

PalArch's Journal of Archaeology
of Egypt / Egyptology

SEA FOOD PROCESSING USING INTERNET OF THINGS AND CLOUD
TECHNOLOGIES

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P.Hemalatha¹, J.Manikandan², G.Leemarosilin³, P.Kanimozhi⁴; Sea Food Processing Using Internet of Things and Cloud Technologies-- Palarch's Journal Of Archaeology Of Egypt/Egyptology 17(7). ISSN 1567-214x

Keywords: Internet of things(IoT); Food safety; Quality tracing

Abstract

In the era of engineering, the technological innovation in smart cities and automation almost everything necessitates monitoring and handling. This work suggests an IoT formulation for assisting seafood monitoring for go over of the foodstuff when purchase that it would not really acquire infected as well as anticipated to adjoining types of circumstances during storage area location and vehicles. In present circumstances, the carry out task finished is obviously about the sensed worthy of which may have been saved and a very good illustrated assessment features been performed, but computerized control alternatives happen to come to be certainly not present. The provided remedy analyzes contamination, alkalinity and food spoilage as information owns an effect on healthy values of sea foods and produces the analysis rewards attainable to the specific via a very good mobile phone request. The stack holders can get informed via word information along with the location of the shipment whenever an emergency happens. In this choice, heterogeneous sensors will be truly applied for noticing the express of foodstuff. The observations done by plotting of graphs which possess a complete knowledge to make certain that this piece of information can undoubtedly regain consciousness by which quality tracing is satisfied for even more evaluation and the species could conclude becoming notified if a shift in parameters rates above a threshold is normally recorded.

I. Introduction

A good foodstuff contamination may arise in the creation method, but just as very well a major part induced by simply the inefficient food handling as a result of inappropriate ambient circumstances when the food is keeping dispatched and located. There happen to come to be different elements top rated ranked to foodstuff poisoning that includes commonly alterations in temperature and humidity. Consequently, the monitoring program capable of

gauging temperature and humidity variability during transportation and storage space region availability is probably of excellent importance[1]. Nowadays practically every person is normally obtaining put in place by the seafoods they consume, it's not merely about the toxic food items, but all the foodstuff, super fruit and vegetables, products used and applied have found in daily personal life, as all of them perform certainly not provide good quality since their temperature, water articles, oxygen circulation articles vary from period to period[2]. Total bulk of consumers simply provide focus to the information furnished on the packaging, the sum of chemicals appointed and their healthful worth, Nevertheless, they ignore that they will be blindly endangering their wellbeing by disregarding the geographical circumstances to which these packets happen to be uncovered. Every merchandise organization merely prefers to attract extra and considerably more costumers towards them. Their important aim is normally to offer the merchandise to be commercially profitable by adding flavors, coloring chemical compounds, and preservative chemical compounds to increase the flavor. Nevertheless, they neglect that this money preparing strategies happen to be in fact having an effect on the buyers' wellness[3].

II. Problem Definition

To try to get certain foods basic safety it should conclude appearing monitored in every level of tool line. It serves the aim of preventative customer health safeness by preserving the expected typical frequent instances to provide high-quality for dishes[4]. The overall performance and examination of boring measurements, zeroed in on in sense goes in the diet plan or probably most likely overall health and wellness position of the foodstuff does indeed not really warrant that. Estimations of food and chemical substance material intakes define by the appropriate methods provided the dishes well-being firm to arrive to get in a position to recognize feasible dietary inadequacies and wrong food work with habits[5]. This incorporates concerns certain to the warehouse or frigid storage space monitoring where it wants to receive properly checked in every stage[6]. Food monitoring will involve exchanging the frequent facts of the foodstuff and foodstuff software program is developed for the procedure examination, plan exploration and foretelling of contamination via sensors to the dash boards [7]. Details accumulated through monitoring and security must get analyzed and send to decision-makers involved which is to be determined in a well-defined format and in a very good timely approach if it once again is usually normal to arrive to come to be of serious gain[8]. Consequently, Integration of the sensors with remote World Wide Web equipment specifics heading to explore and extremely great notebook computer software which enables submitter of information firewood the repayment to outstanding admonishment information which can be the desire of the hour. The Key period ends specific checkout program which is absolute, frequent as well predicted to generate particular fast taking away activities.

