SMART GARBAGE DUSTBIN WITH OVERFLOW INDICATION SYSTEM

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ABSTRACT: In our city many times we see the garbage bins or dustbins placed at public are overflowing. It creates unhygienic conditions for the people also it creates ugliness to that place. At the same time bad smell is also spread. To avoid all such situations we are going to implement a project called garbage collection bin overflow indicator using iot technology. In the project we are going to place a sensor under the dustbin. When the sensor signals reaches to the threshold value a mail notification will be send to the respective municipal. We can also see the density of the dustbin through internet on a dashboard. So any of the authenticate person will easy check the present condition of the dustbin. So then that person can send the collection vehicle to collect the full garbage bins or dustbins. Major part of our project depends upon the working of the Wi-Fi module; essential for its implementation

IndexTerms: Iot, IR sensor, ARM cortex M4, raspberry pi, internet, GUI, ultrasonic sensor.

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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 birth of a sensational gizmo, Internet of Things (IoT). . The overflow of garbage in public areas creates the unhygienic conditions in the nearby surrounding. The most affecting elements are the water, land, air and noise pollution.

Due to this the ozone layer is declining day by day. . Hence our problem statement is to plan a System Based on AT89S52 for collecting the garbage from a particular region – the region whose public Garbage Bins are overflowing with previous concern. The present garbage management system is not efficient enough to take care of the large amount of waste matter that is generated every day because the garbage bins are overflowing. This causes air and water pollution. This also increases number of diseases large number of insects and mosquitoes.

DIFFERENT APPROACHES

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. This schedule varies as per the population of that place. It can be once in a day or twice in a day or in some cases once in two days, it is located near the center of a large plain, referred as the "Rice Bowl of India" – where hundreds of varieties of rice are grown – and is also the biggest city of the region. In this project, we have introduced an integrated system pooled with an integrated system of Global Positioning System (GPS) and Global System for Mobile Communication (GSM).
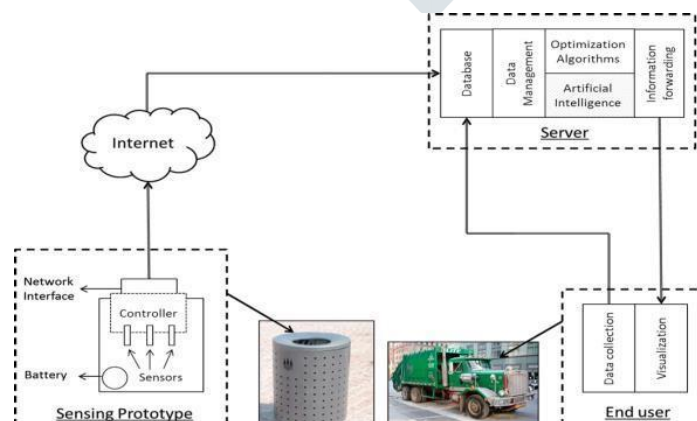
PROPOSED SYSTEM

For detecting the level of the garbage IR sensors are used in this system. Whenever the wastes are disposed in the bin the nature of the waste are identified whether it is degradable or not. And the waste is passed through the conveyor belt and are separated, collected in either degradable or non-degradable bin. Expensive garbage bin would not be a prior experiment that is why we have decided to use based sensors to reduce its cost and also make it efficient in applications.

SYSTEM ARCHITECTURE

Microcontroller ARM(LPC2148)

TheLPC2148microcontrollers are based on a 32/16 bit ARM7TDMI-S™ CPU. With real-time emulation and embedded trace support, that combines the microcontroller With 32 kB, 64 kB and 512 kB of embedded high speed Flash memory. The microcontroller used in this project is AT89S52. Atmel Corporation introduced this 89S52 microcontroller. The present project is put into practice on Keil Uvision. In direct to program the device; Proload tool has been used to burn the program onto the microcontroller.
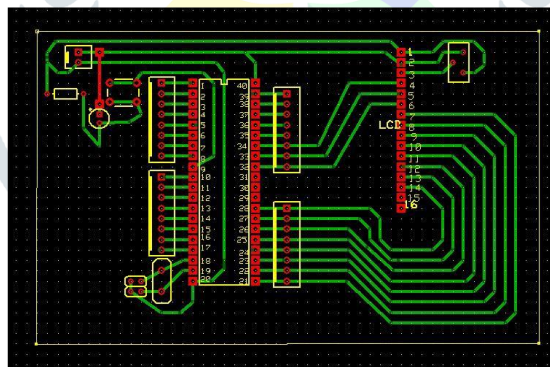
ULTRASONIC SENSOR

