SMART WASTE MANAGEMENTUSING AI

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ABSTRACT

This Paper deals with the mostblistering topic i.e. waste segregation using AI. An efficacious management needs to be materialized for better planet to live in. Hence, with our cost effective project proposal, we try to bring in the change. This paper proposes an automatic waste segregator (AWS) using AI which is a cheap, easy to use solution for a segregation system at households, so that the wastes can be sent directly for processing. AI based waste segregator is designed to sort the waste into three main categories namely; metallic, organic and plastic, thereby making the waste management more effective. Sensors are connected near smart bin to detect different types of waste. first sensor connected is the capacitive proximity sensor to detect non conducting waste and which is having highest priority among the two sensors connected. This sensor gives accurate results even for smaller objects.

I. INTRODUCTION

To make the cities greener, safer, and more efficient, Internet of Things (IOT) can play an important role. The implementation of proper waste management system will avoid the spreading of such disease. In project we proposes a smart mechanism for improving the management of wastes in cities. Things that are connected to the Internet and those devices controlled from the Internet is called Internet of Things. In this system, the smart bin is connected with the internet to display the exact information about the dustbin level and to which area it belong. In present there was a rapid growth in the population which leads to large quantity of waste disposal in the cities. The overflow of dustbin will create a unpleasant environment and it affect many people by spreading the deadly disease.

The ultimate need of the hour for a developing nation is the key for “Smart City”. The influential ecological factors that poses to be a threat to this may include: hazardous pollution and its subsequent effects on health of humanity, alarming global warming and depletion of ozone layer etc. Mostly Environmental pollution may be owing to the Municipal Solid Leftovers (MSL). A Proper maintenance becomes mandatory for an efficient and effective removal of the generated Municipal Solid Leftover. It is perceived that often the waste space gets too much occupied due to irregular removal of garbage occupancy in the dustbin.

II LITERATURE REVIEW

[1] Solid waste management has become one of a major concern in environmental issues (Mazzanti &Zoboli, 2008). This is particularly true to urban areas where population is rapidly growing and amount of waste generated is increasing like never before (Kathiravale&MohdYunus, 2008).

Current earth’s population is 6.8 billion and it isestimated that almost half of this population lives in urban areas (Population Division ofthe Department of Economic and Social Affairs of the United Nations Secretariat, 2009).

[2] Waste generation increase proportionally to this population number and income, creating the needs of effective management (Mazzanti&Zoboli, 2008). Urbanization and industrialization leads to new lifestyles and behavior whichalso affects waste

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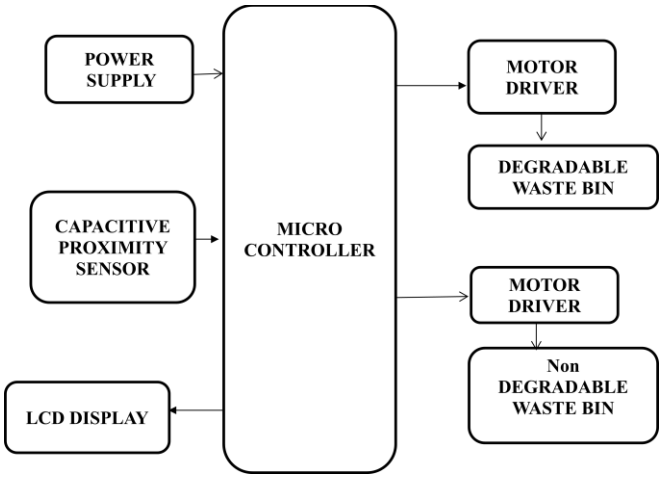
compositionfrom mainly organic to synthetic material that last longer such as plastics and otherpackaging material (Idris et al., 2004). E-waste that barely existed before was generated asmuch as 20-50 metric tons a year (UNEP, 2006).

The management of waste become complex and the facilities provided cannot cope with the increasing demand and needs. Therefore, best approach need to be implemented immediately while considering environmental, social and economic aspects (Aye &Widjaya, 2006).

[3] The drivers of sustainable waste management were clarified by Agamuthuet al. (2009), which include human, economic, institutional and environment aspect. Thestudy suggests that each driving group should be considered in local context as managingsolid waste for a particular society may differ from the others.For example, waste managers in Africa need to tackle some issues including, lack of data,insignificant financial resources, vast different of amount and waste types between urbanand rural area, lack of technical and human resources, low level of awareness and culturalaversion towards waste (Couth &Trois, 2010).

