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Smart Dustbin Application Using IOT with GSM

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***Abstract*- With increase of population, the scenario of cleanliness with respect to garbage management is degrading tremendously. In city, there are many public places where we see that garbage bins or dustbins are placed but are overflowing. This creates unhygienic condition in the nearby surrounding. Also creates ugliness and some serious diseases, at the same time bad smell is also spread and it degrades the valuation of that area. To avoid such situation we come up with a project called "Smart Dustbin" which is a GSM based Garbage and waste collection bins overflow indicator system for Smart Cities. Over main motivation behind this project is the ongoing campaign Swachh Bharat Abhiyan (Clean India Movement) launched on October 02, 2014 at Rajghat, New Delhi, by the Prime Minister of India Narendra Modi which is India's largest ever cleanliness drive to clean the streets, roads and infrastructure of the country's 4,041 statutory cities and towns. In this paper, smart bin constructed on a microcontroller-based platform, which is interfaced with GSM modem, and ultrasonic sensor that detects the presence of human on a particular distance. Once the garbage reaches the threshold level, ultrasonic sensor will trigger the GSM Modem, which will continuously alert the required authority until the garbage in the dustbin is squashed. Once the dustbin is squashed, people can reuse the dustbin. At regular intervals dustbin will be squashed. Once these smart bins are implemented on a large scale, by replacing our traditional bins present today, waste can be managed efficiently as it avoids unnecessary lumping of wastes on roadside. Foul smell from the rotten wastes that remain untreated for a longer time, due to negligence of authorities and carelessness of public may lead to long-term problems. Breeding of insects and mosquitoes can create nuisance around promoting unclean environment. This may even cause dreadful diseases.**

***Keywords*- Garbage Management, GSM, Waste Management.**

I. INTRODUCTION

The rising population of India poses serious threats with regard to the availability of living space, utilization of natural resources and raw materials, education and employment. But another serious peril that follows is the escalating amount of waste generated each minute by an individual. Every city is grappling with the menace of ever- increasing waste. An astounding 0.1 Million tons of waste is generated each day in our country. Sadly, only 5% of this colossal amount of waste is recycled.

In India, the collection, transportation and disposal of MSW are unscientific and chaotic. Uncontrolled dumping of waste on outskirts of towns and cities has created overflowing landfills, which are not only impossible to reclaim because of the haphazard manner of dumping but also has serious environmental implications. When techno logy will offer advanced levels of services and practically change the way people lead their daily lives.

Advancements in medicine, power, gene therapies, agriculture, smart cities, and smart homes are just a very few of the categorical examples where IoT is strongly established, viewed on a larger scale, the poor recovery rate has impeded the growth of the country as well as the economy of the nation. One possible solution for this problem could be segregating the waste at the disposal level itself. We have thus come up with an Automatic waste segregator that categorizes the waste as wet, dry.

This project Smart Dustbin Application using IOT with GSM is a very innovative system, which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins to the specific authority. Admin should monitor the dustbin. There should be send message to worker when garbage is reached to certain threshold. In existing garbage monitoring system, local governments manage garbage by deploying garbage bins and employing multiple pickup businesses for garbage collection. To deal with these problems in existing garbage monitoring, IOT based garbage monitoring system has been introduced. The Internet of Things is a concept in which surrounding objects are connected through wired and wireless network without user intervention.

The Approached method given in this paper aims to monitor the bin full or not and proposed method will calculate the sensor levels in bin and data will be sent to

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database second to second. First sensor will monitor the detection of user and second sensor will calculate the levels further if sensor-1 detected any user status of flag will be sent to other sensor if levels are under condition motor will turn on and bin will be open then if bin is full Motor will be off and it will look for other empty bin which is near to it as result led will indicate the user to go left or right. Other method User can check the levels of bins located in House/Public Places by using android app also every bin has contains distinct id. User can check the levels of garbage in bin by given details of bin id.

The designed algorithm will monitor all the bins located in different location and will give the status of bins. If any one of the bin is full then details will be sent to the concern authorities any user can also get the details of notification.

"The Internet of Things (IoT) is a system of interrelated computing devices, mechanical and digital machines, objects, animals or people that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human.

