An Excess Food Redistribution Framework Using Smart Container

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Abstract - **A trusted and active community aided and supported by the Internet of Things (IoT) is a key factor in food waste reduction and management. This paper proposes an IoT based context aware framework which can capture real-time dynamic requirements of both vendors and consumers and perform real-time match-making based on captured data. We describe our proposed reference framework and the notion of smart food sharing containers as enabling technology in our framework. A prototype system demonstrates the feasibility of a proposed approach using a smart container with embedded sensors.**

Keywords- **Internet of Things (IoT), Sensors, Food Waste Management (FWM), Context, Context-awareness.**

I. INTRODUCTION

Global food losses have recently been documented to be in the order of 25 percent to 50 percent of production volumes, caloric content and/or market values depending on the commodity. A great number of organizations all over the world such as UN Food and Agriculture Organization (FAO) are studying this enormous problem of postharvest food losses.Food insecurity has both physical and psychological impacts on a person's life which could be short term or long term. Tiredness, loss of weight, loss of focus,exposure to illnesses are some of the physical impacts, and stress, loss of confidence, sadness and loss of hope are some of the psychological impacts on a person's life.

The main purpose of this work is to proposes a novel approach towards efficient food waste reduction via an IoT enabled dynamic and real-time match-making system. A Smart Food Container containing different sensors is designed to capture real-time context of food donations made available by the vendors. Although the concepts are proposed for the Food Wastage Management (FWM) domain, our approach can be adopted, customized or extended to manage other resources as well.

II. LITERATURE SURVEY

The paper [1] describes the IoT framework for smart food monitoring system which senses the temperature, moisture, light parameters of surrounding environment as these parameters affect nutritional values of food items .The values of these parameters are then compared to standard values serving as threshold values for respective parameters. The data values with plotting of graphs has been done at remote location so that this data can easily be used for further analysis and the user could be notified if a change in parameters values above a threshold is recorded. This paper [2] " An Intelligent IoT-Based Food Quality Monitoring Approach Using Low-Cost Sensors"presents a method which relies on simple but effective method of integrated food monitoring, right at the client home, suitable for user prepared vacuum-packed foods. It builds upon the IoT concept and is able to create a network of interconnected devices.

By using this approach, we are able to combine actuators and sensing devices also providing a common operating picture (COP) by sharing information over the platforms. More precisely, our system consists of gas, temperature and humidity sensors, which provide the essential information needed for evaluating the quality of the packed product. This information is transmitted wirelessly to a computer system providing an interface where the user can observe the evolution of the product quality over time.

In this paper [3] the proposed design aims to implement a smart refrigerator system, which is easy to use and economical for the user. It is capable of notifying it owner about the activities going on inside it via wireless system on the mobile phone. The android app developed here is used as a GUI for the user where they will be able to see the condition of the food items kept inside the refrigerator. The whole system is governed by the STM32F103x8 cortex M3 ARM microcontroller where load cell act as an input of microcontroller and Wi-Fi transmits the all information to the android phone by usingIoT. The items weight is below the set threshold value to alert notification is send to the user's mobile to refill the food items before the get over and discover the presence of the object by using load cell sensor, which is used for checking the weight of products of the container where objects are placed.

This paper [4] demonstrates how technology can be utilized in warehouse for preventing loss of food grains and food products. An android app is developed that receives information from the sensors and by using android app the food products can be preserved in a nutritional environment.The proposed method of our paper is a special case of introducing an android app using which the various environmental conditions like temperature, smoke, humidity, light can be sensed and can be stored in a database.The smart food storage uses IoT and is cost effective, economical & uses friendly.

III. CONCLUSION

This paper proposed an IoT based novel, real-time and dynamic framework to efficiently distribute excess food which would otherwise end up in waste lands. The concept of a Smart Food Container was introduced. Weight, GPS, Air pressure, Light and RFID readers are added to the Smart Container in the next phase of the implementation. This will enable to gather more accurate context-data about the Smart Food Container's environment. Ultimately it allows real-time, dynamic, intelligent and context-aware match-making between the vendors/food items and consumers.

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