POST HARVEST DEGRADED ONION & SEAFOOD DETECTION AND ENVIRONMENTREGULATION SYSTEM

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Abstract: The freshness of the food is a significant indicator of the quality of food products. Onion & Fish processing, storage, and logistics of onion and seafood products all heavily rely on the rapid detection of the freshness of it. In this study, a rapid and nondestructive Seafood & Onion freshness detection method is proposed in response to the drawbacks of current food freshness detection approaches. We first retrieved the VOC gases of the fish body and down-sampled them before obtaining features. Finally, freshness detection is carried out using the Machine learning algorithm. Eating unhealthy food can cause several foodborne diseases which may harm our health. This IoT-based system aims to detect the quality and freshness of food using various sensors and algorithms. The identification and selection of an MQ135 sensor and TVOC sensor to develop a sensible food ideality detector ensures the freshness of food and lets us know whether to eat it or bin it. It also plays a vital role while the food is being warehoused. The results will be displayed on checking food items through the device**.**

Index Terms **- Food freshness, Food quality, LCD, IoT, MQ135 Sensor, TVOC sensor.**

I. INTRODUCTION

To ensure food safety it should be monitored at every stage of the supply chain. When foods start decaying it produces some gases like ethanol, methane, and VOCs in it. These gases increase with time.

The purpose of this system is to detect early food spoilage before signs are visible. Based on the research, the hypothesis is that, as food decay, they emit certain gases which can be detected by Microcontroller based sensors, and the levels of these gases will vary depending on the extent of the decay.

To solve a problem mentioned in the problem section we are developing an electronic device integrated with biosensors that can detect spoiled seafood, onion, and other food items to avoid more loss due to spoiling food products. The use of sensors that can measure different parameters of food like TVOC, ethanol, and methane level. The device consists of a microcontroller ESP32, electrical and biosensors like the TVOC sensor, MQ135 sensor, and ethanol gas sensor. The proposed solution senses TVOC levels, Ethanol, and harmful gases in related food and sends it to the cloud for further processing. Users can get an alert and monitor the system using an application.

II. LITERATURE SURVEY

P. P. Ray, S. Pradhan, R. K. Sharma, A. Rasaily, A. Swaraj, and A. Pradhan, "IoT-based fruit quality measurement system," 2016 – a portable solution based on the Internet of Things is presented in this paper. This study has been carried out using a set of Apples Malus Domestica) to proof of this concept. The preselected apples are numbered per their ripening (i.e., a measure of good taste and quality). Later, an Arduino-based microcontroller board performs an analog read operation, based on which a pre-calibrated indexing table is compared to disseminate the ripening index. This information is instantaneously sent over the Internet of Things-based cloud platform for storage, and real-time knowledge processing.

S. K. Panda, A. Blome, L. Wisniewski, and A. Meyer, "IoT Retrofitting Approach for the Food Industry," 2019 - In this paper, an advanced quality check method has been proposed by identifying influencing process parameters and proposes a retrofitting architecture for existing machines by implementing a hardware device capable of collecting a vast amount of process data and integrating them with a cloud platform for further analysis.