When something is connected to the internet that means that it can send information or receive information, or both. This ability to send and/or receive information makes things "smart." Internet of Things (IoT) is the networking of physical objects that contain electronics embedded within their architecture in order to communicate and sense interactions amongst each other or with respect to the external environment.

II. SMART DUSTBIN USING ARDUINO IS AN IOT BASED PROJECT

Here we are using arduino for code execution, for sensing we used ultrasonic sensor which will open lid and wait for few moment. It will bring drastic changes in tern of cleanliness with the help of technology. Everything is getting with smart technology for the betterment of human being. So this help in maintaining the environment clean with the help of technology. It is a sensor based dustbin so it would be easy to access/use for any age group.

Our aim is also to make it cost effective so that many numbers of people can get the benefit from this. And it should be usable to anyone and helpful for them.The actual setup and build process of the Smart Dustbin using Arduino. First, I will start with the mechanism to open the lid. As you might have already guessed, I have used a Servo Motor for this purpose. In order to open the lid, I have fixed a small plastic tube (like an empty refill of a ball-point pen) to the servo horn (a single ended horn) using instant glue.

For this mechanism to be able to open the lid of the dustbin, it must be placed near the lid.

In this the actual setup of dustbin design and build the system by using Arduino. Starting with the mechanism of opening the lid of dustbin, for this purpose Servo motor has been used.To open the lid, I have attached a small plastic tube (like an empty refill of a ball-point pen) to the servo horn (a single ended horn) using instant glue.

The final step in the build process is to make the necessary connections using long connecting wires as per the circuit diagram and securing these wires so that they don't hang around. All the wires from both the components i.e. Ultrasonic Sensor and Servo Motor are connected to respective pins of Arduino. This finishes up the build process of the Smart Dustbin.

The Smart waste management system which is uses RFID (Radio Frequency Identification) for specifying unique identity to the dustbin. RFID is a modern and faster mobile technology that uniquely and accurately identifies a RFID tag (waste tag) attached to, or embedded in, a waste bin (e.g., garbage). In each dustbin has been assigned with a unique RFID, using that specific RFID the municipal area or the person who has been in charged for collecting the waste can detect the amount of waste generated and facilitated smart waste management system.

The administrator can easily able to search for a particular dustbin. An RFID waste tag can take away from the dustbin which is totally password protected and ensures data security. The system proposed to calculate and find out the shortest path for collecting the waste so that more waste can be collected with the less consumption of fuel.

Some waste in the dustbin generates harmful gases and such waste should be disposed earlier, as overflowing of such waste in dustbin can cause a great nuisance and a risk to human health and environment. A solution for this problem is also proposed in this system; by using gas sensor the gas present in the dustbin can be measured due to which priority analysis for cleaning the dustbin can be done. Ultrasonic sensors are use as level indicators which indicate the garbage.

A special sonic transducer is used for the ultrasonic proximity sensors, which allows for alternate transmission and reception of sound waves. The sonic waves emitting by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode.

The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.

III. LITERATURE REVIEW

The literature studied some different papers to get information about the existing work done which has been done on the waste management.

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1. Sensor-based waste management system in Efficient Waste Collection System:
The system proposed to calculate and find out the shortest path for collecting the waste so that more waste can be collected with the less consumption of fuel. Some waste in the dustbin generates harmful gases and such waste should be disposed earlier, as overflowing of such waste in dustbin can cause a great nuisance and a risk to human health and environment. A solution for this problem is also proposed in this system; by using gas sensor the gas present in the dustbin can be measured due to which priority analysis for cleaning the dustbin can be done. Ultrasonic sensors are use as level indicators, which indicate the garbage.

2. "Smart garbage collection system in residential area":
In this project, mainly Solid waste management is a big challenge in urban areas for most of the countries throughout the world. An efficient waste management is a pre requisition for maintain a safe and green environment as there are increasing all kinds of waste disposal. The main concept is that a Camera will be placed at every garbage collection point along with load cell sensor at bottom of the garbage can. The camera will take continuous snapshots of the garbage can. A threshold level is set which compares the output of camera and load sensor. There are many technologies are used for waste collection as well as for well managed recycling The Information gathering is big and cumbersome.

