

# A MODERN APPROACH IN IMPLEMENTATION OF SMART GARBAGE SYSTEM

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**Abstract**— In the modern world a huge complications arises because of food wastages for enriching as well as backward countries it's been a severe controversies for a past years which affect them. World food waste statistics says the food waste of US and Europe could feed the world 3 times over, this is a certainly a large count that never consumed. The land, water, air and fire the four elements of earth is wasted as we take the food waste as granted. And added to it we tend to lose our own packet money as wastage with creating an environment impact on the surrounding because of the food waste. To overcome all this we bring an IoT based smart garbage and waste collection bins. The main theme of the paper is to create personal awareness on people food wastage. And display it at the same time recycling the waste to use of fertilizer using embedded system. Near our field we can use the fertilizer on which we use food waste disposal machine. And also we clean the machine using automatic cleaning machine which prevents from bad odour.

**Keywords**—food waste, IoT, smart garbage bin, waste collection bin, recycle, automatic cleaning machine.

## I. INTRODUCTION

The Internet of Things is the network of physical devices vehicles, home appliances and other items embedded with electronics, software, sensors, actuators and connectivity which enables these objects to connect an exchange data. In the field of IoT the objects communicate and exchange information to provide intelligent services for users. Mobile devices are connected with various sensor and communication modules along with communication technology such as Wi-Fi, LTE. This as gained academic interest. IoT was introduced Kevin Ashton who was the director of auto-ID centre of MIT in 1999. Initial technology used was RFID. This is used for tracking of devices and storing device information, sensing, actuating, data gathering, storing, processing. Many researchers on IoT services include environmental monitoring, object tracking, traffic management, health care and smart phone technologies. There are some of IoT characteristics such as connectivity, things, data, communication, intelligence and action eco system. Devices, sensors they need to be connected to an item to each other, actuators, a process and to the internet or another network. Anything that can be tagged or connected as such as it's designed to be connected from sensors and household appliances to tagged livestock. Devices can contain sensors or sensing materials can be attached to devices and items. Data is the glue of Internet of

Things, the first step towards action and intelligence. Devices get connected so they can communicate data and this data can be analyzed. The aspects of intelligence as in the sensing capabilities in IoT devices and the intelligence gathered from data analytics. Due to the characteristics, waste management as become a significant issue. Illegal discharge of waste, absence of waste disposals and management system inefficient waste management policies have cause serious environmental problem. To handle this problems, various researchers into waste management based on IoT technology have been conducted from studies on RFID technology. This paper is about IoT based smart garbage system composed of smart garbage bins, routers, servers.

Smart collection bins works in the similar manner with the combination of sensors namely weight sensor and IR sensor that indicated weight and different levels. The IR sensors shows the various levels of garbage in the dustbins and also the weight sensors gets activated to send it's output ahead when it's threshold level is crossed. The details are given to the microcontroller and the controller gives the details to the modules. At the receiver section a mobile handset is needed to be connected to the Wi-Fi router. The wasted food is fertilize using food waste disposal machine. FWDM used for purpose of recycling food waste to make fertilizer at planting. In this we use mechanical parts for several types of motor on or off switch, IR sensor, push button is used. In the existing food waste management food waste managed by local government or de by unfolding food waste bins and emptying multiple pickup business for collection of food waste. The existing system causes environmental problems due to the single fixed fee. There will not be any incentives for lighter producers. Due to the low reliability of statistics it causes difficulty in adjusting and managing. Due to this problem the existing food waste garbage disposal system has been introduced. RFID is one of the most promising technology in recent years. The system provides real time monitoring of the waste collection.

In the recent technology the garbage wastes were thrown outside where it cause odour and leads to global warming. Then, an technology is brought up with the advancement of fertilizing the food wastes but still it has an disadvantage of non-cleanliness and when produces unwanted odours. In our project we have introduced the automatic cleaning machine which it cleans the machine after the

recycling process so that we can maintain the hygienic in the environment producing the natural fertilizer to plants.

## II. PROPOSED SYSTEM

As the technologies evolution growth is tremendous in the recent years implementing our system does not cost much comparatively with the other field modern advancement. We can considerably reduce its cost using the basic components of circuits which would be if cost efficient while implementing in the application. India will change one day with no wastage of food. In 2014, NEA and the Agri-Food & Veterinary Authority of Singapore (AVA) commissioned a survey to understand consumer behaviour and attitudes towards food wastage in households along with other reasons such as mouldy food and food that looked, smelled or tasted bad. From the consumer survey, NEA launched an outreach program in November 2015 to encourage the adoption of smart food purchase, storage and preparation habits that help consumers save money while reducing food wastage at source. Since its launch, NEA has further developed the programme to enhance and expand its initiatives.

Food waste accounts for 14.5% of all generated waste in the US according to EPA report, and only as a small portion of it is recovered(1.6%). At the same time, food waste contains loads of nutrients that can be returned to the environment, but it should be done the right way. Disposing of the organic waste in the landfill results in the generation of methane, which can pose a threat or contribute to the greenhouse effect. Hence, developing composting technologies is an important part of a sustainable waste management system.