[4] Integrated Sustainable Waste Management (ISWM) system was then introduced in 1995 to improve earlier system that neglect unique characteristics of a given society, economy and environment (van de Klundert, 1999). For example, European countries had applied various system assessment tools and engineering models to create sustainable communities, manage resources efficiently, tapping innovation potential of the economy, ensuring prosperity, environmental protection and social cohesion in their SWM system(Piers et al., 2011). Asian countries had also given attention in building the national legalframeworks, managing institutional, technology, operational and financial aspects, andcreating public awareness and participation (Shekdar, 2009)

III METHODOLOGY



Sensors are connected near smart bin to detect different types of waste. Inductive proximity sensor continuously emits electromagnetic waves and if any non conductive object is present within the range of proximity sensor, then the plastic bin, open the door. Color sensor monitors and reacts if any conductive object is present within the range of proximity sensor, then the degradable waste bin's door open. Microcontroller continuously checks the status of both proximity sensors. If sensor is detecting metal then program is written to select that particular bin using stepper motor. If the waste is not metallic then it passes through another sensor connected near belt itself called the color sensor. If any vegetables or fruit waste is present, the color sensor detects and make the proximity sensor as false, then it put in another bin. These all process are going on automatically which means Artificial Intelligence.

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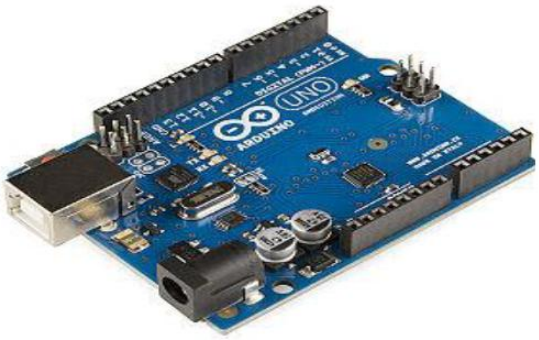
Arduino

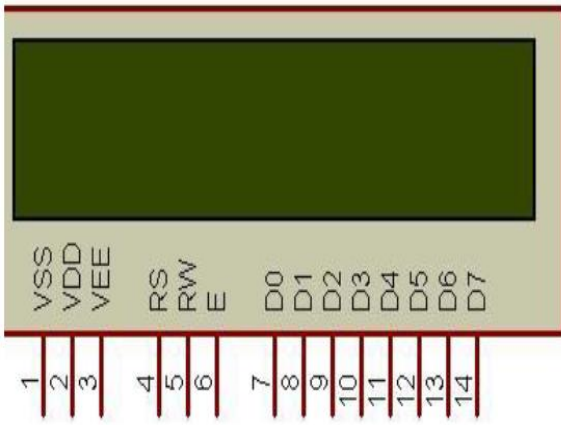


Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible.The hardware consists of an open-source hardware board designed around an 8-bit AtmelAVR microcontroller, or a 32- bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller.

Arduino boards can be purchased pre-assembled or as do-it-yourself kits. Hardware design information is available for those who would like to assemble an Arduino by hand. It was estimated in mid-2011 that over 300,000 official Arduinos had been commercially produced.

Arduino started in 2005 as a project for students at the Interaction Design Institute Ivrea in Ivrea, Italy. At that time program students used a "BASIC Stamp" at a cost of $100, considered expensive for students. Massimo Banzi, one of the founders, taught at Ivrea.[2]

IV LCD DISPLAY



Crystalonics dot –matrix (alphanumeric) liquid crystaldisplays are available in TN, STN types, with or without backlight. The use of C-MOS LCD controller and driver ICs result in low power consumption. These modules can be interfaced with a 4-bit or 8-bit micro processor /Micro controller.

The built-in controller IC has the following features:

- Correspond to high speed MPU interface (2MHz)
- 80 x 8 bit display RAM (80 Characters max)
- 9,920 bit character generator ROM for a total of 240 character fonts. 208 character fonts (5 x 8 dots) 32 character fonts (5 x10 dots)
- 64 x 8 bit character generator RAM 8 character generator RAM 8 character fonts (5 x 8 dots) 4 characters fonts (5 x 10 dots)
- Programmable duty cycles
- 1/8 – for one line of 5 x 8 dots with cursor 1/11 – for one line of 5 x 10 dots with cursor 1/16 – for one line of 5 x 8 dots with cursor
- Wide range of instruction functions display clear, cursor home,display on/off, cursor on/off, display character blink, cursor shift, display shift.
- Automatic reset circuit, that initializes the controller / driver ICs after power on.

V CONCLUSION

The waste segregator as the name suggests, segregatesthe waste into three major classes: plastic, organic, metallic. The proposed system would be able to monitor the solid waste collection process and management of the overall collection process.In order to differentiate between wet and dry waste a moisture sensor is used instead of a capacitive sensor which increases the complexity by making it difficult to differentiate between dry and wet waste by making use of dielectric values of waste substances. In the former system to separate metallic waste inductive sensors were used which

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again requires the controller to be preprogrammed with the threshold values, this necessity is removed in our system by making use of a the flow of waste on to the conveyor. Inductive proximity sensor is used to detect the metallic waste.

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