Department Of Computer Science and Engineering

Title: A Smart Wastebin System using IOT

Course code: CSE 400

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Abstraction: A healthy environment is imperative to a healthy and happy community. The main objective of this research is to design a smart Wastebin which will help in keeping our environment clean and also eco-friendly. For smart lifestyle, cleanliness is needed, and cleanliness is begins with Wastebin. The idea of Smart Wastebin is for the buildings, Colleges, Hospitals and Small city. The Smart Wastebin thus thought is an improvement of normal Wastebin by elevating it to be smart using sensors and logics. Smart Wastebin is a new idea of implementation which makes a normal Wastebin smart using ultrasonic sensors for garbage level detection and sending message to the garbage collector updating the status of the bin using GSM module. With the help of technology we have introduced IoT based Smart Waste Management solutions and initiatives that ensures reduced amount of time and energy required to provide waste management services and reduce the amount of waste generated. Unfortunately, developing countries are not being able to implement those existing solutions due to many factors like socio-economic environment. Therefore in this research we have concentrated our thought on developing a smart IoT based waste management system for developing countries like Bangladesh that will ensure proper disposal, collection, transportation of household waste with the minimum amount of resources being available.

Problem statement: The greatest problem regarding waste management in developing countries begins at the very starting point of the process. Due to lack of proper systems for disposal and collections, wastes and garbage's end up in the roads and surrounding. If seen in the market most of wastebins are manually operated and it will use leg and hand for open the cover of dustbin that can allow a person to dispose the rubbish. This wastebin is not user –friendly system wastebin because without touching wastebin people can't dispose the rubbish. In cities some times we can see the rubbish is overloading but the management team cleanup is slow to take the action for the collected rubbish. This is because cleaner not accept the instruction or information about the overflow rubbish inside the dustbin. For monitoring the wastebin it still use the old-fashioned way and it is not very efficient for this age, so created this project can make the work clean faster and easier. Other problem that can see is many people not interested to use wastebin for littering because they not interesting to came near the dustbin. So this project can attract attention people to use dustbin because it very easy to use and it is a very modern system.

Motivation: Waste management is a great problem in poor developing countries as waste is scattered all over roads due to improper methods of collection and dumping thus polluting the environment. This creates ugliness and some serious diseases, at the same time bad smell is also spread and it also degrades the valuation of that area. Due to lot of factors including socio-economic and cultural drawbacks existing smart solutions are not compatible in developing countries like Bangladesh, as there exists basic problems regarding the primary task of waste management like proper disposal, collection, sorting, recycling etc. To avoid such situation we come up with a project called A smart wastebin system, Which is a GSM based waste and garbage collection bins overflow indicator systems for smart cities.

Feature: →There is no contact touch between dustbin and Person so, prevention from germs and diseases.

→ 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.

→It further reduces manpower requirements to handle the garbage collection process.

→Applying smart waste management process to the city optimizes management, resources and costs which makes it a "smart city".

Final Outcome: This project will send an SMS to municipal authorities which contains the details about the overflow wastebin.

Lid of wastebin will be opened when any person reaches to near on it.

LED indicates whether wastebin is full or not?

→ RED LED indicates Wastebin is FULL

→ GREEN LED indicates Wastebin is EMPTY

Component:

Hardware Description:

1.Ultrasonic sensor: Ultrasonic sensors measure distance by using ultrasonic waves.

2.GSM 900: GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services.

3.Arduino UNO: Arduino is an open-source electronics platform based on easy-to-use hardware and software.

4.LCD: Liquid Crystal Displays are used for displaying status or parameters in embedded systems.

5.Servo Motor: Servo implies an error sensing feedback control that is utilized to correct the performance of a system.

6.PIR Sensor: PIR sensors allow you to sense motion, almost always used to detect whether a human has moved in or out of the sensors range.

7.Dustbin: Dustbin definition is a can for trash or garbage.

8.DC Jack: A DC jack is a component used in many electronic devices that accepts a plug from a steady power source.

9.USB Charger: A power adapter that generates the 5 volt DC standard required by USB.

10.LED: LED is a semiconductor device that emits light when an electric current is passed through it.

11.Header Pins: Pin header connectors comprise several different means of connection.

12.Jumper wires: Jumper wires are used for making connections between items on your breadboard and your Arduino's header pins.

13.PCB Board: A printed circuit board is used to mechanically support and electrically connect electronic components using conductive pathways, tracks or signal traces etched from copper sheets laminated onto a non-conductive substrate.

Software Description:

Arduino IDE: Arduino IDE is open-source software that is mainly used for writing and compiling the code into the Arduino Module.