Ultrasonic sound is a cyclic sound pressure with a high frequency than the upper limit of human hearing equal to 20KHz. Some animals like dolphins, mice, dogs, and bats have a high- frequency limit that is larger than that of the human ear & thus can hear ultrasound. When the surfaces of metals can be placed in contact with each other, then the metals can be welded and illuminating the contact with ultrasound. Ultrasonic sensor sends out a high frequency sound phase and then times long it takes for the echo sound. The speed sound is approximately 341 meters per second in air.

IR Sensor (TSOP 1738)

This IR Sensor gives indicates the level of garbage filled in dustbin and IR Sensor are planted at three different levels on the surface of dustbin to show us the actual level of garbage present in it.] Infrared sensor (IR sensor) is used which is a multipurpose sensor, which can detect the level of garbage. IR sensor emits the light, which is invisible to naked eye but the electronic components can detect it. It consists of IR transmitter and IR receiver. The IR sensor arrangement is act as level detector .

The output of level detector is given to the microcontroller (as shown in figure 3). The AT commands are used to facilitate the messaging service through the GSM Module. This program is burned in the microcontroller with the help of Arduino software (IDE) version1.6.1. These messages consist of information of garbage levels of respective dustbins. Depending on the information sent to control room, the authority informs the concern person of the respective area about garbage level. Then the concerned person makes sure that the garbage of that *particular* area is collected by sending the cleaning vehicles.

ARM CORTEX M4

Gain the advantages of a microcontroller with integrated DSP, SIMD, and MAC instructions that simplify overall system design, software development and debug. Accelerate single precision floating point math operations up to 10x over the equivalent integer software library with the optional floating point unit (FPU). Develop solutions for a large variety of markets with a full-featured ARMv7-M instruction set that has been proven across a broad set of embedded applications Achieve exceptional 32-bit performance with low dynamic power, delivering leading system energy efficiency due to integrated software controlled sleep modes, extensive clock gating and optional state retention.
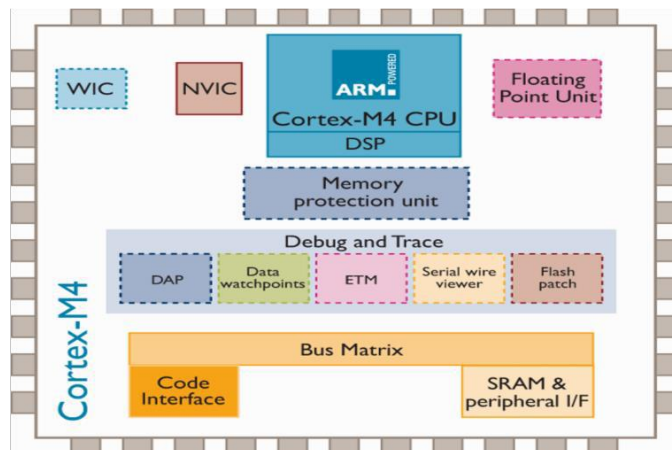
RASPBERRY PI

Raspberry Pi is as small as the size of a credit card; it works as if a normal computer at a relatively low price. It is possible to work as a low-cost server to handle light internal or web traffic. Grouping a set of Raspberry Pi to work as a server is more cost-effective than a normal server. If all light traffic servers are changed into Raspberry Pi, it can certainly minimize an enterprise's budget. The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity, and peripheral device support.
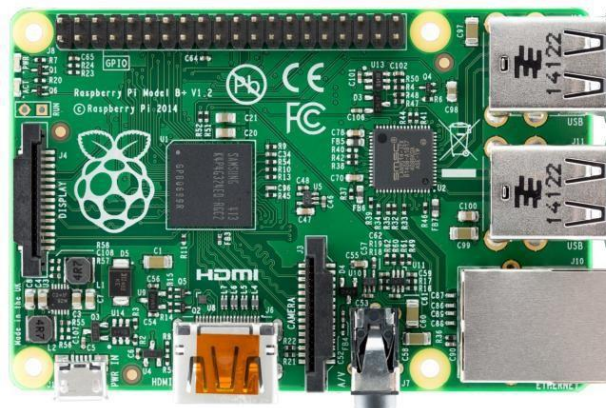

