Smart Garbage System Using Internet of Things

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Abstract— **Waste management place a vital role in day to day life, but there is a lack of maintenance in our country. The main theme of our concept is to maintain and manage the disposal of wastages. This makes our country clean and green (swachh bharath). In our project we have done that the hardware will automatically detect the level of the waste in the trash can and intimate to the garbage collector with the exact location of trash can. Then the garbage collector can easily visit to the location directly it will decreases the travel allowance and also manual work. For house hold purpose we have designed for automatic open closing of lid also with level detection, which became a hygienic and healthier way to use our trash can. The additional future like automatic collection of wastages by our trash can. After collection of all wastages it was segregated and send it to the recycler for recycling. This may reduce the wastages up to 80 percentage. The process of intimating and location tracking are done by Internet of Things and we plan to add a feature for user friendly Wi-Fi connectivity.**

I. INTRODUCTION

Waste management or Waste disposal is all the activities and actions required to manage waste from its inception to its final disposal. This includes amongst other things collection, transport, treatment and disposal of waste together with monitoring and regulation. it also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling etc.the term normally relates to all kinds of waste, whether generated during the extraction of raw materials, the processing of raw materials into intermediate and final products, the consumption of final products, or other human activities, including municipal (residential, institutional, commercial), agricultural, and social (health care, household hazardous waste, sewage sludge).waste management is a major issue in nowadays situation. Absence of proper waste management leads to various issues like health problems and economic issues. Waste management is intended to reduce adverse effects of waste on health, the environment or aesthetics. Thus the waste management can be controlled by using iot.

II. EXISTING SYSTEM ANALYSIS

The major drawback for existing system is improper garbage collection. Even while collecting the garbage most of the Garbage are not properly collected and they are left then and there. Thus, we provide a solution by intimating the level of garbage in each dustbin. Due to the intimation of the garbage level, the garbage can be cleaned before it is fully filled and so the unnecessary accumulation and disease causing agents can be reduced.

iii. PROPOSED SYSTEM

Our solution to the above mentioned problem is the smart bin which is used to detect the level of wastages in the bin and intimate to the garbage collector. Current system in our country is collecting all wastages and dumping or burning at a place. Instead of that our plan is to collecting of wastages and make a segregation for recycling process. Which gives a at most solution to the above mentioned problem and by this the daily wastages are decreased up to 60-80%.Waste management is the major issue in nowadays environment. In nowadays world, people are running badly behind the work. They don't have any time to look for cleanliness we even see the wastages are accumulated in the road sides and in the other empty places. These wastages are not properly collected and reused. Collection is the major process which is lagging in the present day condition when these wastage accumulation are properly intimated and collected by the recycler, then the recycle process can be enhanced. Flowingly it leads to the development of green India. For this collection and intimation of wastages, we use ultrasonic sensor and infrared sensor. The ultrasonic sensor which is placed in the top of the dustbin detects the level of the garbage in the dustbin. The values from the sensors are sent to the cloud via ardunio and Wi-Fi module. The level of the garbage in each dustbin can be monitor in the website. Collection process can be enhanced by, automatically moving some particular number of dustbins to a common place, and drain the garbage there. So that, the garbage collector can collect the garbage of those dustbins in a single place. For the movement of the dustbin we use infrared sensor. The infrared sensor are placed in the bottom of the dustbin. The path of the dustbin is given in white color line. The infrared rays which is emitted from the sensor gets reflected when it strikes the white line. As long as the infrared rays is reflected the bin continuous to move. The place at which the bin is to stop is coated with black color. The black color absorbs the infrared rays so that there is no reflection of rays. Thus the bin stops moving and drains the wastages within it via the side doors. After draining the bin returns to its original position. Its advantages are, it reduces the time consumption for collecting wastages and it also make the garbage collector convenience like time consumption, reduction in the human labor.
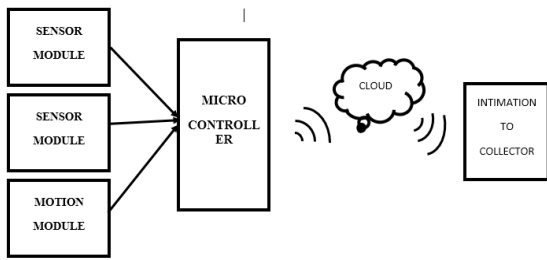
IV. TECHNIQUES USED