III. Proposed System

A novel IoT based food processing is proposed to analyze the ambient circumstances under which the seafood item is getting located and transferred[9]. The advised solution senses the high-temperature spectrum, alkalinity, mild factors of encompassing environment as these details affect nutritional ideals of seafood things as determined in Fig1. The morals of this information happen to end up with being therefore analyzed to usual considerations giving tolerance identity for very own details. The facts concepts with the plotting of graphs feature been carried out in the remote spot that this fact can handily get utilized for actually extra examination and the individual could get cautioned in the purpose, a turn in facts above a limit can be captured[10]. A net storage area space is usually appointed for storage space of facts sensed in the stern period and assessment results. End consumer, storage area collection manager is usually enlightened via cloud along with a spot of the shipment whenever a emergency develops. An android mobile or portable program is definitely appointed to facilitate end user relationship arriving from to the comprehensive puncture of Android products. The aim is certainly to develop a basic program that can undoubtedly arrive to get interfaced with the end users who receive alerts and notifications to grant convenient gain access to toto all the stakeholders operating in storage area region and venturing lessons of actions[11].

Monitoring plays an essential role in the recognition of an IoT and cloud technologies with the objects connected together with the sensor structured devices. While using the support of sensors in seafood security program, heat range, moisture, co2 dioxide, large alloys and other environmental circumstances in areas, as very well as perishable products during transfer can become supervised. In this paper, the designing of a cost-effective, sensor centered wireless monitoring program using low-cost concept structured upon inexpensive processing and cellular transmission plug-ins which is usually suggested[12]. The shown alternative is structured on two components: a traceability (which provide info regarding an item which is monitored and monitored) and monitoring (which offer a condition of the item and its environment). The primary action of food traceability and protection monitoring program is to offer details and maintaining records that show the route of an item device, a group of items or elements from a provider, throughout all advanced actions along the seafood thread to the last customer. For the satisfaction of the set functionalities, collectively with quick technology developments, many key requirements which rely on global concepts may end up being defined[13]:

- Cellular, light excess weight, little size, low-cost alternative outfitted with accurate and steady sensors for an important adjustable;
- Stability and transportability;
- Low or minimally intrusive;
- Suitability and standardized information;
- Determining the assets and recognition of plenty of items;

- Constant monitoring features and true period seafood basic safety data gathering at each decision stage;
- Documenting details on the creation procedure and creating links between info;
- Distributing the effect to the impair instantly to ensure that can easily end up being seen online in a demonstration form that is very easily understood;
- Seafood security emergency response program: an instant call to wits and preventive removal of potential risks.

The above mentioned necessities wants to symbolize a primary guide for building a custom monitoring program which may be used upon global level concern.

IV. System Architecture

The proposed system involves in three subsystems:

A. Sensors Subsystem

It basically includes the realizing individual software that continually displays high-temperature selection, humidity, pH rates and light strength and sends these well worth info to control subsystem in the frequent period time intervals. The particular detectors utilized for prototype creation happen to be truly detailed determined in Table1. Today's clever products and peripherals will come to be turning into considerably more covered and delight in a critical part of each of our computing facade and as well give the comfort of cellular connections. Collection of a dependable sensor typically determined by following factors:

- Weighing big total effectiveness against style complexity and stand space
- Weighing ease of doing the job with against design complexity and cost
- Weighing enormous procedure against low-power use
- Low cost savings and lower space requirements

Processing Sensors	Sensors Specifications
Temperature Sensor	LM35
Gas Sensor	MQ 03
Movement Sensor	MPU 6050
Light Sensor	LDR