The concurrent effects of a fast national growth rate, of a large and dense residential area and a pressing demand for urban environmental protection create a challenging framework for waste management. The complexity of context and procedures is indeed a primary concern of local municipal authorities due to problems related to the collection, transportation and processing of residential solid waste today, the garbage collection is manual, which takes many efforts and is time consuming. In this project, humans and vehicles were used to do that work and here we are using automatic technique to detect garbage level in Garbage.

3. Microcontroller based system:
A dustbin is interfaced with microcontroller-based system having IR wireless systems along with central system showing status of garbage, on mobile web browser with html page by Wi-Fi. Hence, the status will be updated on to the html page. There by to reduce human resources and efforts along with the enhancement of a smart city vision. Considering the need of modern technology, the smart garbage bin can expensive but considering the amount of dustbin needed in India, there for they used based sensors to reduce its cost and also make it efficient in applications.

In addition, at the sender side they used only a Wi-Fi module to send and receive data. However, because of the use of weight sensor for detection of amount of garbage in dustbin. It will only detect the weight of waste; not how much level it is of. The message can be sent directly to the cleaning vehicle instead of the contractor's office. An enhanced routing and scheduling waste collection model is proposed for the Eastern Finland, featuring the usage of a guided variable neighborhood thresholding metaheuristic.

The aim of the research was to develop an optimal schedule for trucks on defined collection routes. The data from the bins are processed in the DSS and if it is correct, it is sent to organizers of waste collection in this particular place and to the road police. The truck driver does not waste time for waiting, he/she goes to the next point and the route is dynamically recounted. When the problem is solved, the system recounts the route for one of the available trucks and the waste from unlocked bin is collected. It is combined with dynamic routing algorithms to maximize the efficiency of waste collection.

A survey presented in reviews the researches done on waste collection in developing countries from 2011 to 2019 and considers challenges for developing countries in waste collection sphere.

The research focuses on determination the stakeholder's actions/behavior and evaluation of influential factors defining their role in waste collection process. The models in the survey were tested on real data. Considering system approaches for solid waste collection in developing countries is presented.

The research compares the history and the current practices, presented from 1960s to 2013. The output of the survey is drawing a conclusion that developing and implementing solid waste collection approaches in developing countries are of a great importance.

The main issue is that waste collection does not include innovation that IoT can provide.

4. RFID-based Real-time Smart Waste Management System:
The Smart waste management system which is uses RFID (Radio Frequency Identification) for specifying unique identity to the dustbin. RFID is a modern and faster mobile technology that uniquely and accurately identifies a RFID tag (waste tag) attached to, or embedded in, a waste bin (e.g., garbage). In each dustbin has been assigned with a unique RFID, using that specific RFID the municipal area or the person who has been in charged for collecting the waste can detect the amount of waste generated and facilitated smart waste management system.

The administrator can easily able to search for a particular dustbin. An RFID waste tag can take away from the dustbin which is totally password protected and ensures data security.

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5. Main Components of RFID and sensor-based waste management system in Efficient Waste Collection System:

The system proposed to calculate and find out the shortest path for collecting the waste so that more waste can be collected with the less consumption of fuel. Some waste in the dustbin generates harmful gases and such waste should be disposed earlier, as overflowing of such waste in dustbin can cause a great nuisance and a risk to human health and environment. A solution for this problem is also proposed in this system; by using gas sensor the gas present in the dustbin can be measured due to which priority analysis for cleaning the dustbin can be done. Ultrasonic sensors are use as level indicators which indicate the garbage.

5.1 Ultrasonic Sensor:

A special sonic transducer is used for the ultrasonic proximity sensors, which allows for alternate transmission and reception of sound waves. The sonic waves emitting by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.

IV. RELATED WORKS

The initial waste management dustbin will open when anyone makes a clapping noise either with hand or leg. Opening based on sound is embedded with sensor, which are used to sense the sound. The waste management system can check the level of dustbin to find whether the dustbin is filled or not is initially done by using a web application. Where the web application need to be logged in by the specific authority to find the level of the dustbin used by the public.

