

# Solar Based garbage collecting robot with time slot Management

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**Abstract** - Waste disposal is a crucial problem in developing countries particularly in India due to heavy population. Presently in India, sanitary workers are using the oldest devices like brooms, iron plates and bamboo baskets for primary collection of solid waste. Thousands of workers die from or are affected with respiratory diseases, urinary, skin & eye infection, lung cancer, tuberculosis etc. There are many ways to clean the garbage but people in this generation are not willing to spend time in doing such things, there are vacuum based garbage cleaning machines and other road cleaners but these will not clean wastage like water bottles, paper cups, disposal glasses etc and these are manually operated by human.

**Keywords** - Arduino Board, EEPROM

## I. INTRODUCTION

As a solution to manual primary waste disposal, a cost effective garbage cleaning robot is developed the system consists of very simple but highly efficient mechanism. The main components consist of a rotating brush assembly (rake), a unique tilting wedge, a conveyor system and a garbage collection unit. The rake and wedge assembly serves as the most important component in this vehicle. The rake is a roller fitted with alternating nylon or jute brushes and metal sheets. The brushes help to sweep and pick the lightweight litter such as papers, leaves, cups and plastics. The metal sheets help act as a crusher to crush plastic bottles and cans. This garbage is pushed onto the conveyor belt over the wedge which is the transmitting medium. The conveyor belt then carries the waste and drops it in the garbage disposal unit placed at the back. Two DC motors are used to drive the rake as well as the conveyor system. A solar panel is provided for partial charging of the battery.

## II. BLOCK DIAGRAM

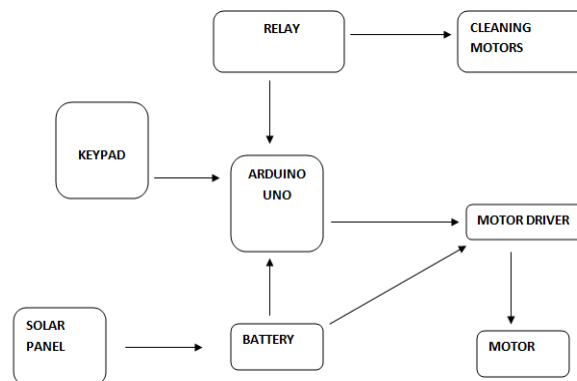


Fig. 1. Block Diagram

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### III. WORKING OPERATION OF PROJECT

The machine runs on four wheels each driven by individual motors. These individual motors help attain the necessary torque to run the vehicle. Two wheels on either side are synchronized in order to obtain complete 360° Turn on the spot and normal forward and reverse motion. This gives a larger degree of freedom for the robot to collect trash from almost every nook and corner of the area. In order to automate this system completely, 3 sensors are mounted on the vehicle. Robot is programmed in a certain pattern so as to navigate automatically and detect obstacles to move in a free path. If encountered by a moving obstacle, the robot is programmed to pause for duration of 50 seconds and then sense again to move or it will take turn of 180.

### IV. HARDWARE

#### A. Arduino board

An Arduino microcontroller board can be thought of as a user-friendly, open-source input-output system. An input can range from anything from a finger pressing a button to a change in light intensity, and outputs can range from lighting up a simple LED light to sending out a Twitter message.

#### B. Technical features of Arduino

- Microcontroller ATmega328
- Operating Voltage 5V
- Input Voltage (recommended) 7-12V
- Input Voltage (limits) 6-20V
- Digital I/O Pins 14 (of which 6 provide PWM output)
- Analog Input Pins 6
- DC Current per I/O Pin 40 mA
- DC Current for 3.3V Pin 50 mA
- Flash Memory 32 KB of which 0.5 KB used by bootloader
- SRAM 2 KB
- EEPROM 1 KB
- Clock Speed 16 MHz

#### C. What You Need

To work with the Arduino, we need a laptop, desktop, or tablet that you can download the Arduino development environment onto. It is written in Java, and can be downloaded on Windows, Mac OS X 10.7 Lion or newer, and Linux 32 or 64 bit. To connect your board with your computer, you will need a USB data cable. Unlike USB charging or syncing cables, they have a square, blocky-shaped interface instead of a small interface like the micro-usb. It is recommended that, unless you are a well-established electronics hobbyists with tons of cool sensors and the like lying around, you invest in a kit. These vary in price, and can save you time and money by helping you obtain the electronic components that are compatible with your board – and they usually come with tutorials and source code. For testing and prototyping, your laptop provides the power for the Arduino via the USB data cable. However, for laptop independent projects you will probably want to provide an independent, portable power source for your project. A link is provided under online resources that shows how to use battery power for your Arduino.

#### D. EEPROM

EEPROM stands for Electrically Erasable Programmable Read-Only Memory. This is a type of computer chip that can be written and re-written with code (instructions). Notice that it is electrically erasable. This means that an electric current can be used to erase it so that it can be used again. However, when it is erased, the entire chip must be erased. This is different from RAM, or Random Access Memory, which can have just certain bytes erased. RAM is more like writing on a sheet of paper with a pencil, where you can erase and rewrite just the parts you want. EEPROM is like a writing on a sheet of paper with a pen, where if you erase you need start with a fresh sheet of paper. The electrical erasure is the equivalent to providing a clean, empty sheet of paper.

#### E. External Interrupt

We all know what it means to be interrupted. An external interrupt means that something has occurred outside of the computer system or processor and needs attention.

#### F. Flash Memory

Flash memory is another type of memory. It retains data whether power is supplied to it or not. A good example is the typical flash drive: it still stores you files even when it is not plugged into your computer. It is good for storing memory that may change, but needs to remain even when powered down.

#### Special Issue:

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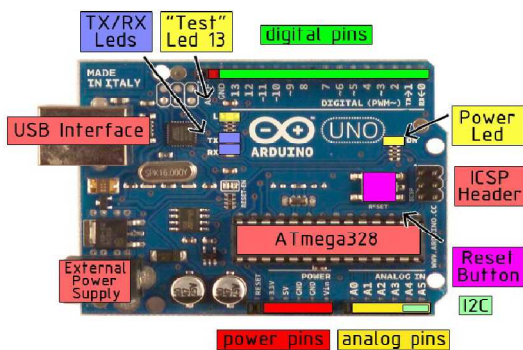
## G. Input/Output

Digital Input/Output: Digital pins can have one of two values: low or high, where low corresponds to 0 or false and high corresponds to 1 or true. The number of available digital pins is another major difference between the different Arduino boards. The largest boards have 54 input pins and 15 output pins. These would be the MEGA 2560 and the MEGA ADK (both using the ATmega2650 processor). The next largest is the DUE (with an ATSAM3X8E processor), with 54 input pins and 12 output pins. The smallest is the Gemma (using the ATtiny85 processor) with only 3 input pins and 2 output pins.

## V. SOFTWARE

### A. Arduino IDE

Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the board is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software on running on a computer (e.g. Flash, Processing, MaxMSP). Arduino is a cross-platform program. You'll have to follow different instructions for your personal OS.



As you can see, downloads are available for Windows, Max OS X and both 32 and 64 bit Linux. This example will download the software on a Windows system with admin rights. If you are installing the software and do not have administrator rights on your system, you will want to download the ZIP file instead of the Installer. Download the file (you may be asked for a donation, but that isn't necessary) and save it to your computer. Depending on your internet connection speed, it may take a while. Once it downloads, run it. If asked if you want to allow it to make changes to your computer, say yes.

## VI. CONCLUSION

This project is very useful as compared to existing system, which will help physically handicapped people for travelling, and this project further can be modified to autonomous with self driving using raspberry pi and image processing.

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