

An Efficient System to Detect Freshness and Quality of Food

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Abstract - Food quality tracking system based on the Internet of things is an integrated monitoring and management information system, which consists of intelligent database technology, radio frequency identification technology, food safety technology, network technology, as well as other practical high-tech techniques. The food we consume provide nourishment and gives energy to our body which helps us to perform our day to day activities. A healthy and fresh diet is the most important way to keep ourselves fit. The food items kept at room temperature undergo rapid bacterial growth and chemical changes in food. Eating unhealthy food can cause several foodborne diseases which may harm our health. The aim of this IOT based system is to detect the quality and freshness of food using biosensor and electrical sensors. A smart system which can detect the freshness of household food like dairy items, fruits and food items. The identification and selection of hydrogen sensor, Moisture sensor, and Gas sensor to develop a sensible food freshness detector ensures the freshness of food and tells whether or not to eat it or bin it. A web application is developed to display results of checking food items by the device. User can register a complaint and post reviews on the web portal if the system does not provide efficient results by filling an online form.

Key Words: Food freshness, Food quality, LCD, Arduino, Moisture Sensor, Hydrogen gas Sensor.

1. INTRODUCTION

Today, in most of hostel mess and government schools kitchen everybody is getting affected by the food they consume. It's not only about the junk food, but all foods like meals, vegetables, products consumed and used in daily life, as all of them do not offer quality since their temperature, moisture, oxygen content, harmful gases varies from time to time. The 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 health by ignoring the environmental conditions to which these packets are subjected. To ensure food safety it should be monitored at every stage of the supply chain. The potential of hydrogen (pH) is used to specify the alkalinity or acidity of milk. Variation in pH can affect taste, flavor, shelf-life of dairy products. When fruit like banana starts ripening its chemical properties change with the production of different gases like ethanol and ethylene in small amount. These gases increases with time. Increased water content in food items changes its chemical composition and pH level. The measurement of

parameters like pH level, moisture, gas level in food items is necessary to determine freshness and quality of food. It serves the purpose of consumer health protection by maintaining the required standard to preserve the quality of food. The health status of the food is not guaranteed, all the time. The analysis of routine measurements aims to detect changes in the nutritional value of food. The proposed system will help people to identify the freshness of food or the quality of food items. Our purpose is that the system may give better quality and freshness in food. General awareness of nutrients in food must be known by the consumer. Food poisoning has been the source of innumerable diseases that bad effect on health. To avoid illness, we use sensors to determine the freshness of household food items like dairy, fruits which can reduce food poisoning.

2. LITERATURE SURVEY

Paper 1: "EFresh – A Device to Detect Food Freshness"
September 2018

In this paper authors Naveed Shahzad, Usman Khalid used biosensor and electrical sensors to check out the freshness of food. A smart system which may sight the freshness of food like farm things, meat, and fruits. The identification and choice of hydrogen ion concentration device, moisture sensor, and Gas sensor is used to develop a wise food freshness detector that ensures the freshness of food and tells whether or not to eat it or bin it. An android application is developed to select the type of food to be checked.

The system ensures the quality of food, whether it is good for eating or not. It does not provide the facility to lodge a complaint if the device does not provide accurate results. The feedback may recover the issues related to the device.

Paper 2: "Detection and classification of bacteria in common street foods using electronic nose and support vector machine"2017

Authors Jessie R. Balbin, Julius T. Sese, Crissa Vin R. Babaan focused on the classification of bacteria in street food. Street food features a major impact on the culture and however, as a result of the dearth of information on correct food preparation, the cleanliness and quality of street food are neglected. Bad microorganism that causes diarrheal diseases and it's exhausting to sight whether or not the microorganism exists, by using electronic nose, and image processing.

This paper aims to design an electronic nose with gas sensors that will detect three common types of bacteria on street foods, namely *Enterococcus faecalis*, *Escherichia coli* and *Staphylococcus aureus*; and to classify if the said bacteria are present in the pre-cooking stage and the bacteria are still present after cooking. Electronic nose system detects the bacteria in the sample street food during pre-cooking stage and Support Vector Machine detects the bacteria in the sample street food during post-cooking stage. This system lacks the detection of other parameters like moisture, gas level in food.

Paper 3: “Real Time Milk Monitoring System”2018

Authors Prof. Kadam P. R , Miss. Shinde K. P. describes the scenario of smart city services which are provided to manage the city's asset by integrating information and communication technology (ICT) and Internet of things (IoT). Different sensors, terminals with a variety of topologies and different application requires security for managing them. To make money day by day quality of food decreases and it affects the health of people and this creates food safety problems. In this paper, the presented model detects the raw milk for spoilage detection. From last decade researches are coming up with different efficient methods for detecting spoilage of milk.