Many system requirements were been lagged in the previous waste management. The existing garbage monitoring method is based on a Garbage weight data of vehicle as well as Garbage Boxes which causes incorrect data and create the problem in future for any municipal corporation.

In the proposed work to design an architecture, which works on optimization algorithms for Smart City management and more, specifically this system deals with municipal waste collection procedure. Consider existing IOT infrastructure and sensor networks for proposed execution. We need to achieve all the parameters using the IOT environment.

Nowadays, almost nothing can be achieved or fulfilled without the use of computers. The world is drenched in the internet and the trend internet of things is also gaining a lot of attention. The Internet of Things (IOT) is a phrase that was first used in 1999 by Kevin Ashton while he was working at MIT's Media Centre. He meant it to represent the concept of computers and machines with sensors, which connect to the Internet to report status and accept control commands. The IOT, in reality, has been around for a long time, but it didn't have a name. Machine-to-machine communications have been in existence for many decades, often using dedicated networks that eventually converged over to the Internet. It enables the feature as everything to everything connectivity to enhance the vision of the smart world. IoT is a network of sensors where data is exchanged, using different connectivity protocols, with systems. This set up can be leveraged to create a new business application or to enhance an existing process.

The Smart Dustbin will automatically open when anyone approaches to it for throwing garbage, and then closes automatically. Opening of the Smart Dustbin is embedded with photo sensors, which are used to sense the distance of any obstacle coming in front of it. These sensors will sense any person approaching towards the dustbin within its range. After sensing the person, it will inform the motor to open the opening of the Smart Dustbin, so that the person can throw garbage without taking efforts to open it. As the person will move away from the Smart Dustbin after throwing the garbage, the sensors will not sense anything in its region in front of it, and will indicate the motor to close the Smart Dustbin. The auto bin like other dustbin will be a box to accumulate garbage with an opening.

The Smart Dustbin will consist of a level indicator, which will display the levels of the garbage in the Smart Dustbin. The Smart Dustbin will contain a GPRS system, through which the levels of the garbage are displayed on the LCD screen. If the level reaches up to 80% then it will display in the mobile where in the user was already registered. GPRS system can send and receive messages. Using this system, the Smart Dustbin will send a text message to the registered user notifying that the dustbin is full and there is a need to empty it. The authority then gets aware about the status of Smart Dustbin by the notification, which helps them to determine its state, that it is full and can take the required and desired action. When the level reaches the particular threshold, it automatically notifies the respective authority and it further doesn't allow depositing the waste. It functions back only after the waste clearance is done.

This result in better hygienic surrounding and prevents from leakage of waste.

In summary, the significant contributions of Smart Dustbin are as follows:

- Smart Dustbin, follows the module, which automatically opens when anyone approaches it.
- Opening of the Smart Dustbin is embedded with photo sensors.
- These sensors will sense any person approaching towards the dustbin within its range.

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- The working of the Smart Dustbin, which follows the module and detectsthe status of the BIN.
- "GREEN" and "RED" LED's are used to refer the indication of the BIN.
- The SMS notification is send to the specified authority on the ongoing status of the Smart Bin.

V. WEB BASED SOFTWARE SYSTEM

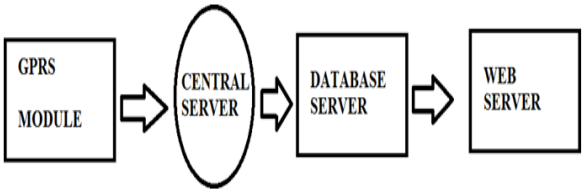

Fig 1. Software System.

1. System Design:

System Design is a solution, how to approach to creation of a new system. This important phase is composed of several steps. It provides the understanding and procedural details for implementing the system recommended infeasibility study. Stress in on translating performance requirement into design specification design goes through logical physical stages of development. Logical design reviews the present physical, prepare input and output specification.

