Introduction:

Internet and its applications have become an integral part of today’s human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just computers into the web. These researches led to the Ultrasonic of a sensational gizmo, Internet of Things (IoT). Communication over the internet has grown from user-user interaction to device-device interactions these days. The IoT concepts were proposed years back but still it’s in the initial stage of commercial deployment. Home automation industry and transportation industries are seeing rapid growth with IoT.

Since most of the process is done through the internet we must have an active high speed internet connection. The technology can be simply explained as a connection between humans-computers-things. All the equipment’s we use in our day to day life can be controlled and monitored using the IoT. A majority of process is done with the help of sensors in IoT. Sensors are deployed everywhere and these sensors convert raw physical data into digital signals and transmits them to its control centre. By this way we can monitor environment changes remotely from any part of the world via internet. This systems architecture would be based on context of operations and processes in real-time scenarios.

Smart collection bin works in the similar manner with the sensor namely Ultrasonic sensor that indicates its different levels respectively. The ULTRASONIC sensors will show us the various levels of garbage in the dustbins and its output ahead when its threshold level is crossed. This details are further given of the PIC controller and the controller gives the details to the transmitter module (Wi-Fi module). At the receiver section a mobile handset is needed to be connected to the Wi-Fi router so the details of the garbage bin is displayed onto the HTML page in web browser of our mobile handset.

References:

1) IOT Based Smart Garbage and Waste Collection Bin

*S.S.Navghane1, M.S.Killedar2, Dr.V.M.Rohokale3.*
2) A State of the Art review on Internet of Things by P. Suresh, Vijay. Daniel, R.H. Aswathy, Dr. V. Parthasarathy. It gave the idea of IoT subject and addition details about IoT. The proper smart environment and various applications.

**Objective:**

Smart waste management is a idea where we can control lots of problems which disturbs the society in pollution and diseases. The waste management has to be done instantly else it leads to irregular management which will have adverse effect on nature. The Smart waste management is compatible mainly with concept of smart cities.

The main objectives of our proposed system are as follows:
1. Monitoring the waste management.
2. Providing a smart technology for waste management system.
3. Avoiding human intervention.
4. Reducing human time and effort.
5. Resulting in healthy and waste ridden environment.

**Methodology:**

The proposed waste collection system is based on waste level data from trashcans in a metropolitan area. The data collected by sensors is sent over the Internet to a server where it is stored and processed. The collected data is then used for monitoring and optimizing the daily selection of trashcans to be collected. The key feature of this system is that it is designed to learn from experience and to make decisions not only on the daily waste level status but also on future state forecast, traffic congestion, balanced cost-efficiency functions, and other affecting factors that a priori humans cannot foresee. The rate at which trashcans are being filled can be analyzed based on historical data and the overflow predicted before it occurs. The optimized selection of trashcans to be collected is expected to reduce costs, improve collection efficiency or both, depending on predefined economic requirements. Fig. 1 shows the system overview.
A) THE PROTOTYPE:
- **SENSORS:** The waste level is determined by measuring the distance from the top of the trashcan to the waste by sonar. The sonar used in the prototype is Ultrasonic Ranging Module (HCSR04). It can provide measurement from 2cm to 400cm with 3mm accuracy, which adequate for typical trashcans. Additional temperature, humidity and motion, or weight sensors can be installed to increase the efficiency in the future.
- **Access Network Interface:** The data collected must be sent to a remote server via a wireless link. In our prototype we used WiFi as a network access technology. The total cost of the whole prototype was approximately 45$, price than can go down to around $15-20 when massively produced.
- **BATTERY:** It is essential to optimize the battery usage to increase the lifespan of the devices. Sensing and data forwarding rates, and wireless technology used have a strong influence on energy consumption. In this particular case, data is collected and forwarded once day. The estimated device battery lifetime is at least a couple of years considering the used technologies and conditions.

B) SERVER:
- The information obtained from controller is sent to server through IOT, this information is finally displayed on the webpage updating the present status of the bin.

C) End user:
- **Visualization:** The routes are sent to the end user and visualized in common devices such as mobile phones, tablets or navigation systems with data access. In this way the driver can easily follow the routes.
- **Data collection:** Additional data can be collected from the trucks such as GPS locations and timestamps in order to determine the traffic flow on the different streets. These and other data could be used by the Artificial Intelligence and Optimization Algorithms modules to learn and make better and more efficient can selections and routes.

**Results and conclusion:**
**RESULTS:**
- Less time and fuel consumption as the trucks go only to the filled containers.
- Decreased noise, traffic flow and air pollution as a result of less trucks on the roads.
- Our smart operating system enable two way communication between the dustbin employed in the city and service operator. Therefore the focus is only on collection of route based fill level of the containers.
- The sensors installed in the containers provide real time information on the fill level. This information helps determine when and where to priorities collection.
- In this way both service providers and citizens benefit from an optimized system which results in major cost savings and less urban pollution.
- Reduces the infrastructure (trucks, containers), operating (fuel) and maintenance costs of the service by upto 30%.
- Applying this technology to the city optimizes management, resources and costs, and makes it a “SMART CITY”.
Conclusion:

The objective of the project is for the real time access of information about the dustbin. This waste Management System using IOT has implemented the management of waste in real time using smart dustbin to check the fill level of dustbin to check if it is full or not. The novel cloud-based system for waste collection in smart cities. Providing the services for the different kind of stake holders involved in this area. On-board surveillance cameras and reporting system. Development of application for city administration, municipality staff. In this information is send and action is taken immediately based on the aspect. It is accessed from anywhere in the world continuously. It is able to be understand easily by all kind of people. It does not have any complicated work. This IOT based management of waste is very useful for smart cities in many aspects. This system will prevent the overflow of dustbin and make the environment neat and clean. It will reduce the wastage of time, cost and energy of the human. It will also prevent the occurrence of any disease. The truck drivers easily get the information about the clearing process and do their work immediately.

Future scope

• Efficient and energy-saving waste management, reducing CO2, air pollution and vehicle exhaust emissions—these are just a few examples for the demands of future cities. In views of that, the efficient use and responsible handling of resources become more important.
• Effectively managing waste is important in developed countries. Waste management may swallow up to 50% of a city’s budget, but only serve a small part of the population.
• Sometimes, up to 60% of waste is not being collected; it is often simply burned by the roadside. It can pollute drinking water, it can spread disease to people living nearby.
• Even with great route optimization, the worker must still physically go to the dustbin to check waste levels. Because of this, trucks often visit containers that do not need emptying, which wastes both time and fuel.
• Waste management prevents harm to human health and the environment by
• reducing the volume and hazardous character of residential and industrial waste.
• Improving proper waste management: such as separation of solid and liquid wastes, crushing of the waste would be the most advantageous, and other methods will reduce pollution, recycling of materials and create more green cities.
• This fact requires the development of sustainable solutions for urban life, managing waste is a key issue for the health.