

# ***IOT BASED FOOD WASTAGE MANAGEMENT SYSTEM***

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**Abstract**— In recent times, food wastage is increasing at an unprecedented rate and creating a negative effect on the economic growth factors. This in turn creates a major impact on the agricultural processing industries. As food recycling is always remaining as a complex task, in this paper, we are focusing mainly on the food wastage measurement system in the office premises, where it provides real-time input on the wastage of the food to the employee on a live computer based dashboard. This research work focuses mainly on the integration of the multiple locations present in the office premises. With this the proposed model, we can analyze and generate comparison reports to deliver a detailed insight to the higher management and employer about the real-time food wastage analysis reports. This can be done in two methods either manual (or) automated by using Internet of Things (IoT) as an underlying architecture. In general we are automating the process of the food wastages measurement in each office premises, where it can make sure that wastage is controlled by the analysis reports generated in a daily basis.

**Keywords**— *Internet of Things (IoT); IoT weight Sensors; Sensors; Cloud computing, Internet of Things (IoT) management; Food wastage management, IoT controlled food wastage management, Food wastage cloud computing*

## **INTRODUCTION**

Operational food waste management has always posed a difficult task for those in food service operations [1]. This issues can be handled very well via using Internet of Things (IoT) and these technology has grown form researchers to implementation level, hence it has turn out to be a vital application technology that has the potentials of delivering smart services.

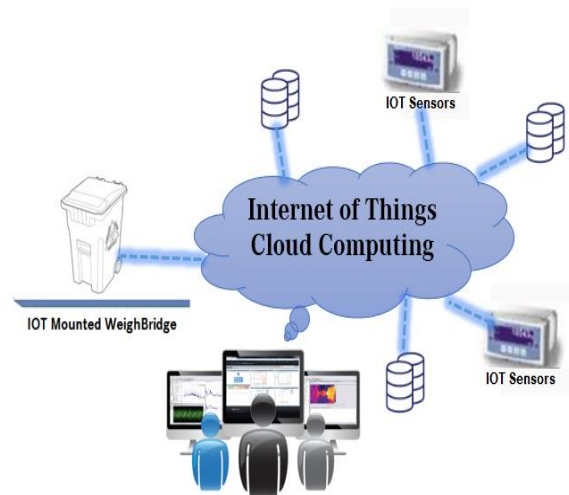


Figure 1: The Internet of Things (IoT) multiple sensors devices are inter-connected with cloud computing servers.

The cloud computing, hadoop big data, Internet of Things (IoT) and block chain are the key terms or the buzz words in the technology development of these years [5]. With the exponentially growth of Internet of Things (IoT) and devices, security has become most important. As more and more end objects or entities are added to Internet of Things (IoT) more data is produced and these data needs to be transported over the server. The data is then processed and analyzed to use it resourcefully. The resource constrained nature of Internet of Things (IoT) devices has highlighted different security for different end devices [6]. In these paper as we are integrated with could computing rather than the block chain security concepts, which provides more security of the data [7] and the other application where the Internet of Things (IoT) is picking up is in the driven intelligent transportation System [8], where the vehicles interact with each other very smartly and when the vehicles interact smart there is very less prone to the fatal accident and as the Internet of Things (IoT) assign the unique ip address for each devices it's very difficult to hack the system[9].

The cloud computing acts as a collection of the data and acts as the real-time analysis of the data and instantly produce the data analysis (or) the reports.

Cloud computing has newly materialized as a new example for holding and distributing the services over the

wider Internet. Cloud computing is striking to business people as it removes the prerequisite for users to plot ahead for provisioning, and permits the organization to start from the very small and rise the resources only when there is a growth in service request [10]. However, if cloud computing and the Internet of Things (IoT) technologies is to achieve its prospective growth in the coming years, there needs to be a clear accepting of the numerous problems involved, both from the outlooks of the providers and the consumers of these technologies. While a lot of research work needs to be carried out and currently taking place in these integration of the Internet of Things (IoT) and cloud computing technologies itself [11]

All these data captured via Internet of Things (IoT) sensors can be feed into the big data [12d] lake for different source or the target system for further detail analytics. The re-processing of the larger set data for the extraction from different Internet of Things (IoT) devices and saving these and again re-processing these data is a complex task, usually the traditional system cannot process such a larger amount of the data, in such as case if we want to process larger set of the main or sub set of the data for generating the detailed analytical reports then the big data technologies plays and vial role [13], in these paper instead of using big data approach to save the data, the content of the data is directly pushed into the cloud computing services for the real time report generation.

