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GARBAGE COLLECTOR USING ARDUINO

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Abstract - The amount of Solid waste that is being produced through our everyday activities is huge and is getting unmanageable day by day. This is mainly due to increasing population leading to haphazard dumping and increasing transportation costs with already few cost-effective methods to treat the solid waste. According to an estimate in 2016, 277 million tons of solid waste is produced by India every year. It is also projected to increase to 387 million tons by 2030 and 543 million tons by 2050. The very first method involved in the Solid Waste Management is sorting of waste which simplifies the further procedure as to what to do with the waste i.e., should it be treated thermally, biologically or dumped. Improper segregation of solid waste and segregation at secondary levels of waste management is only going to delay the waste management process and sometimes even lead to inappropriate dumping. This project suggests a way to deal with segregation process so as to make the whole solid waste management easier and more efficient. Automatic Waste Segregation system provides a practical segregation process of solid waste into metal waste, dry waste and wet waste at the primary level right where the waste is being generated. An Automatic Waste Segregator with simpler mechanism than that of previous models is designed and a detailed methodology of the working of the segregation process is provided. Selection of the required equipment has been mentioned. This project aims at segregating the waste produced at the primary level and reducing the burden at secondary levels and cost of transportation of the waste. The results obtained after testing the Automatic Waste Segregator with wastes proved to be functional and can be comfortably relied upon to segregate the wastes.

1.INTRODUCTION

Waste disposal has gotten a gigantic cause for worry on the planet. A voluminous measure of waste that is produced is arranged by implies which have an unfriendly impact on the climate. The regular technique for removal of the waste is by spontaneous and uncontrolled open unloading at the landfill locales. This strategy is damaging to human wellbeing, plant and creature life. This destructive technique for garbage removal can produce fluid leachate which pollute surface and ground waters; can hold sickness vectors which spread hurtful illnesses; can corrupt tasteful worth .

In India, rag dealers assume a significant part in the reusing of metropolitan strong waste. Rag dealers and conservancy staff have higher horribleness because of contaminations of skin, respiratory, gastrointestinal lot and multisystem hypersensitive messes, notwithstanding a high predominance of chomps of rodents, canines and other vermin. Reliance on the rag dealers can be lessened if segregation is properly pre done at the municipal waste dump. At the point when the waste is isolated into essential streams such as wet, dry and metallic, the waste has a higher capability of recuperation, and thus, reused a lot. The wet squander portion is frequently changed over either into fertilizer or methane-gas or both. Manure can swap interest for compound manures, and biogas can be utilized as a wellspring of energy. The metallic waste could be reused. Despite the fact that there are enormous scope mechanical waste segregators present, it is in every case much better to isolate the squander at the actual source. The advantages of doing so are that a better caliber of the material is held for reusing which implies from the waste. The rag dealers or labors for this kind of occupation will reduce too, the isolated waste could be straightforwardly shipped off the reusing and handling plants. At present there is no arrangement of segregation of dry, wet and, metallic squanders at a domestic level.

2.PROBLEM STATEMENT:

During Poor waste management - ranging from non-existing collection systems to in effective disposal - causes air pollution, water and soil contamination. Open and unsanitary landfills contribute to contamination of drinking water and can cause infection and transmit diseases**.**

A growing population and economy, which means increased volumes of waste generated. This puts pressure on waste management facilities, which are already in short supply.

Increased complexity of the waste stream because of urbanization and industrialization. The complexity of the waste stream directly affects the complexity ofits management, which is compounded when hazardous waste mixes with general waste.

Absence of a recycling infrastructure which will enable separation of waste at source and diversion of waste streams to material recovery and buy back facilities.

Growing pressure on outdated waste management infrastructure, with declining levels of capital investment and maintenance.

Fig.1: waste area

3.OBJECTIVES

- The Our primary goal is to design an Automatic Waste Segregator which can be used to segregate waste into dry and wet waste categories that can be used at a primary level which is suitable for institute-level.
- To award the amount for disposing waste based upon the weight of the waste.

4.OVERVIEW OF THE PROJECT

This paper suggests a way to build an Automatic Waste Segregator which uses a PLC as its core of the system. Photo-electric sensor has been used to detect the plastic waste where an infrared light is transmitted by the transmitter and received by the receiver. If there is any plastic waste it gets detected. And a Proximity Capacitive sensor is used to detect paper and glass. Conveyor belt is used to transfer the waste from one sensor position to another to get detected and hydraulic cylinders are used to divert waste into its respective bins.

An embedded system is a microcontroller or microprocessor based system which is designed to perform a specific task. Embedded systems are typically characterized by their small size, low power consumption, and real-time performance requirements. They are often used in applications where reliability and safety are critical.

The hardware components of an embedded system typically include a processor, memory, and input/output (I/O) devices. One of the key features of embedded systems is their ability to interact with the physical world through sensors and actuators.

Sensors collect data from the environment, such as temperature, pressure, or motion, providing valuable input for decision-making processes.

Actuators, on the other hand, are responsible for controlling physical processes, such as motor movement or valve activation, based on the instructions received from the system. This interaction between the embedded system and its surroundings allows for automation, monitoring, and control of various processes.