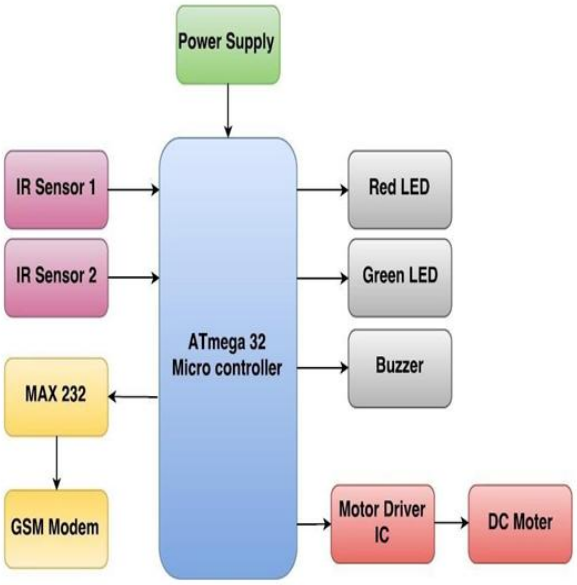

Fig 2. Text Here Fig Title.

The ATmega328 Controller is an open-source controller board based on the microchip ATmega328 controller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins, 6 Analog pins, and programmable with the Arduino IDE (Integrated Development Environment) via a type B USB cable.

It can be powered by a USB cable or by an external 9 volt battery, though it accepts voltages between 7 and 20 volts. It is also similar to the Arduino Nano and Leonardo. The hardware reference design is distributed under a Creative Common Attribution Share-Alike 2.5 license and is available on the Arduino website. The ATmega328comes preprogrammed with a boot loader that allows uploading new code to it without the use of an external hardware programmer.

The ESP8266 Wi-Fi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions another application processor.

The ESP8266 Wi-Fi module is a low cost component with the dustbin within its range which manufacturers are making wirelessly networkable microcontroller module. ESP 8266 Wi-Fi module is a system-on-a-chip with capabilities for 2.4GHz range. It employs a 32 bit RISC CPU running at 80 MHz. It is based on the TCP/IP (Transfer control protocol). It is the most important component in the system as it performs the IOT operation. It has 64 kb boot ROM, 64 kb instruction RAM, 96 kb data RAM. Wi-Fi unit performs IOT operation by sending energy meter data to webpage which can be accessed through IP address. The pins are connected to the 7 and 8 pins of the Arduino microcontroller.

A special sonic transducer is used for the ultrasonic proximity sensors, which allows for alternate transmission and reception of sound waves. The sonic waves emitting by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.

Ultrasonic sensor measures distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected from the target.Ultrasonic Sensor measure the distance to the target by measuring the time between the emission and reception.

In summary, the significant contributions of Smart Dustbin are as follows:

- Smart Dustbin, follows the module, which automatically opens when anyone approaches it.
- Opening of the Smart Dustbin is embedded with photo sensors.
- These sensors will sense any person approaching towards
- The working of the Smart Dustbin, which follows the module and detectsthe status of the BIN.
- "GREEN" and "RED" LED's are used to refer the indication of the BIN.

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- The SMS notification is send to the specified authority on the ongoing status of the Smart Bin.

VI. SMART DETECTION SYSTEM

1. Automatic Opening:
This Smart Dust-bin will automatically open when anyone approaches to it for throwing garbage, and then closes automatically. Opening of the Smart Dust-bin is embedded with photo sensors, which are used to sense the distance of any obstacle coming in front of it. These sensors will sense any person approaching towards the dustbin within its range. After sensing the person, it will inform the motor to open the opening of the Smart Dust-bin, so that the person can throw garbage without taking efforts to open it.

As the person will move away from the Smart Dust-bin after throwing the garbage, the sensors will not sense anything in its region in front of it, and will indicate the motor to close the Smart Dust-bin. The auto bin like other dustbin will be a box to accumulate garbage with an opening.

2. Level Indicator:
The Smart Dust-bin will consist of a level indicator, which will display the levels of the garbage in the Smart Dust-bin. The Smart Dust-bin will contain a GPRS system, through which the levels of the garbage are displayed on the LCD screen. If the level reaches up to 80% then it will display in the mobile where in the user was already registered. GPRS system can send and receive messages.