X. Wang et al., "Blockchain-Enabled Fish Provenance and Quality Tracking System," in IEEE Internet of Things Journal, vol. 9, no. 11, pp. 8130-8142, 1 June1, 2022, DOI: 10.1109/JIOT.2021.3109313.- A multilayer Blockchain architecture based on attribute-based encryption (ABE) is proposed to tackle the privacy issue caused by applying Blockchain to secure supply chain data and achieve trusted and confidential data sharing among parties in fish supply chains. An Internet-of-Things (IoT) chain saves encrypted fish provenance and quality tracking data, and an ABE chain is specifically designed for access control to the data in the IoT chain. Latest IoT and artificial intelligence (AI) technologies, including Narrow Band-IoT, image processing, and biosensing, are developed for fish origin proof, supply chain tracking, and objective fish quality assessment. As proven by field trials with SFM and a local fish supply chain, the BeFAQT can provide trusted and comprehensive fish provenance and quality tracking information in real-time.
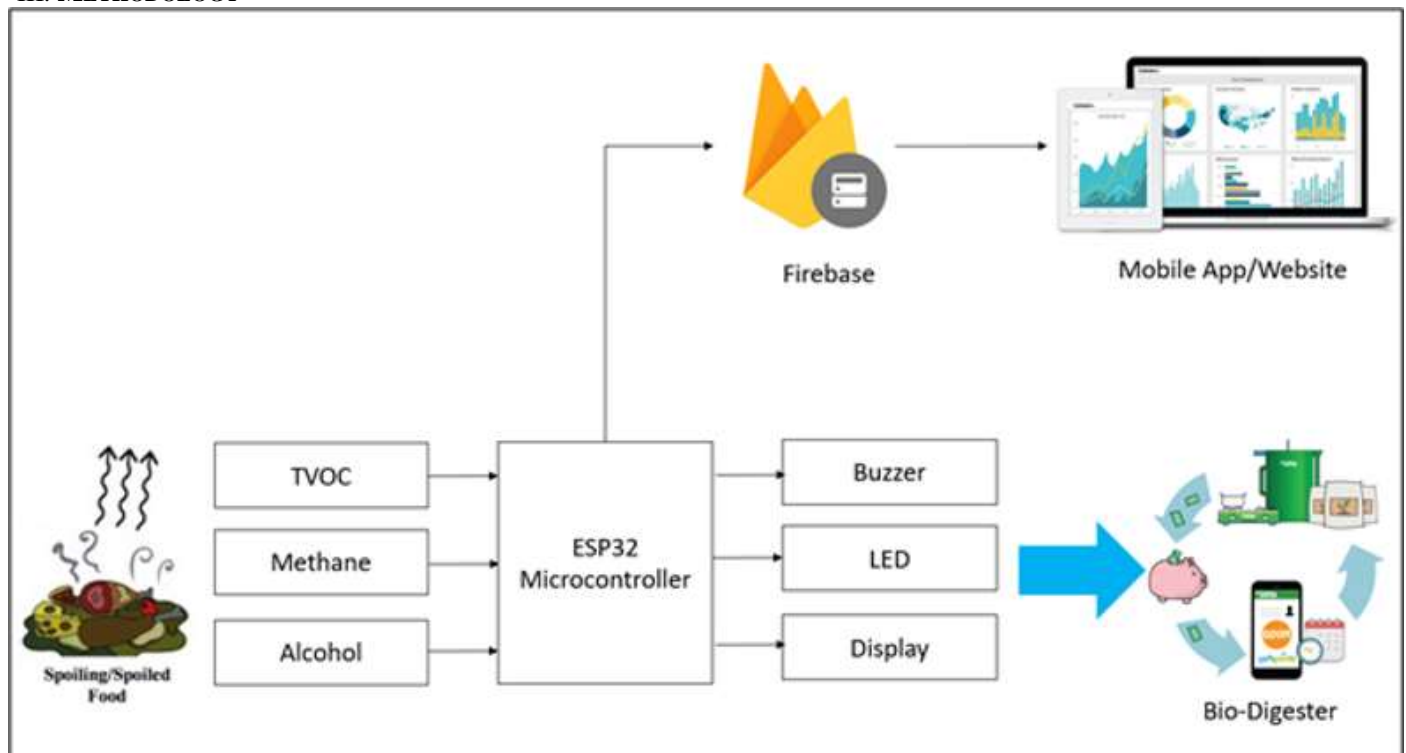
III. METHODOLOGY

Figure 1 System Architecture

TVOC and ammonia sensors measure the TVOC and ammonia content of a food item. The machine learning model uses a trained model to predict if the given food item is spoilt or not based on the TVOC and ammonia content. ESP32 (microcontroller) starts to sound a buzzer when it encounters a spoilt food item. This data is sent to a cloud platform. Several spoilt food occurrences can be monitored, and a machine learning model can be deployed again to predict the average shelf life of given food items.

This work proposes an Intelligent Degraded Onion & Seafood Detection System for checking food parameters using the Naïve Bayes algorithm. Food parameters like ammonia gas, methane, and TVOC, which show the quality of the food and food started spiling in the proposed work, if they are not in the advisable range of their values, then the user can take further action. In this work, the online analysis would be performed to predict food conditions to avoid food spoilage. This helps to keep food from spoiling and reduces incidental losses in the business.

VI. 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 dairy items, fruits, and foods. Detecting naturally emitted gases such as Ethanol as food decay can be used to detect food spoilage. The ESP32 with sensors can detect gas emissions and other important constituents like volatile organic compounds and moisture levels from food items even before the presence of any visible signs of spoilage. Using sensors to detect the presence of these values among foods can help detect food spoilage early and prevent the consumption of spoiled food. These techniques can be further developed to include other types of gas sensors and foods to increase the sensitivity of such detection methods. This system consists of a hardware device and a web application that checks the quality and freshness of food.

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