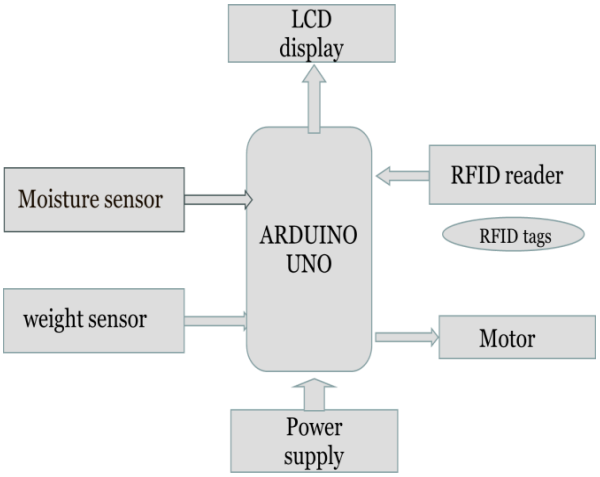

Fig.2: Block diagram

The Arduino UNO is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button. It contains everything needed to keep up the microcontroller; simply connect it to a data processor with a USB cable or power it with an AC-to-DC adapter or battery to get moved. The UNO differs from all preceding boards in that it does not use the FTDI USB- to-serial driver chip. Instead, it features an Atmega16U2 programmed as a USB-to- serial converter. This auxiliary microcontroller has its own USB bootloader, which allows advanced users to reprogram it. The Arduino has a large support community and an encompassing circle of funding libraries and hardware add-on “shield”, naming it a great introductory program for embedded electronics.

LCD modules are very commonly used in most embedded projects, the reason being its cheap price, availability and programmer friendly. Most of us would have come across these displays in our day to day life, either at PCO’s or calculators. The appearance and the pinouts have already been visualized above now let us get a bit technical.

An infrared sensor is an electronic device, that emits in order to sense some aspects of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called a passive IR sensor. Usually, in the infrared spectrum, all the objects radiate some form of thermal radiation.

A Moisture Sensor is a tool used for sensing rain. It consists of two modules, a Moisture board that detects the Moisture and a control module, which compares the analog value, and convert sit to a digital value. The Moisture sensors can be used in the automobile sector to control the windshield

wipers automatically, in the agriculture sector to sense rain and it is also used in waste segregation.

There are lots of servo motors available in the market and each one has its own special and applications. The following two paragraphs will help you identify the right type of servo motor for your project/system.

Most of the hobby Servo motors operates from 4.8V to 6.5V, the higher the voltage higher the torque we can achieve, but most commonly they are operated at +5V. Almost all hobby servo motors can rotate only from 0° to 180° due to their gear arrangement so make sure you project can live with the half circle if no, you can prefer for a 0° to 360° motor or modify the motor to make a full circle.

The RC522 is a 13.56MHz RFID module that is based on the MFRC522 controller from NXP semiconductors. The module can supports I2C, SPI and UART and normally is shipped with a RFID card and key fob. It is commonly used in attendance systems and other person/object identification applications.

The power supply of automatic waste segregator machine is turned on. The LCD turns on displays a message to tap the card on the RFID reader. The RFID reader reads the card and displays the balance amount on the LCD.

Then the waste is put into a container. This garbage/waste and gets segregated into dry, wet waste and then sent to the weight sensor.

The weight sensor weighs the amount of the waste/garbage received and displays the amount on the LCD. The amount will be then credited to your RFID linked to a card.

5.CONCLUSION

The project focuses on implementation of garbage collection. This system benefits of garbage collection system to maintain a clean city. Developing a garbage collection system solution within a city solves the pollution problem. Thus , a safer and more sustainable approach may minimizing the number of landfills constructed and insuring their longevity so as not to continue taking viable land for waste disposal. It is therefore critical to divert waste from landfills through reduction and recycling The of generating garbage is too dangerous not only for today's generation, but also for future generations. It is critical to educate people and encourage them to practice Recycle, Reuse, and Reduce instead of producing waste. Waste disposal should be a priority for municipalities and governments Waste accumulation will harm the environment's quality and ability to sustain life. It puts one's health at risk. a bigger amount of toxic, unhealthy waste in our environment will eventually find its way back into our food chain, resulting in more disease waste management is the biggest problem of today's world. It is the important concern not only for LPU campus but also for the whole world. As the garbage is increasing at an alarmingly high rate day by day. We should control it as fast as possible otherwise we should ready to face consequences.

6.FUTURE SCOPE

Smart waste management automated sorting and recycling sustainable packaging Solutions public awareness and education circular economy initiatives.

7.REFERENCE

- SubhasiniDwivedi, Michael Fernandes, RohitD'souza, "A Review on PLC based Automatic Waste Segregator", IJARCET, Volume 5, Issue 2, February 2016.
- M.K.Pushpa, Aayushi Gupta, Shariq Mohammed Shaikh, StutiJha, Suchitra V, "Microcontroller based Automatic Waste Segregator", IJIREEICE, Volume 3, Issue 5, May 2015.
- AmruthaChandramohan, JoyalMendonca, Nikhil Ravi Shankar, Nikhil U Baheti, Nitin KumarKrishnan, Suma M S, "Automatic Waste Segregator", IEEE, April 2014.
- ArchanaBabu S1, Arunima SJ2, Athira J3, BhavanaChandran, Naveen S, "An Economic Automatic Waste Segregator using Arduino", Volume 4, Issue 7, July 2016.