

Interactive Dustbin

Krutika Agrawal¹

¹Sandip Polytechnic, Post Mahiravani, Trimbak,
Nashik, India
Krutikaag007@gmail.com

Abstract: Nashik is a pilgrimage place and faces Kumbhmela in every 12 year. Being a place crowded with people, garbage disposal is a major problem. Lumping of garbage is found in city which may infect people and produce foul smell. Despite of creating awareness among the citizens, the waste is not yet being disposed in the bins provided by the Nashik Municipal Corporation. This paper brings to you an interactive solution for this, where people will anxiously participate in cleaning the city while they get some General knowledge.

Keywords: Arduino, Dustbin, Garbage, LCD Display, Load Cell.

1. Introduction

Solid waste is collected from 2.9 lakh households of 108 wards of the city through 124 Ghanta Gadi's and ownership of the Ghanta Gadi's is with NMC. After huge efforts taken by the Nashik Municipal Corporation, it still seems difficult for NMC to clean the city. The same is observed in other cities of the country. An Interactive Dustbin will help keep the city clean and will create awareness amongst the citizens. This interactive dustbin will Display a few questions regarding general knowledge with options and citizens will have to dump garbage in the right dustbin in order to get a right answer.

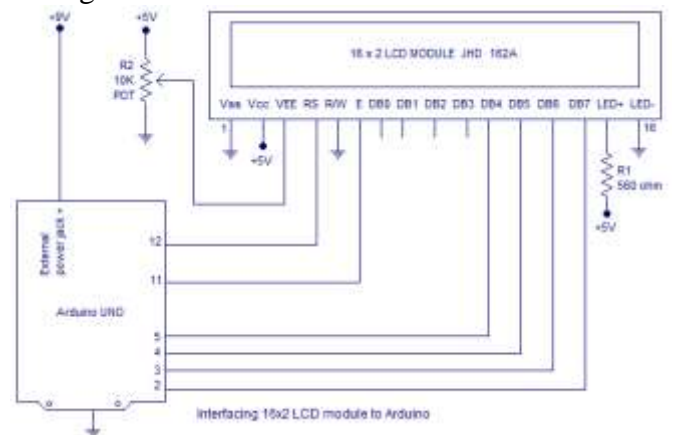
2. Constructional Features

For a demo prototype arduino UNO board is used. The hardware required for the Interactive Dustbin are two of load cell Breakout for detecting the deposition of weight, an LED display for displaying questions and options and the result of answer given by the garbage depositor, two dustbin to which each load cell is attached, and a USB power supply for the dustbin.

3. Interfacing of LCD Display

LCD modules form a very important part in many arduino based embedded system designs. So the knowledge on interfacing LCD to arduino is very essential in designing embedded systems. This article is about interfacing a 16x2 LCD to Arduino. JHD162A is the LCD module used here. JHD162A is a 16x2 LCD module based on the HD44780 driver from Hitachi. The JHD162A has 16 pins and

can be operated in 4-bit mode or 8-bit mode. Here we are using the LCD module in 4-bit mode. The JHD162A has 16 pins and can be operated in 4-bit mode or 8-bit mode. Here we are using the LCD module in 4-bit mode. The circuit diagram of interfacing LCD to arduino for displaying a text message is shown below:



RS pin of the LCD module is connected to digital pin 12 of the arduino. R/W pin of the LCD is grounded. Enable pin of the LCD module is connected to digital pin 11 of the arduino. In this project, the LCD module and arduino are interfaced in the 4-bit mode. That means only four of the digital input lines(DB4 to DB7 of the LCD are used). This method is very simple, requires less connections and you can almost utilize the full potential of the LCD module. Digital lines DB4, DB5, DB6 and DB7 are interfaced to digital pins 5, 4, 3 and 2 of the Arduino. The 10K potentiometer is used for adjusting the contrast of the display. 560 ohm resistor R1 limits the current through the back light LED. The arduino can be powered through the external power jack provided on the board. +5V required in some other parts of the circuit can be

tapped from the 5V source on the arduino board. The arduino can be also powered from the PC through the USB port.