## PROBLEM STATEMENT

In the developing countries such as India, Sir lank etcetera the food leftovers are a worrying concern. The waste containers, and the waste produced is an evidence to demonstrate these situation. In the office premise eateries, big and smaller road side eateries, community get together parties, and wedding gatherings produce a bigger chunk of the food wastage. These food excess wastage produced is common sign of the pollution to earth environment factors, but also cause many economic distresses [14]. The modern measurements displays that the half quantity of all these foods are wasted over worldwide, it's expected the global volume of the food wastage is around 1.3 billion tones[15] and it's expected to grow more and more in the coming year, and which is an alarming issues. The figure 2 shows the food wastage collected during the function event.



Figure 2: Food Wastage collected during the function event.

The food wastage and disposal issues, can be addressed in different ways, as in the developing nations the government organizational institution are still struggling to dispose these food wastage in corrective away without causing any harm to environment, by bringing the new process (or) adapting new recently developed technologies can address these issues in more effective manner. These food waste is not only concerning the developing nation, it's also causing a major issues for the developed natation's such as United States and European nations. In the recent survey, the amount of the food waste is increased day by day in the developed countries, the most uneaten food waste lands into dumping open area, when the food waste is decomposes for serval days in open field without oxygen, then it cause the major impact on the environment[16-17].

## PROPOSED METHOD

The increased use of mobile devices and smart devices and sensors in the area of food processing and other domain has caused great waves on the world. The food industries and other domain are increasingly taking advantage of the benefits these Internet of Things (IoT) technologies [17].

The As shown in the figure 3, the weighbridge is used to weight the food wastage of each office premise and the weight of the each trash box is directly feed to the cloud service or mobile device, in the cloud service all the 2 office premise weight is collected and an analysis reports is generated on the real time basis's and the data is shared across to the office television dashboard or on the user mobile devices.

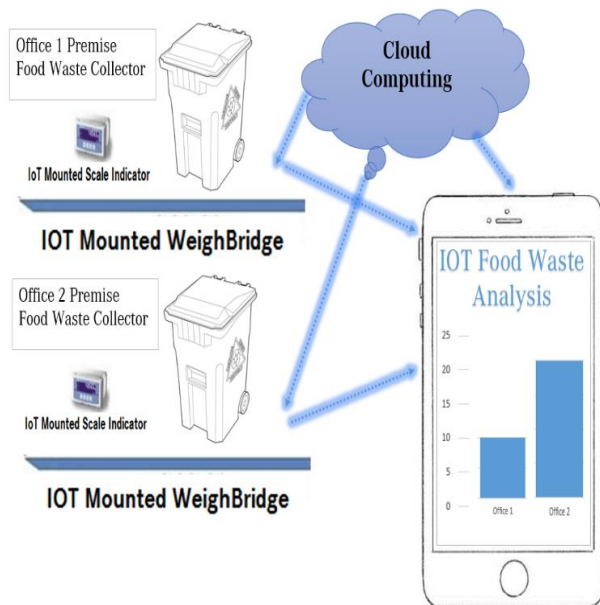


Figure 3: IOT Based Food waste measurement Weigh Bridge.

As shown in the figure 4, the analysis graphs collected for one of the day, during breakfast, lunch, dinner and snack time others are collected for all the three office location the values measured in the terms of the percentage wastages produced by each office location, the reports are also directly sent via a mobile devices to respective office location employees, these graph reports will immense help to reduce the wastage in the office cafeteria, these approach can be easily adopted at different level government and private organizational level.

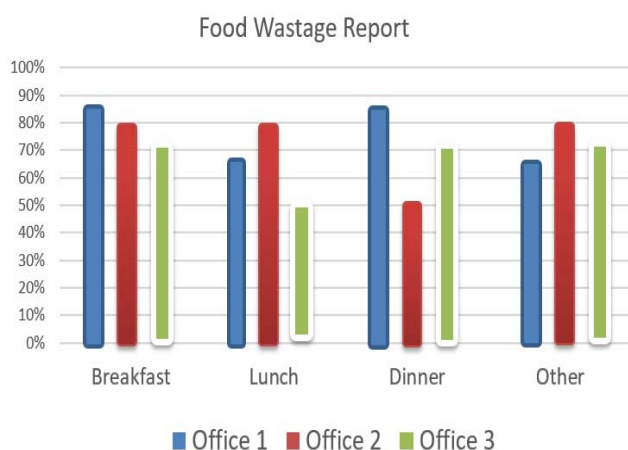


Figure 4: Sample real-time analysis report of the food wastage reports collected from the different office premises via Weigh Bridge.

## CONCLUSION AND FUTURE WORK

In our proposal, we are targeting only on office premises with Internet of Things (IoT) and cloud service solution, this will create a greater impact on the cost saving as well as the food wastage management system, and there will be greater impact on the day by day food wastage at the office premise, In our future work, we will try to integrate with other emerging technology such as block chain and also it will cover more other areas such as restaurants and other party areas.

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