Weekly Plan (4-1):

Week 1 & 2: Select project

Week 3 & 4: Problem Analysis & Proposed Model

Week 5 & 6: Dataflow Diagram

Week 7: Block Diagram

Week 8: Select Components

Week 9 & 10: Project Proposal

Week 11: CO PO Mapping

Week 12 & 13 & 14: Report Writing and Presentation Slide

Weekly Plan (4-2):

Week 1 & 2: Project Setup

Week 3 & 4: Managing component

Week 5 & 6 & 7: Coding

Week 8: Testing

Week 9 & 10: Error Fixing & Final Implementation

Week 11 & 12 & 13 & 14: Final Report Writing

Cost/Budget:

GSM Sim900a	= 1499 Tk
Ultrasonic sensor HC-SR04	= 850 Tk
PIR Sensor	= 110 Tk
DC JACK	= 70 Tk
USB Charger 5V/2A	= 260 Tk
Arduino UNO	= 749 *Tk*
PCB Board	= 100 Tk
Header Pins	= 20 Tk
Jumper wires	= 90 Tk
Dustbin	= 180 Tk
LED	=15 Tk
LCD	=160 Tk
Servo Motor	=305 Tk
Total	= 4408 Tk

Economic Feasibility:

Economic analysis is most frequently used for evaluation of the effectiveness of the system. More commonly known as cost/benefit analysis the procedure is to determine the benefit and saving that are expected from a system and compare them with costs, decisions is made to design implement the system. This part of feasibility study gives the top management the economic justification for the new system. This is an important input to the management, because very often the top management does not like to get confounded by the various technicalities that bound to be associated with a project of this kind. In the system, the organization is most satisfied by economic feasibility.

Technical Feasibility:

Technical feasibility centers on the existing manual system of the test management process and to what extent it can support the system. According to feasibility analysis procedure the technical feasibility of the system is analyzed and the technical requirement such as software facilities, procedure, inputs is identified. It is also one of the important phases of the system development activities. Since processing speed is very high and the work is reduced in the maintenance point of view management convinces that the project is operationally feasible.

Project Management & Finance:

Project management refers to how a project is designed and organized to produce an end product that will make an impact on an organization. It is where knowledge, skills, experience, and processes are applied to meet an organization's objectives. Projects that are new, time-bound, involve multiple parties and require risk control need project management. In this project we spent almost a year. And total we spent 4408 Tk.

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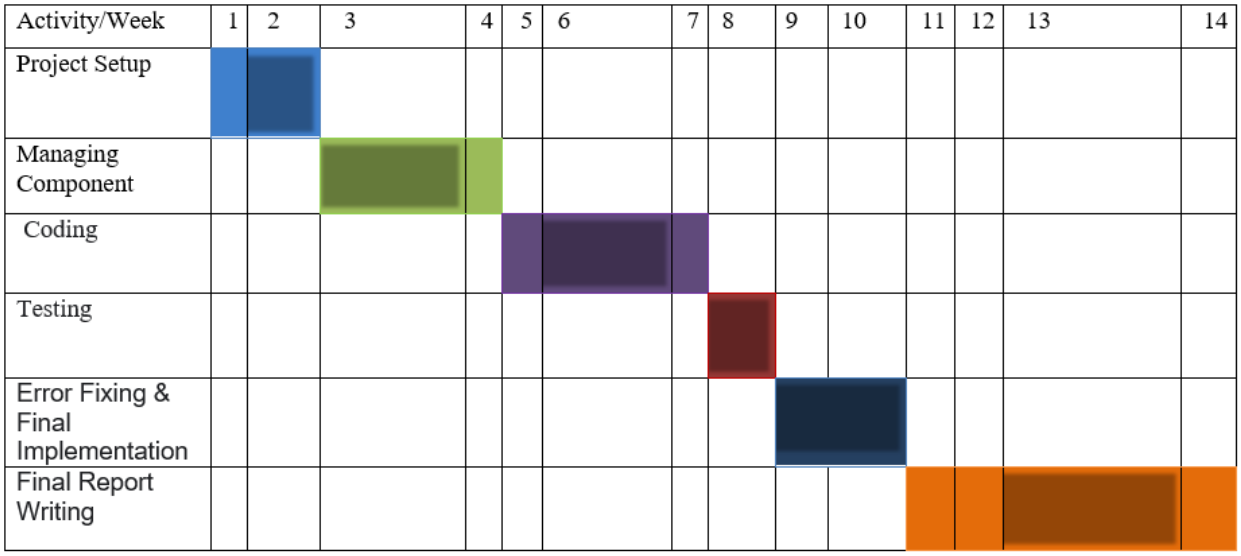

Environment:

The main objective of this project is to design a smart waste bin which will help us to keep our environment healthy, clean and pollution free. Nowadays waste bins placed in public places overflow without proper disposal which leading to widespread diseases. To avoid this kind of overflow, we can use smart waste bins. Our proposed system not only reduces the spread of deadly diseases but also avoids the foul smell only for the efficient and timely disposal of wastes. For all of this reason, it is very good for the environment. In a word, we can say that it is very much environment friendly and sustainable too.

Ethics:

Ethics is all about making the best possible choices by concerning resources and the environment. It leads to trust which leads to project successes. We all are following these ethics because we know it is key to success professionally. Here intentionally or knowingly we don’t use any software that is obtained or retained either illegally or unethically. Here we are following proper and achievable goals and objectives for this project on which we propose the work. Recognize that personal violations of this Code are inconsistent with being a professional software engineer so here we didn’t copy anyone's code Trust, honesty, responsibility, and fairness are the main critical values we maintain because it will create professionalism in a team that will lead to project success.