GUI

The GUI for smart garbage management system proposed by authors is developed using MATLAB software and discussed in this section. In this paper, GUI is used to display different parameters and information regarding the garbage and garbage collection viz. location of dustbin, status of the dustbin, date & time of garbage collection. GUI will be used in the interface and these widgets tracking the level of dustbin filled will be put in the location exactly the way dustbins are placed every part of the city. This will help the garbage monitoring to keep a track of dustbin filled in exact location. Thus our application will help the garbage

monitoring to keep a check or track on every dustbin throughout city. It will help him taking accurate decision and avoid the overflow of dustbins and use the resources more efficiently. An enhanced routing and scheduling waste collection model is proposed for the Eastern Finland, featuring the usage of a guided variable neighborhood thresholding met heuristic.

BLOCK DIAGRAM
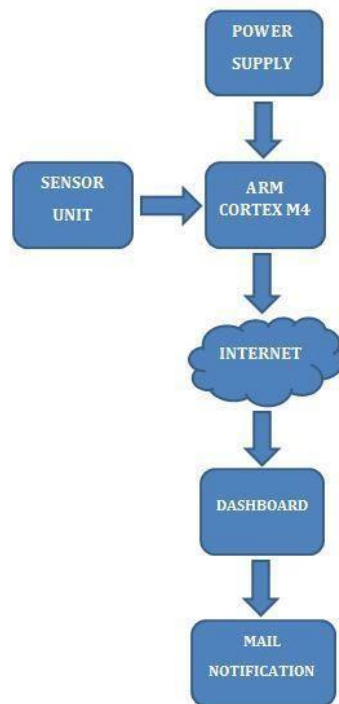
Block Diagram of Working

METHODOLOGY

In this project methodology model takes the fundamental process activities of Project Plan, specification, Analysis, Design, development, validation and evolution and represents them as separate process phases. Using a waterfall model as a project development methodology.

Do to Specific system models, system architecture and detailed design of the project, to implementation process using Eclipse JUNO tool and aurdino tool with java language for developing the modules in windows platform. In the smart dustbin hardware contains motor-driver, 16*2 LCD Display, Aurdino UNO, Load cell, Playback IC, Speaker, IR Sensors, Smell Sensors , Bread Board, Power Supply and Raspberry pi. In the smart dustbin IR sensors will continuously monitor the status of the bin. If the bin reaches more than certain weight, the weight sensors will trigger the message to the concerned authority.
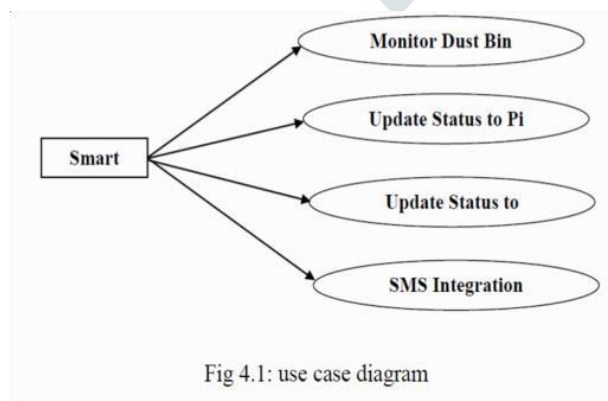

Fig 4.1: use case diagram

Representation of Waterfall Model.

CONCLUSION

This implementation of Smart Garbage collection bin using IoT, IR sensor, microcontroller and GUI . This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor. This reduce the total number of trips of garbage collection vehicle and hence reduce the overall expenditure associated with the garbage collection. It ultimate helps to keep cleanness in the society. Therefore, the smart garbage management system makes the garbage collection more efficient. It can also indicate degradable and non-degradable waste with the help of PH sensor. This method finally helps in keeping the environment clean. Thus, the garbage collection is made more efficient.

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