Using this system, the Smart Dust-bin will send a text message to the registered user notifying that the dustbin is full and there is a need to empty it. The authority then gets aware about the status of Smart Dust-bin by the notification, which helps them to determine its state, that it is full and can take the required and desired action. When the dustbin is full, then even if any person approaches to it, the Smart Dust-bin will not open. The Smart Dust-bins are designed using ultrasonic sensor to check the level of the garbage by measuring the distance between the object and the sensors and automatic opening of the Smart Dust-bin.

3. Ultrasonic Sensor:
A special sonic transducer is used for the ultrasonic proximity sensors, which allows for alternate transmission and reception of sound waves. The sonic waves emitting by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.

The ultrasonic sensor echo pin and trigger pin is connected to pin digital pin D7 and D8. The +Vcc pin is connected to +5V supply and GND pin is connected to ground pin of arduino Uno board. The control (PWM) pin of servo motor is connected to digital pin D9 of Arduino. Hence, servo motor is used to open the cap of dustbin. When Ultrasonic sensor detect any object for example like hand or others, here Arduino calculates its distance and if it less than a certain predefines value than servo motor get activate first and with the support of the extended arm of the lid. For this project and components used, the preset level of distance between dustbin and hand is fixed to 40 cm.

This sensor is used in to locate the distance between the smart dustbin and hand/object come near to it. The principle behind finding distance of obstacle is sonar wave. It only detects obstacle when Trigger pin receive high pulse for the period more than 10 us. When this sensor verifies the presence of hand (obstacle) it starts to send eight cycles of ultrasonic burst at 40 KHz and then it waits for reflected ultrasonic signal.

Ultrasonic sensor module has two drums. One of the drums is used for transmitting the pulse of ultrasonic and the second drums are for receiving the ultrasonic signal.

When ultrasonic detect/sense object, the echo pin of module is set high. Waiting period of reflected pulse is completely dependent upon the location of obstacle. When the echo signal is obtained, we can calculate the distance by using the formula;

Distance (in cm) = (duration/2) / 29.1

Initially, the cap of dustbin is switched back to zero-degree position (Close) by the servo motor. The controller keeps on monitoring the signal receive from ultrasonic module. When ultrasonic module detects an obstacle, the controller check if it crosses a threshold distance value set for open the cap of dustbin.

As soon as that happens, the controller triggers the servo motor when then open the cap for limited line (as set in code part). For this system prototype set time is given for 2 second.

Here in this project also used an ON/OFF switch, in order to activate and de-activated the smart dustbin whenever require as per situation. A pull- up resistor of 10K is connected in series of switch as shown in circuit diagram in order to solve the de- bouncing problem.

We can also use Arduino NANO instead of Arduinouno. Do not have to change source code because the board use identical pin for controlling servo motor, switch and ultrasonic sensor.The simplest part of the project smart dustbin using arduino is software part because it is clean, simple and easy to understand.

The program check the distance had also used “Servo.h” inbuilt library function for servo operation.

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4. Sensor Concept:
The ESP8266 Wi-Fi Module is a self contained with integrated TCP/IP protocol stack that can give any microcontroller access to your Wi-Fi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions another application processor. The ESP8266 Wi-Fi module is a low cost component with which manufacturers are making wirelessly networkable microcontroller module. ESP 8266 Wi-Fi module is a system-on-a-chip with capabilities for 2.4GHz range. It employs a 32 bit RISC CPU running at 80 MHz. It is based on the TCP/IP (Transfer control protocol).

After wiring and attaching all the devices and setting up to the Smart Dustbin, now observe all the important setup whether they are well connected or something missed.

After connection set up now next step is to submit/upload code in Arduino and supply power to the circuit.

When system is powered ON, Arduino keeps monitoring for any things that come near the sensor at give range.

When Ultrasonic sensor detect any object for example like hand or others, here Arduino calculates its distance and if it less than a certain predefines value than servo motor get activate first and with the support of the extended arm of the lid.

Lid will open for a given time than it will automatically close. The combination of intelligent waste monitoring and trash compaction technologies, smart dustbins are better and shoulders above traditional garbage dustbin. It is equipped with smart devices like sensor Arduinoetc. Lid of the dustbin will automatically open when an object comes near to the dustbin and after certain time period it will close the lid.