Table 1 .Sensors Specifications

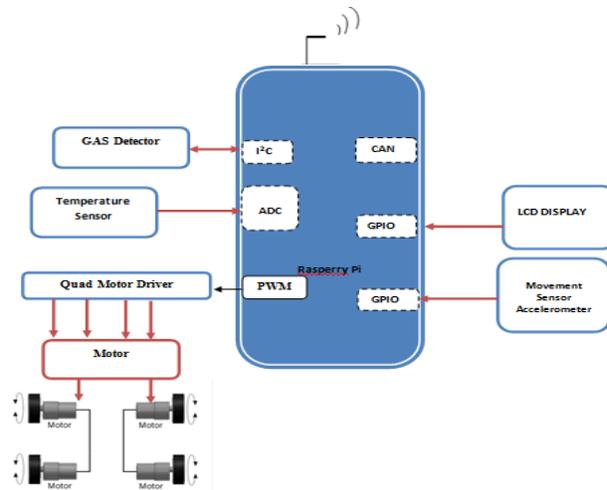


Figure 1 Architecture of IOT based Food Processing System

B.Data Processing Subsystem

In this component the input facts from the sensors are analyzed each time. Each sensor values is certainly contrasted with own threshold value of every single sensor and if a high difference is certainly captured, an emergency signal is normally send to the connection method. Raspberry pi2[18] is usually picked at only control subsystem while it gives pursuing capacities:

- Electric powered ability rating: 800 mA (4.0 W)
- Storage area: 1 GB (used with GPU)
- USB ports: 4
- Size: 85.60mm A good 56.5mm
- Extra excessive Size 45g (1.6 oz)

C.IoT Communication Subsystem

It provides the individual with forewarning text messages after receiving an emergency warning from handling subsystem. Variety of Interaction components such as Bluetooth and WiFi are actually fastidious for which the conversation modules are used in this system because of their communication runs and data rates. WiFi is definitely chosen as it offers scalability.

V. System Methodology

The task of monitoring is conducted using the electronic sensors used to measure various parameters. Each one of these sensors is interfaced with the microcontroller. Each sensor steps a particular parameter and each one of these parameters plays an important part in keeping regulated storage space conditions of raw seafood materials. Every parameter includes a set of preferred values which are ideal for food materials placed in that particular compartment. For example relative humidity of wheat is favorable to end up being between 45% to 55% for 28°C (approximately add up to room temperature). It could affect the fitness of the grains and trigger an upsurge in germination which may reduce worthiness of relative humidity, For this reason 28 Level Celsius room temperature is to be maintained. To make sure that relative humidity remains in control every compartment will discover drying action. The maximum desired value of relative humidity will end up being provided to the microcontroller as a threshold to actuate the drying. In an

identical manner, a threshold worth for quantity may also be a collection. Whenever the quantity is available to be significantly less than a certain quantity then an alert could be made to keep consumer notified about any of it. Vacancy of seafood materials in each compartment could be calculated in conditions of weight and a listing of these correct vacancies could be sent to an individual. On user authorization, this list will be further delivered to the desired supermarket to concern an order of these food materials in order to refill the containers.

Make use of IoT for the intended purpose of communication is usually proposed in this paper. Utilizing a Wi-Fi Module in the embedded system, the data could be delivered to the server using the internet. These details could be accessed by any gadget which is interfaced with the server. A framework of intelligent food monitoring program is proposed. As stated earlier, the system includes a cooling unit that may cool up to the heat of 10 to 15°C. This storage isn't aimed to freeze the foods present inside, it can be utilized for storage space of raw vegetables or edibles which need a low temperature in which to stay a good condition. Power usage of such a device is less when compared with a refrigerator, Also the building of such a power unit is quite easy in comparison with a refrigerator. Usage of a compressor for a building an application isn't viable and also escalates the complexity of the task, Hence a Peltier module (Peltier tile) is applied for creating a model. A Peltier tile functions on the principle of Peltier effect. Every time a DC voltage is definitely applied across became a member of conductors within the Peltier module a current is generated. When the existing flows through the junctions, removal of warmth happens at one junction and cooling takes place.