This paper states different studies that show that the raw milk contains the bacteria which are harmful to human beings, so there is a need to develop one real time

3. PROPOSED SYSTEM

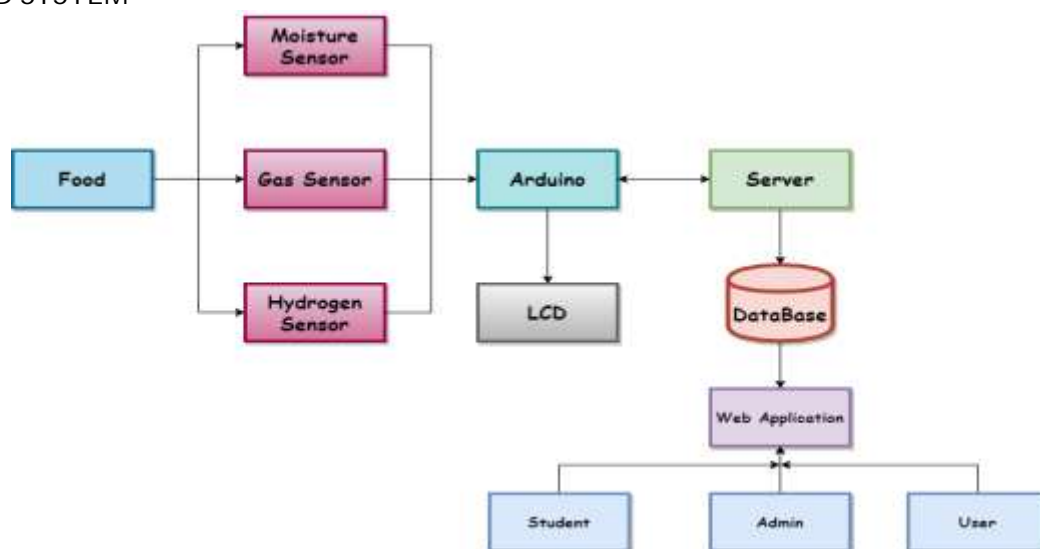


Fig.1: Architecture Diagram Of Proposed System

A system has been proposed to analyze the ambient conditions under which the food item is being eaten and buy. The proposed solution senses the temperature, moisture, light parameters, harmful gases in related food. The sensor senses the moisture level with moisture sensor, gas level with gas sensor and the hydrogen level with the help of

system which will monitor the quality of milk distributed to the people or getting used for dairy products. The proposed system work with a set of different sensors which are connected to the Arduino board and in turn all data will get passed to the android app and according the value, the system checks the quality of milk and user can easily identify the quality of milk, the user is getting. Along with milk ,a system must check other items which will make the system more effective.

Paper 4: “The Vegetable Freshness Monitoring System Using RFID with Oxygen and Carbon Dioxide Sensor”2012

In this paper authors Ki Hwan Eom,Min Chul Kim proposed an oxygen and carbonic acid gas concentration observation system for freshness management, which supports radio frequency identification (RFID). Freshness may be checked by varying factors as well as wetness, temperature, oxygen, and carbonic acid gas. This paper focuses on oxygen and carbon dioxide. The concentrations of these two gases are related to freshness and affect the food.

This system uses a device for observation of gases and connect the device with associate RFID tag. The RFID system is relatively easy to manage. With this combined system, it calculated the freshness of vegetables.

values are sent back to the Arduino. Arduino displays the results on the LCD screen as fresh or not fresh. The server stores the results in the database. Admin, students and hostel organization can view the result form the database by log in the web application.

4. IMPLEMENTATION

In our proposed System, we are providing a web application at the user interface.

There will be 3 modules:

1. Admin
3. User
4. Student

Admin:

- Admin will register the user, i.e hostel organization with a particular device.
- Admin will store and manage all the data recorded from various devices to a server.
- He will also take care of the maintenance work of each device.

User:

- Hostel organization will check the food quality and freshness with the help of the device regularly.
- The user will add students to the system.
- View results and student feedback on the website.

Student:

- The Student can log in with id and password.
- The student is able to post a review or lodge complaints in case of false results of the system.

5. CONCLUSION

Food poisoning has been the source of innumerable diseases, to reduce and avoid illness, we use biosensors and electrical sensors that determine the freshness of household food items like diary items, fruits, and meat. The system is an organic combination of food safety detection, full track of the quality of products, integration and management of network-based information platform, with crossover technology field and practical research results. This system consists of hardware device and a web application that checks the quality and freshness of food.

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