The two sensors which we use in our project are:

1. Ultrasonic Sensor
2. Servo Motor.

Working Principle - Ultrasonic Sensors:

Ultrasonic sensors emit short, high-frequency sound pulses at regular intervals. These propagate in the air at the velocity of sound. If they strike an object, then they are reflected back as echo signals to the sensor, which itself computes the distance to the target based on the time-span between emitting the signal and receiving the echo.

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BLOCK DIAGRAM:

As the distance to an object is determined by measuring the time of flight and not by the intensity of the sound, ultrasonic sensors are excellent at suppressing background interference. Virtually all materials which reflect sound can be detected, regardless of their color. Even transparent materials or thin foils represent no problem for an ultrasonic sensor. Ultrasonic sensors are suitable for target distances from 20 mm to 10 m and as they measure the time of flight they can ascertain a measurement with pinpoint accuracy. Some of our sensors can even resolve the signal to an accuracy of 0.025 mm. Ultrasonic sensors can see through dust-laden air and ink mists. Even thin deposits on the sensor membrane do not impair its function.

A. Working Principle – Servo Motor
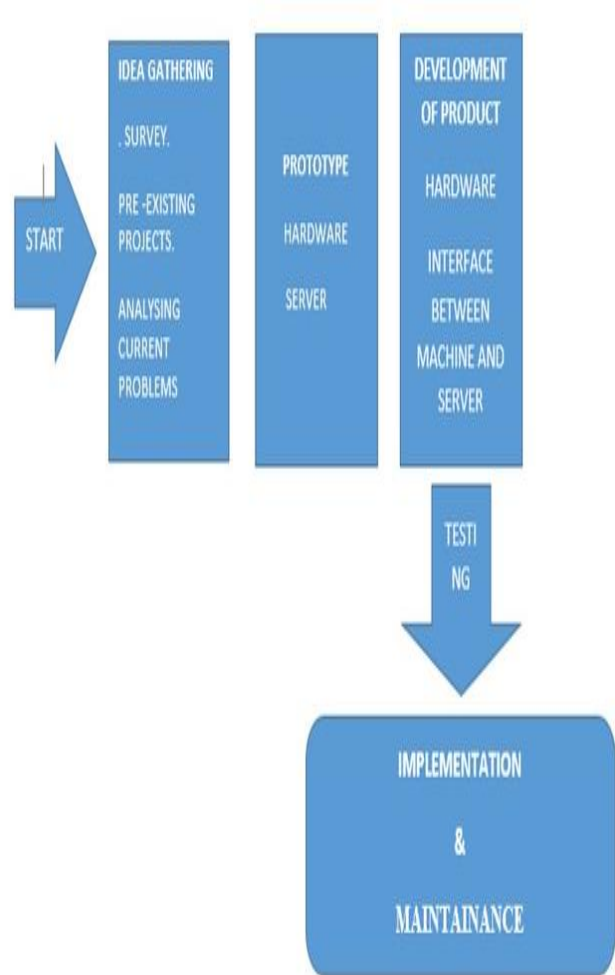
It consists of three parts:

1. Controlled device

2. Output sensor

3. Feedback system

A servo consists of a Motor (DC or AC), a potentiometer, gear assembly and a controlling circuit. First of all we use gear assembly to reduce RPM and to increase torque of motor. Say at initial position of servo motor shaft, the position of the potentiometer knob is such that there is no electrical signal generated at the output port of the potentiometer. Now an electrical signal is given to another input terminal of the error detector amplifier. Now difference between these two signals, one comes from potentiometer and another comes from other source, will be processed in feedback mechanism and output will be provided in term of error signal. This error signal acts as the input for motor and motor starts rotating. Now motor shaft is connected with potentiometer and as motor rotates so the potentiometer and it will generate a signal. So as the potentiometer's