4. Interfacing of Load Cell Breakout

A loadcell is an energy conversion device. The conversion can be to/from electrical, electro-mechanical, electromagnetic, photonic, photovoltaic, or any other form of energy. Here it is used to convert a force into electrical signal. The mechanical arrangement is done with loadcell on which a load is applied and the force applied is converted electrically and the output signal is amplified by an instrumentation amplifier INA125P (Texas instruments) before it can be used.

Load cells are used in several types of measuring instruments includes electronic weighbridge force measurement, portable weigh scales etc. Load cell breakout allows an Arduino/Comet board to connect to the loadcell. It is based on the INA125P instrumentation amplifier from Texas instruments. This breakout board is intended to make the interface between the Arduino and an instrumentation amplifier easier thereby allowing various measuring devices like a loadcell to be connected.

The breakout also provides an easy way to connect a 16x2 LCD as well as a potentiometer to vary the gain value of the on board amplifier.



Figure 2. Load Cell Breakout

The loadcell sensor with metal gauge on which the load is applied is connected to the breakout board

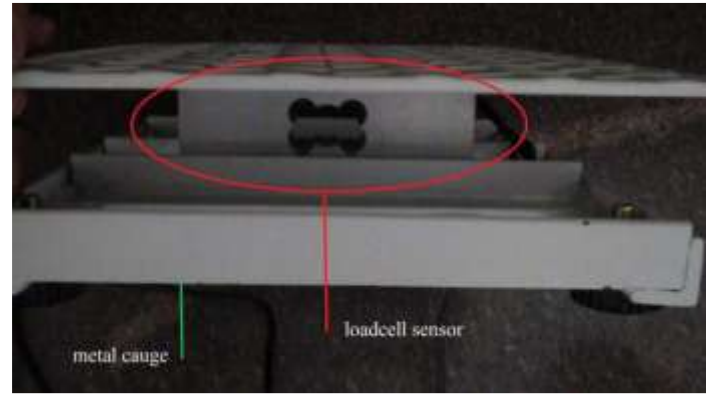


Figure 3: load cell sensor with metal gauge

5. Actual Concept:

As mentioned above, the key components in Intelligent Dustbin are- a Display and Dustbin attached with load cell to measure the change in weight. The display will display a question, say- who is the prime Minister of India? and the options displayed will be (A) Mr. Narendra Modi (B) Mr. Pranab Mukharjee.

(we all know the right answer for this). The two dustbins will be marked as A and B with load cell attached to each. Any change observed in the weight by the load cell will generate an analog voltage which will be converted into digital signal and then given to the display. Say- if the user inserts the garbage in B dustbin (answer is wrong) the display will show "WRONG ANSWER", if the user inserts the garbage in A dustbin (right answer) the display will show "CONGRATULATION". After any of the case, next question will appear with next fresh options. Thus the citizens will find it interesting and will enthusiastically participate in cleaning the city.

6. Area of Application:

Public places are the most highly recommended area of its application because majority of the wastes and disposal will be collected here.

Shopping mall may also find an application for this. Shopping malls may make it a centre of attraction giving discounts on disposal of wastes.

The system can be used in Commercial complex.

These systems have a wide range of applications.

7. Conclusion:

Intelligent Dustbins helps in creating the awareness amongst the citizens to keep the city clean, helps improve general knowledge of the citizens and also may give attractive offers to the citizens. Most importantly it is user friendly. Using this type of system in the country will help the Indian

government to run its SWACHH BHARAT campaign more efficiently and effectively. The system remains energy efficient and serves the purpose to the fullest.

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Author Profile

Krutika Agrawal received the Bachelor's Degree in Electrical Engineering from Gokhale Education Society's College of Engineering, Nashik. Presently she is presently working as a Lecturer with Sandip Foundation's Sandip Polytechnic, Nashik, Maharashtra India.