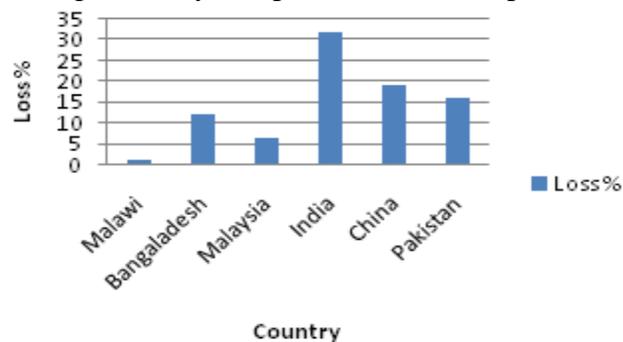
On the other hand, heat is produced at the additional junction. The cooling part of the tile can be raised up to 0-2°C if proper temperature sinks and insulation against warmth is provided. Regular storage unit may be the unit built with the objective to store raw food materials which require being kept at room temperature, mainly seafood grains. This unit must be both quality and amount monitored as stated earlier. In this framework, there is a temperature and humidity sensor to gauge the temperature and relative humidity of the content within the storage unit. To be able to tackle the issue of extra humidity an induction circuit is present as shown in Fig. 1, Both induction circuit and sensor can be interfaced with the microcontroller. If the relative humidity is found to be higher than the desired selection of humidity the microcontroller alerts the induction circuit to change on and due to heat produced simply by the induction circuit and exhaust fan present on the Storage space, the humidity is pulled away. Once the humidity drops right down to its desired benefit the microcontroller orders a shutdown of induction.

The load cell is utilized to gauge the weight of this content in the container. A minimal threshold value regarding the minimum weight content material of the container is usually fed to the microcontroller. If the excess weight is decreased below the threshold because of repetitive use of the seafood material within that storage, a user alert takes spot to notify the user regarding the low amount of this particular food within that one storage. Further on consumer acceptance,

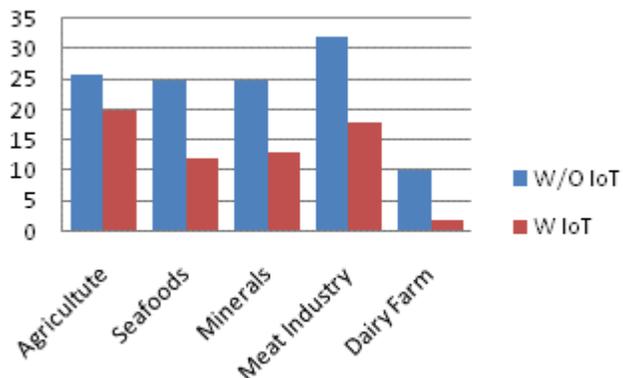
the microcontroller calculates the weight necessary to refill the compartment. This can help the user to produce a set of refilling if multiple compartments are present. Because of this actions, easy refill of compartments happen and the user won't operate out of the seafood resources.

Result Analysis

The wastage of food materials not just costs cash, additionally, utilizes additional assets such as drinking water, energy, and work. When it gets into drinking water utilization, India's (IND) food wastage costs become vital as it is usually among the globe's driest parts of the world. To illustrate, around 30% of IND's harvest creation is dependent straight on irrigated drinking water, while fruits and veggie creation consumes around 90% of all irrigated drinking water utilized. The total price of meals waste materials in IND each 1 year is usually approximated to become around US\$ 6.30 billion and equates to 3% of the country's GDP. Interestingly, a comparative study is made between agriculture and meat industry in terms of amounts and creation costs among various countries. This suggests that both phases are not really cost-effective and rather vulnerable to wastage. While quantity of food waste generated by customers are fairly low, distribution and infrastructure waste materials amounts are fairly high. The outcomes of this research obviously indicate the intensity of waste materials amounts within the IND meals source string. After the implementation of smart IoT based food processing the amount of food wastage decreased significantly compare to traditional processing



Graph1: Percentage gain in developing and less developed countries.



Graph 2 : Comparison between food waste quantities (% , by mass) with and without IOT Processing

VI.CONCLUSION& FUTURE WORK

Seafood security is a primary matter currently, and as a result, it is important to have a program which allows food products traceability and monitoring at the time of the entire food string procedure. This paper, beside offered seafood security preferences and existing systems, suggests a cost effective solution based on IoT. The benefits of the presented program for food products monitoring at the time of transport are low cost, small size, flexibility, rapid system expansion, real-time access and automated cargo identification. The long-term study will become concentrated on interconnecting automobiles, sensors, and cellular devices into a global IoT network, which allows numerous solutions to culminate in being shipped to vehicular and transport systems, and also to people within and around automobiles. Advertising awake notices determined in the sort of emoticons to convey the stack holders about harmfulness to the seafood through text messages may end up being grasped easily therefore, requirements to obtain explored.

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