SOLAR BASED AUTONOMOUS INDUSTRIAL GRADE GARBAGE CLEANER AND DUMPER ROBOT WITH BLOWER AND SCRUBBER

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ABSTRACT –

The autonomous floor-cleaning, wall-cleaning, and rubbish collecting robots have been developed for years, proposed autonomous cleaning robot that can operate at industrial level & solar based completely autonomous still remains a challenging task. This Project deals with idea of design and fabrication of solar based cleaning and garbage collecting robot for industrial purpose. The robot is equipped with high torque traction motors and rigid custom chassis for heavy use. There is always a trade-off between Accuracy, efficiency and cost of garbage collection, especially When robots get into the picture. Our purpose is to find the Perfect balance between these factors.

Keywords : autonomous, garbage Collector, low-cost, sensor fusion

1.INTRODUCTION

Garbage generation is an issue of worldwide importance, requiring global attention . Improper management of waste and garbage is the root cause of several hindrances and issues that we face today such as health and hygiene, transport safety, wildlife endangerment and environmental aestheticism. At present, the method of cleaning up is majorly manual. With trends in industries shifting towards automation, it should A also be efficiently applied towards waste management. While manual labour to clean up garbage is a good source of employment, there are several problems that are associated with cleaning up of garbage manually

EXISTING SYSTEM- In traditional system we have humans dedicated for doing cleaning task on regular basis in industries. This periodic regular maintenance is costly as the labour charges of humans are high. Also, while human labour is cleaning a supervisor is required to constantly check the quality of work. Human labour and other technique are slow as compared robot and are inefficient in nature. There are some cleaning robot and garbage collector available in real life but they are not efficient as compared to proposed system manually.

PROPOSED SYSTEM- The designed robot will utilize renewable energy in terms of solar power hence the robot is eco-friendly as well as emission free in nature. The robot is having a DC operated suction chamber to suck out the dust present on surface and also is equipped with fibre-based feather cleaner rotating at high speed to collect bigger garbage particle in dust collecting chamber. The collected dust in chamber is carried via screw type conveyor and dump inside on board present dustbin. The system is completely autonomous as it uses IR sensor, Ultrasonic sensor & Timers to perform cleaning periodically. The project utilizes AT Mega 328p microcontroller-based system to perform complex tasks of cleaning.

2. OBJECTIVE

- The garbage collected and disposed efficiently and effectively.
- The robot moves in a constant speed. The garbage gets detected when it is at near from the trash.
- To analyse the problem of garbage disposal at a school, restaurant, office, hotel, production plant or any other suitable location
- To design and develop a system for solving the problem
- To test and maintain the implemented system.

3. METHODOLOGY

The operation of whole robot is classified into three main categories are main control of robot , Garbage collection and disposal of garbage

3.1 **Main control of robot**

The robot can work on supply given by 50 watt solar panel to the battery. The 12v battery can charge by using solar power . The robot can travel a certain distance to collect Garbage in the predetermined time by using combination of motor. The robot can detect garbage by using sensors connected in n Arudino. This system consists of motor 200 rpm. It detect garbage and dispose into dumper place .
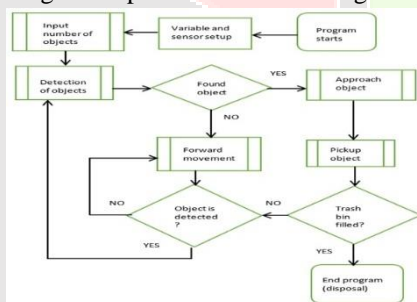
3.2 Garbage Collection

This garbage collector robot collect garbage at specified time without any human interruption. It collect garbage by detecting it using ultrasonic sensor , it detect all garbage around it and then travel towards detected garbage .
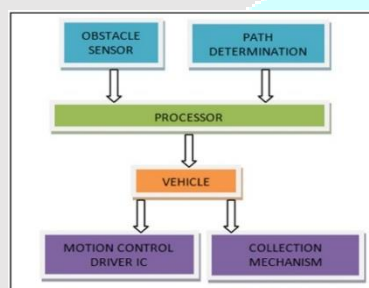
3.3 Disposal of garbage

This action is done using tilting mechanism. The speed of the motor attached to shaft is kept at nominal value to get proper rotating action to move the garbage right into the bin. This is just a prototype and hence the mechanism used can pick only above-mentioned garbage. The mechanism can be changed according to the place where it is being used.

4. LITERATURE SURVEY : The below description explains related to automatic collection of garbage by using various Technology.

- John et al. [11] owned a patent for their project which is used to collect garbage in streets. They designed a front-loading, refuse collecting vehicle which is modularly provided with a Combination of a low profile, front-loadable waste bin (intermediate container) and one or More, side-loading robotic arms. The designed vehicle was not an automatic one, it was Operated purely by mechanical means.

- Ruide et al. [7] proposed a project for collecting the waste automatically. They designed a Prototype for automated garbage collection robot that uses visual information ie. Image Processing to navigate and a robot arm to collect and deposit cans. This robot was planned for Domestic purpose.

- Apoorva et al. [8] have designed an Autonomous Garbage collector Robot to dispose the Garbage. It is built in such a way that when it is started it will move on the path defined in the Arduino program. When it encounters any obstacle, depending upon the conditions applied in The program the robot makes further motion and picks the garbage. It is designed to collect Garbage in foot path, public places(Parks, schools, colleges), mostly cemented paths and Beach.

- Samrudhi et al. [10] designed a garbage collecting robot using raspberry pi. The detection of Dustbin is done by computer vision that is by camera and opto couplers. The collection is done By Vaccum unit where it takes all the garbage and cleans the area. Once the dustbin is full, the Level sensor in the bin will sense the level of the garbage and send it to the nearest garbage Collector truck. We have designed a robot to eliminate the initial level problems. The robot automatically Tracks the path and detects the garbage and then will pick it up. Thus for the detection of Dustbin whether it is dustbin or not we have used edge detection method as it provides (a) Good detection (b) Good localisation (c) Minimal response. The controller used for Interfacing the hardware is NI-myRIO. The NI- myRIO is used because it is a reconfigurable And reusable tool. Initially we worked on the chassis and robotic arm with gripper. The motors Used are dc motor for the movement of the robot and gripper and servo motor for the robotic Arm.

5. RESULTS

Garbage and recycling pickup work is physically demanding and it exposes workers to many occupational hazards. This project is designed to fulfil the task of collecting garbage from certain places and then dispose it at a single place from where the garbage will then be taken for disposal or process of recycling. To build an automatic trash robot using Arduino microcontroller which detects and collects the paper and plastic items automatically and process it. So, this reduces the requirement of manual clearance of plastic waste

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