For social it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it. Believe this will bring something changes in term of cleanliness as well technology.So our next work will be adding one more sensor which will sense whether our dustbin is full or not. And there will be a display will be added so that user can notify that dustbin is full or not.

VII. CONCLUSION

Here we are going to make an evolution changes toward cleanliness. The combination of intelligent waste monitoring and trash compaction technologies, smart dustbins are better and shoulders above traditional garbage dustbin. It is equipped with smart devices like sensor Arduinoetc.Lid of the dustbin will automatically open when an object comes near to the dustbin and after certain time period it will close the lid.

For social it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it. Believe this will bring something changes in term of cleanliness as well technology.The work will be adding one more sensor which will sense whether our dustbin is full or not. And there will be a display will be added so that user can notify that dustbin is full or not.Further adding multiple dustbins helps in better usage socially.

REFERENCES

[1] Twinkle Sinha, K. Mugeshkumar, P. Saishan an, (2015) “Smart Dustbin“. International journal of Industrial electronics & electrical engineering, ISSN: 2347- 6982, Volume e-3, issue-5.
[2] Glossary of Environment statics: series F, No.67/Department for Economic and Social Information and policy Analysis, United Nations. New York: UN, 1997.
[3] R. Narayanmoorthi, Shubham Thakker: smart and wireless waste management system. System that gives prior information of the filling of bin that alerts the municipality and propose a “Smart Garbage Bin”, which will inform the authorized person when the garbage bin is about to fill. NIT spectroscopy is used for separation of biodegradable waste.
[4] “GSM Global system for mobile communication”. 4 G Americas. Retrieved 2014-03-22.
[5] United Nations Environmental Programme (2013), "Guidelines for National Waste Management Strategies Moving from Challenges to Opportunities".
[6] Yusof, N.M., Jidin, A.Z., Rahim, M.I, “Smart garbage monitoring system for waste management”, MATEC Web of Conferences Engineering Technology International Conference, vol. 97, EDP Sciences (2017), p.01098.
[7] Issac, R., Akshai, M, “SVASTHA: an effective solid waste management system for Thiruvalla Municipality in Android OS”, Global Humanitarian Technology Conference: South Asia Satellite, GHTC-SAS, Trivandrum, India, IEEE (2013).
[8] Rajkamal, R., Anitha, V., Nayaki, P.G., Ramya, K., Kayalvizhi, E., “A novel approach for waste segregation at source level for effective generation of electricity—GREENBIN”, International Conference on Science Engineering and Management Research, ICSEMR, Chennai, India, IEEE(2014), pp. 1–4.
[9] Kumar, N.S., Vuayalakshmi, B., Prarthana, R.J., Shankar, A., “IOT basedsmart garbage alert system using Arduino UNO.”, Region 10 Conference, TENCON, Singapore, IEEE (2016), pp. 1028– 1034.
[10] Thakker, S., Narayanamoorthi, R., “Smart and wireless waste management”, International Conference on Innovations in Information, Embedded and Communication Systems, ICIIECS, Coimbatore, India, IEEE (2015), pp. 1–4

