**Chapter I**

**Introduction**

* 1. **Introduction**

In the recent years, Urbanization has increased tremendously in our country. Due to Urbanization many people are moving towards cities. For the large number of people, a large number of waste produced. But at the same time waste management system is not sufficient. Number of waste collector in our country is not sufficient, as manner of huge number of waste. So proper waste management system is not applied properly. As a result it pollutes our environment. According to World Bank’s review report, in 2012, the global Municipal Solid Waste (MSW) generation levels were around 1.3 billion tons per year. This figure is expected to reach 2.2 billion tons per year by 2025. Per capita waste generation rates are between 1.2 to 1.42 kg per person (varying by region, country, and city) per day in the next one decade or so [1]. Our era is technology based and at present internet is very common in our country. The price of internet is decreased day by day and the use of internet is much more easier than previous. So, interconnected system will be a good solution for waste management system. Interconnected system may decrease cost and time. This will make waste management more efficient and convenient.

Chapter III

Related Works

**3.1 Introduction**

There are many IOT based smart waste management project around the world, most of them are designed in different purposes. In next section we will see some of the Smart Bin and their limitation in perspective to our country.

**3.2 Related Works**

In this section we will introduce some previous application related to our work. These applications will give us clear introduction what type of application are already done and what is our goal.

**3.2.1 Smart Dustbin for Smart Cities [1]**

This System provides an integrated GPS and wifi enabled Smart Bin. This system has three layer – Dustbin Layer, Server Layer and Client layer. Dustbin Layer consists of some hardware including Arduino UNO R3, Sonal sensors and wifi module. Server Layer is basically data layer where wifi module update Dustbin position and current state. Client Layer receives data from the server. So here server to client network is established.

**3.2.2 Smart Waste Collection System Based on Location Intelligence [2]**

This paper practically demonstrates how Internet of Things (IOT) with data access networks, Geographic Information System and electronic engineering works together to improve waste management system. Here a waste collection solution based on providing intelligence to trashcans, by using an IOT prototype embedded with sensors, which can read, collect and transmit trash volume data over the Internet. Then data put into a spatio-temporal context and processed by graph theory optimization algorithms to handle waste efficiently. Here also server to client communication occurs.

**3.2.3 IoT Based Smart Garbage and Waste Collection Bin [3]**

This system is designed with a smart bin and a html page. Dustbins are designed with microcontroller based system having IR wireless systems along with central system showing current status of the bin. Status of bin will updated through wifi in the html page. Html page data also accessible through smart phone. Here they create a server in wifi module to send data in html page, later they access data from any Internet enabled devices. Here they are not truly used server in server client sense.

**3.2.4 IoT-Based Smart Garbage System for Efficient Food Waste Management [4]**

In this system, they interfaced with a battery based smart garbage bin and exchange information with each other using wireless mess networks. In this system an RFID is used to sense garbage bin level. RFID sensed garbage bin also measured weight of the food waste and communicate with the central server. This bin is also energy efficient and fixed power supply with a battery.

**3.2.5 Solar-power smart bins launched at Orchard Road [5]**

A solar powered Smart bin launched on Nov 15, 2016 SINGAPORE. This smart bin is self-sufficient when it gets energy it stored in battery cells and used that when sunlight is absent. It has also some featured including wifi hotspot, business advertise.

**Chapter IV**

**Methodology**

**4.1 Introduction**

Here we are going to discuss about our proposal and system architecture. After that we will discuss about hardware and software that are used for developing our system.

**4.2 Project Description**

Our project has two part-

1. Hardware part
2. Software part

**Hardware part**

In hardware part we will build a Smart Dustbin. Our Dustbin