction. within the food. There are several viruses and bacteria that causes food contamination and leads to numerous food borne diseases, for example nor virus a very contagious virus caused by contaminated food or water. Most of the people die of food poisoning globally every year. Maintenance of foods and use of chemicals to artificially increase the time span of food causes people illness. It is essential to develop a system that can help people to identify the freshness of food or quality of food items. Our proposed system may give the good quality (freshness) management in food. It is based on IOT and the different sensors are testing food freshness. Food like meat could not produce any smell they start to rotten. Most meat sellers add salt content meat to make meat fresh. For this reason we can check a temperature level humidity level, Ph sensor used to test a meat salt content and image processing using matlab for predefined images are stored and testing freshness of food. In this way we are checking food quality explained below.

METHODOLOGY

BLOCK DIAGRAM

The working of proposed system. Different sensor are used to testing a food quality like, temperature sensor used to sense a food temperature level, pH sensor is used to test a salt content of food and normal pH value is stored in IOT server and compared to that food. The pollution sensor is used to check the gas level of food it will alert food normal -or abnormal condition. The fruit freshness is nested using image processing testing colour of food and testing food freshness.



In this way we are checking food quality in a effective way to avoid food borne illness and buy a healthy food and make a human wealthy. Our proposed is designed to make a compact and handy to detect and alert the human to find UN healthy food. It is used in also take shop to buy a fresh food fruits and meat also.

HARDWARE COMPONENTS

Arduino Uno

Arduino Uno is a microcontroller board based on the ATmega328P.It has 14 digital input/output pins (of which 6 have be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the embedded controller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started you have tinker with your UNO without worrying too much about doing something

wrong, worst case scenario you can replace the chip for a few dollars and start over again.

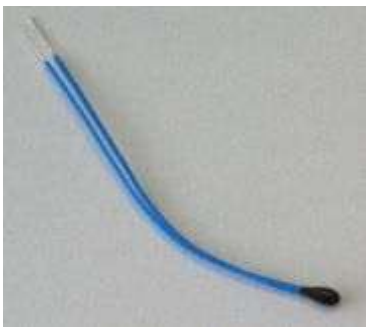
LCD DISPLAY

A **liquid crystal display** (**LCD**) is a thin, flat electronic visual display that can uses the light modulating properties of the liquid crystal (LC). LC does not emits light directly. . It has low electrical power consumption enables to be used in battery-powered electronic equipment.

TEMPERATURE SENSOR

A thermistor is the type of resistor whose the resistance varies with the temperature. Thermistors are widely used as current limiters, temperature sensors, self-resetting overcurrent protector, and self-regulating heating elements.

Thermistors different from resistance temperature detectors (RTD) in that the material used in a thermistor is generally a ceramic or polymer, while RTD use pure metals. The temperature response is also different; RTD are useful over a larger temperature ranges, while thermistors typically to achieve a higher precision within the limited temperature range [usually −90 °C to 130 °C].



POLLUTION SENSOR

In this Electrochemical gas sensors or gas detectors that can measure the concentration of the target gas by oxidizing or reducing the target gas at the electrode and measuring the resulting current.

PH SENSOR

pH, commonly used for water measurements, is a measure of acidity and alkalinity, or the caustic and base present in a given solution. The measuring electrode detects changes in the pH value while the reference provides a stable signal for comparison.

WIFI

A Wi-Fi is the enabled device, such as personal computer, video game console, smartphone or digital audio player, that can connect to the Internet when within the range of the wireless network connected to the Internet.

The coverage of one or more (interconnected) access points are called hotspots. It comprises an area of small as few rooms or large as many square miles.

INTERNET OF THINGS (IOT):

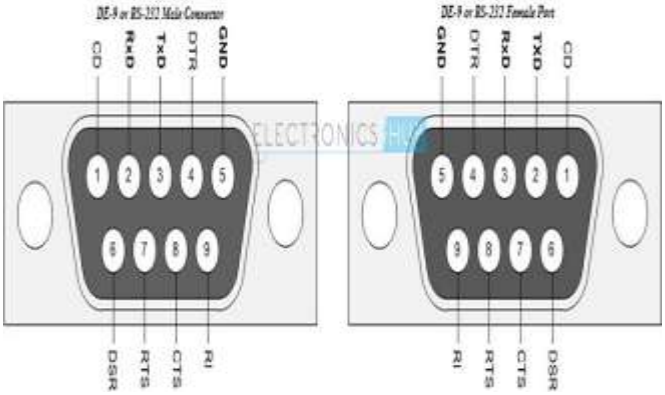
The Internet of things (IOT) is the network of physical devices, vehicles, home appliances, and other items embedded with the electronics, software, sensors, actuators, and connectivity which enables these things to connect, collect and exchange the data.