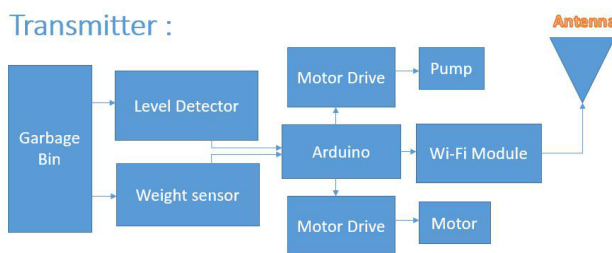


Figure 1 : Transmitter Block diagram



Figure 2 : Receiver Block diagram

Arduino is the combinational of hardware and software which is used to interface the other circuit like level detector, weight sensor, pump and motor and also does desired process that we program. We use IR sensor for level detecting. We detect the food wastage in three level after which it

indicates to the user. This uses to aware that no overflow occurs. Weight sensor detects the amount of wastage produced and displays in the LCD display so we aware of how much waste we produce. Wi-Fi module transmits and receives the data and aware the user be sending information to this mobile. It acts as the privileged circuit for IoT. The motor smashes the food waste and transfer it as a fertilizer and the pump produces water cleaning the entire wastes protecting it from odd odour. The pump and motor are integrated with the Arduino. The water is sprayed on the device thus flushing out the wastes that is in the surface of the machine thus maintaining it hygienic.

## III. SYSTEM ARCHITECTURE

### SMART GARBAGE SYSTEM:

SGS are installed in hotels, colleges, factories, individual houses and apartments building, in which it is connected through wireless communication via server. Again it is basically divided into two that is administration and service domain. In the administration domain consists of group of service domain where the results are processed with the help of individual domain results. The service domain is the individual system where you obtain the result. The administration domain calculates and gives the overall result.

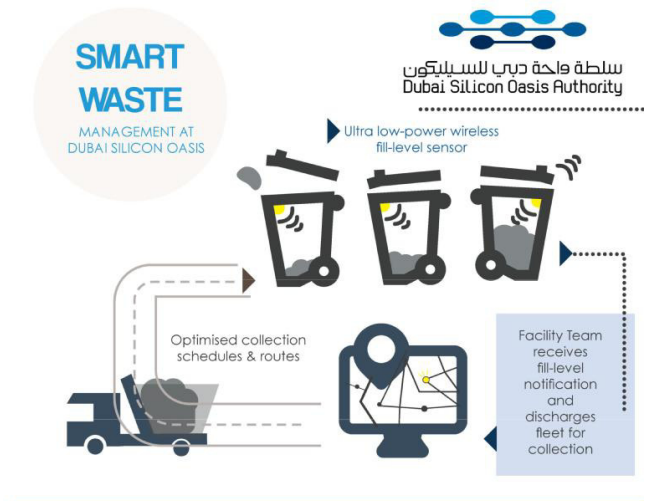


Figure: 3 Smart Waste

Source : <https://goo.gl/images/CYGES9>

#### DISPLAY SYSTEM:

The display system telecast the amount of wastage produced also gives the initial food weight and after food weight. The display effectively aware the user by projecting into the naked eyes for understanding the value of food and resources.

The device will give you a complete solution on the food waste management from the primary to the last steps. It overcomes all the disadvantages in the past technologies. It gives the revolution change where it is provided with automatic cleaning machine. It gives you the wastage level at the same time grinds the waste into fertilizer and also clears the machine automatically.

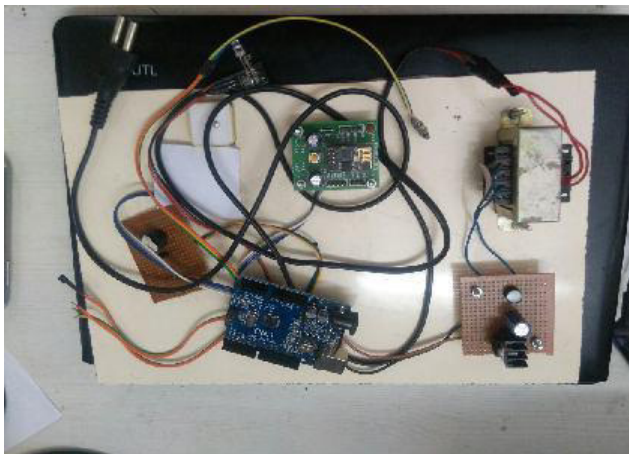


Figure 4:Experimental Setup

#### IV CONCLUSION

We use IR sensor, Arduino, motor, pump and Wi-Fi module on the processing of smart IoT based garbage management system. This project guarantees the clearance of dustbins at the same time it ensures the waste are recycled and the device is cleaned automatically. If the garbage is not cleaned with the specific time then a message send to the user regarding it. It's main aim is to reduce overall wastage and also conserving the environment towards to the waste management also reducing the cost on the food. The display projects the output to our naked eye proving the amount of waste and by making is aware about it. Not only used to aware as but also recycles the waste as fertilizer and cleaning the environment.

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