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[11] Andrei Borozdukhin, Olga Dolinina and Vitaly Pechenkin, "Approach to the Garbage Collection in the Smart Clean City Project" in, Yuri Gagarin State Technical University of Saratov, Saratov, Russia 2016.
[12] Saurabh Dugdhe1 , Pooja Shelar, Sajuli Jir and Anuja Apte,"Efficient Waste Collection System",IEEE journal 2016 International Conference on Internet of Things and Applications (IOTA) Maharashtra 1 Institute of Technology, Pune, India 22 Jan - 24 Jan, 2016.
[13] Dr.N.Sathish Kumar, B.Vijaylakshmi, R. Jenifer Prathana, A.Shankar, "IOT Based Smart Garbage alert system using Arduino UNO" IEEE 2016.
[14] Tarandeep Singh , Rita Mahajan , Deepak Bagai, "Smart Waste Management using Wireless Sensor Network", in IJRCCE Volume 4 , Issue 6 , June 2016.
[15] Collection Bin", IJARECE Volume 5, Issue 5, May 2016.
[16] Prakash, Prabu," IoT Based Waste Management for Smart City", published in IJRCCE Volume 4, Issue 2, and February 2016.
[17] Narayan Sharma, "Smart Bin Implemented for Smart City", International Journal of Scientific & Engineering Research, Volume 6, Issue 9, September-2015
[18] KanchanMahajan, "Waste Bin Monitoring System Using Integrated Technologies", International Journal of Innovative Research in Science, Engineering and Technology, Issue 3, Issue 7, July 2014.
[19] KanchanMahajan, "Waste Bin Monitoring System UsingIntegrated T echnologies", International Journal of Innovative Research in Science, Engineering and Technology, Issue 3, Issue 7, July 2014.
[20] M. Al-Maaded, N. K. Madi, RamazanKahraman, A. Hodzic, N. G. Ozerkan , An Overview of Solid Waste Management and PlasticRecycling in Qatar, Springer Journal of Polymers and the Environment, March 2012, Volume 20, Issue 1, pp 186- 194.
[21] Islam, M.S. Arebey, M. ;Hannan, M.A. ; Basri, H,"Overview for solid waste bin monitoring and collection system" Innovation Management and Technology Research (ICIMTR), 2012 International Conference, Malacca, 258 – 262.
[22] Longhi, S; Marzioni, D; Alidori, E; Di Buo, G.; Pris, M.; Grisostomi, M.; Pirro, M. "Solid Waste Management Architecture Using Wireless Sensor Network Technology", New Technology, Mobility and Security (NTMS), 2012 5th International Conference.
[23] Raghumani Singh, C. Dey, M. Solid waste management of Thoubal Municipality, Manipur- a case study Green Technology and Environmental Conservation (GTEC 2011), 2011 International Conference Chennai 21– 24
[24] Kumar NS, Vuayalakshmi B, Prarthana RJ, Shankar A. IOT based smart garbage alert system using Arduino UNO. In 2016 IEEE Region 10 Conference (TENCON) 2016 Nov 22 (pp. 1028-1034). IEEE.
[25] Reddy PS, Naik RN, Kumar AA, Kishor SN. Wireless dust bin monitoring and alert system using Arduino. In2017 Second International Conference on Electrical, Computer and Communication Technologies (ICECCT) 2017 Feb 22 (pp. 1-5). IEEE.
[26] Rafeeq M, Alam S. Automation of plastic, metal and glass waste materials segregation using arduino in scrap industry. In2016 International Conference on Communication and Electronics Systems (ICCES) 2016 Oct 21 (pp. 1-5). IEEE
[27] Anushri G, Manikandan A, Nivas P, Vignesh K. Garbage Monitoring System Using Arduino.
[28] Zade R, Khadgi N, Kasbe M, Mujawar T. Online Garbage Monitoring System Using Arduino and LabVIEW. International Journal of Scientific Research in Network Security and Communication. 2018; 6(6):5-9.
[29] Baby CJ, Singh H, Srivastava A, Dhawan R, Mahalakshmi P. Smart bin: An intelligent waste alert and prediction system using machine learning approach. In2017 International Conference on Wireless Communications, Signal Processing and Networking (WiSPNET) 2017 Mar 22 (pp. 771-774). IEEE.
[30] Selvaraj K, Chakrapani A. Smart dustbin monitoring system using LAN Server and Arduino. International Journal of Advances in Computer and Electronics Engineering. 2017 Apr; 2(4):20-3.
[31] Ramji DR, Shinde JR, Venkateswarlu R. Smart Hands-Free Waste Compactor Bin for Public Places.International Journal of Digital Electronics. 2019; 1(2):52-8.
[32] Hassan SA, Jameel NG, Şekeroğlu B. Smart solid waste monitoring and collection system. International Journal. 2016 Oct; 6(10).
[33] Sai PY. IOT Smart garbage monitoring system in cities-An effective way to promote smart city.International Journal of Advanced Research in Computer Science and Software Engineering. 2017 Feb; 7(2).

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