IOT involves extending Internet connectivity beyond standard devices, such as desktops, laptops, smartphones and tablets, to any range of traditionally dumb or non-internet-enabled physical devices and everyday objects.

Embedded with the technology, these devices can communicate to interact over the Internet, and they can be remotely monitored and controlled. With the arrival of the driverless vehicles, a branch of the IOT. Therefore, the Internet of the Vehicles starts to gain the more attention.

RS232

In telecommunications, **RS-232** is the standard for the serial binary data interconnection between the *DTE* (Data terminal equipment) and *DCE* (Data Circuit-terminating Equipment). It is commonly used in computer serial ports.



CAMERA

A **camera** is the device that can record and stores the images. These images can be still the photographs or moving the images such as videos or movies. The term *camera* comes from the camera obscure (Latin for "dark chamber"), an early mechanism for the projecting images. The modern camera is evolved from the camera obscure.

PERSONAL COMPUTER

A **personal computer** (**PC**) is any general-purpose computer whose the size, capabilities, and the original sales price makes it useful for the individuals, and which is intended to be operated directly by the end user with no interviewing computer operator. This is the contrast to the batch processing or time-sharing models for which allowed the large expensive mainframe systems to be used by the many people, usually at the same time of large data processing systems which is required for the full-time staff to be operate efficiently.

IMAGE PROCESSING
Introduction

Image processing is the computer imaging where the application involve the human being in the visual loop. In the other words of the images are to be examined and acted upon by the people. The major topics is within the field of the image processing include:

- ✓ Image Restoration
- ✓ Image Enhancement
- ✓ Image Compression

Image Restoration

Image Restoration is the process of taking an image with the some known, or estimated the degradation, and the restoring of the original appearance. Image restoration is often used in the field of photography or publishing where an image was somehow degraded but needs to be improved before it can be printed(Figure 3.1).

a. Image with distortion
b. Restored image

Image Restoration
Image Enhancement

It involves to taking an image and improving it visually, typically by taking the advantages of the human Visual Systems to response. One of the simplest enhancement techniques is to be simply stretch the contrast of an image. Enhancement methods tend to be problem specific. For example, the method that is used to enhance satellite images may not suitable for enhancing medical images.

(a) (b)
a. Image with poor contrast
b. Image enhancement by contrast stretching

Image Enhancement

Image Compression

It involves the reducing the typically massive amount of the data needed to be represent an image. This done by eliminating the data that are visually unnecessary and by taking the advantage of the redundancy that is inherent in the most images.

Image processing systems is to be used in many and various types of environments, such as:

- ✓ Medical community
- ✓ Computer – Aided Design
- ✓ Virtual Reality
- ✓ Image Processing

MATLAB

MATLAB is the high-performance language for the technical computing. It integrates the computation, visualization, and programming is an easy-to-use environment where the problems and the solutions are expressed in familiar of the mathematical notation .Typically uses includes are:

- ❖ Math and computation
- ❖ Algorithm development
- ❖ Modelling, simulation, and prototyping
- ❖ Data analysis, exploration, and visualization
- ❖ Scientific and engineering graphics
- ❖ Application development, including the Graphical User Interface building

MATLAB is an interactive system whose the basic data element is an array that does not requires the dimensioning. This allows you to solve the many technical computing problems, especially those with the matrix and vector formulations, in an fraction of time it would be take to write the program in a scalar non-interactive language such as C or FORTRAN.

RELAY

A relay is an electrically operated switch. Current flowing through the coil of the relay creates the magnetic field which attracts a lever and changes the switch contacts. The coil current can be on or off so the relays have two switch positions and they are double throws the (changeover) switches. Relays allow one circuit to switch the second circuit which can be completely separate from the first. For example the low voltage battery circuit can be use the relay to the switch an 230V AC mains circuit. There is no electrical connection inside the relay between the two circuits; the link is the magnetic and mechanical.

FAN

A mechanical fan is an electrically powered device used to produce an airflow for the purpose of creature comfort (particularly in the heat), ventilation, exhaust, cooling or any other gaseous transport.

CONCLUSION

In this effective way we are designed food quality detection system. For using this project is very compact and handy to detect and alert rotten food, like meat fruits vegetables are tested through image processed by controller using matlab the quality food images are stored in mobile app and easily find unquality food. Nowadays are most of the diseases are spread out through the unhealthy food. Some of the people having an in immunity, they are easily affected by eating unhealthy food. Using this project we can find a healthy food and eat a healthy food. Finally this project is also used in food checking department and check the hotels are making good foods and also the normal people go to

shop using this compact project buy a healthy fruits vegetables, meat through mobile app.

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