angular position changes, its output feedback signal changes. After sometime the position of potentiometer reaches at a position that the output of potentiometer is same as external signal provided. At this condition, there will be no output signal from the amplifier to the motor input as there is no difference between external applied signal and the signal generated at potentiometer, and in this situation motor stops rotating.
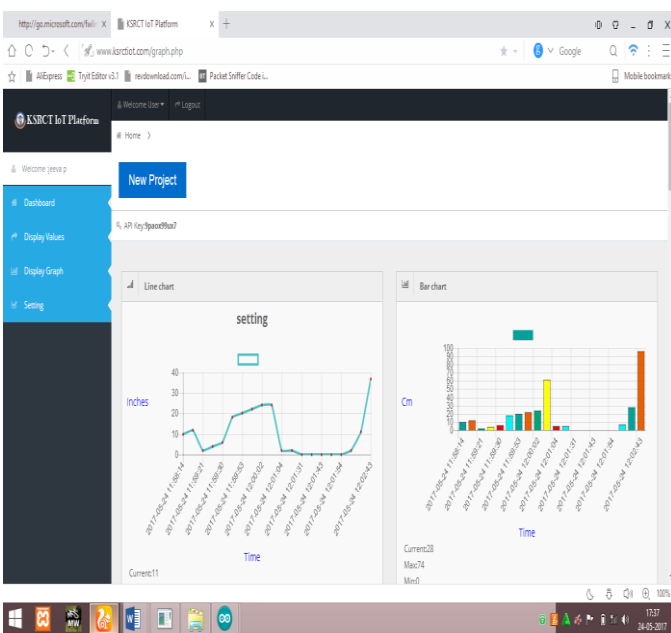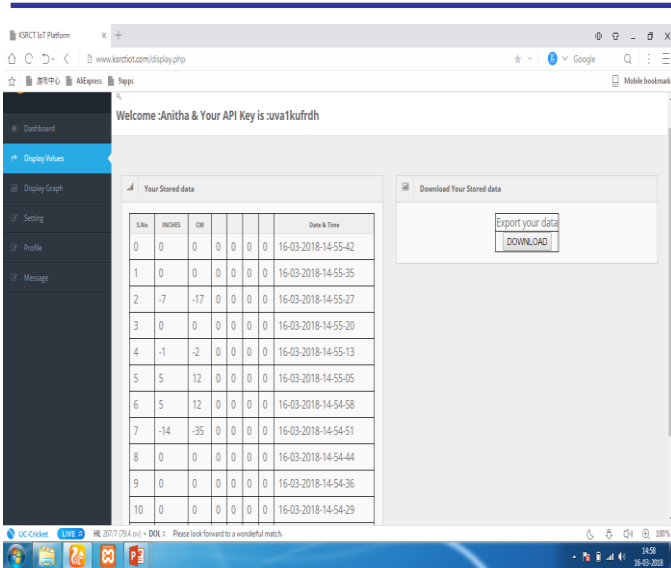
V. FINAL OUTCOME

The final outcome of the project is the smart garbage monitoring and controlling system. Thus, in this system, the garbage from each house is collected and drained in a common place. It is useful for the garbage collectors since all the wastages in an area is accumulated in a single place. In addition to this, the level of garbage in each area is intimated to the garbage collector via text message. The bin collects the waste from each house and drains it in a common place by

means of line follower system. The level of wastage in each bin is detected by means of level detection system.

VI. RESULT

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VII. CONCLUSION

In this project, we proposed an IoT-based SGS for replacing existing garbage collection systems. To provide differentiation from passive collection bins and other types of RFID-based garbage collection systems, we also proposed components required in external and public environments and designed the SGS based on these components. The basic system structure of a SGS is a centralized structure in which information gathered in each bin is transferred to the server. An adaptive user-oriented charge policy is used to motivate residents to reduce their waste, and Web-based services are provided to achieve more efficiency in the disposal and collection processes. The energy efficiency of the proposed SGSs shows 16% energy saving result, which shows that SGSs can contribute to not only a reduction of waste but also energy saving. The proposed system along with the adaptive user-oriented charge policy resulted in a reduction of waste of about 33%, and it is expected that the proposed system will thereby improve the efficiency of waste management.

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