IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SOLAR OPERATED SMART MULTIFUNCTIONAL FLOOR CLEANING ROBOT

[1]Malavika Venugopal, [2]Abhijith P, [3]Aswin V, [4]Srijush P R,[5]Vishnu Prabha N Kaimal
[1]UG Student, [2]UG Student, [3]UG Student,[4]UG Student, [5]Assitant Professor
[1] Electronics and Communication Engineering,
[1]Nehru College of Engineering and Research Centre, India

Abstract: The conventional floor cleaning machines is most widely used in airport platforms, railway platforms, hospitals, bus stands, malls and in many other commercial places. These devices need an electrical energy for its operation and not user friendly. In India, especially in summer, there is power crisis and most of the floor cleaning machine is not used effectively due to this problem, particularly in bus stands. Hence it is a need to develop low cost, user friendly floor cleaning machine. In this project, an effort has been made to develop a solar powered mobile operated floor cleaning machine so that it can be an alternative for conventional floor cleaning machines.Automated floor cleaning machines are commonly used in developing countries since many years because of high cost of labor, time, efforts and affordability. The concept is not popular in developing or emerging economic countries. Reasons for non-popularity are cost of machine and operational charges in terms of power tariff.A semiautomatic floor cleaning machine is developed by keeping basic consideration for less energy consumption, machine as well as operational cost reduction, reduce the human effort, environment friendly and easy to handle. Base of the project was to use renewable energy which is abundant in most of the countries, will have less Envronmental impact.

I. INTRODUCTION

Cleaning is important work approximate every place. Sometimes this is easy and sometimes difficult. Sometimes we assigned people for purpose of cleaning and pay money and sometimes cleaning is required in areas where presence of living being dangerous so we cannot assigned living being in every place. Some places are so that have a large floor areas in that place for cleaning purpose we need more than one person so we required some technique to compensate these problems. In advancement of science a robot come in light but it operate by a personnel. To avoid this limitation of personnel we require more technologies. Cleaning machine is very much useful in cleaning floors and outside ground in hospitals, houses, auditorium, shops, bus-stands and public place etc. In modern days interior as well as outside cleaning are becoming an important role in our life. Cleaning of waste is a very important one for our health and reduces the man power requirement. Many of floor cleaning machines are available but we developed machine is very simple in construction and easy to operate. Anybody can operate this machine easily. Hence it is very useful in hospitals, any large area space. The time taken for cleaning is very less and the cost is also very less. Maintenance cost is less. Much type of machines is widely used for this purpose. The Floor cleaner is of very simple construction and is very easy to operate, anyone can operate it without any prior training of any sorts with safety.

II. LITERATURRE SURVEY

Solar powered unmanned cleaning robot -Rajkumar P, Abhiram K, Anushiya R, Elakkiya M, Harshidha P.R (IJEAT)-The SPUCR navigates in all directions with help of motors connected to the wheel.The robot moves by itself without continuous human guidance and cleans the house or office. Thus, saving a lot of time and making it convenient and useful.

Manually operated floor cleaning machine-N.B Khan, G.V Ana sane, R.A Bhoyar, Y.S Shaikh(IJFEAT)-Now a day the conventional floor cleaning machines are most widely used in airport platforms, Railway platforms, hospitals, bus stands, malls and in many other commercial places.

Solar floor cleaner robot-Aishwarya Harke, Aboli Ramteke, Oshine Gour, Manaswi Charde(IRJMETS)-Ultrasonic sensor is the most important component for autonomous floor cleaning robot because ultrasonic sensor works as eyes of robot. Ultrasonic sensor useful for turning of robot by sensing the obstacle or wall. Sensing distance range set by programming. In this range robot sense the obstacle and turn back.

Semi automatic floor cleaning machine - Vardhaman Ladage, Shardool Jawanjal, Dnyanesh Kamat, Rutuja Majgaonkar, Bhagyashri Kadam (IJDMT)-A semi-automatic floor cleaning machine is developed by keeping basic considerations for less energy

consumption, machine as well as operational cost reduction, reduce the human effort, environment friendly and easy to handle. Base of the project was to use renewable energy which is abundant in most of the countries, will have less environmental impact and easy to construct for commercial scale in future.

Solar operated multifunctional floor cleaning-Vikrant Bhute, Piyush Ladse, Aniket Ingle, Nitesh Rane (IRJET)-The DC motor used for rotation of the mop having high torque than the motor used for the brushes. The other two DC motors having high RPM are used to clean the front section of the floor the DC motor rotates the brushes through the shaft which is connects to the shaft of the motor through nuts and bolt. During the dry cleaning the supply of water is disconnected. In the water flowing tube number of holes are created for equal amount of water.

III. OBJECTIVE

Main objectives of this work can be illustrated as:

- To develop a machine that helps in easy and quick cleaning. To reduce human efforts.
- To save the time.
- To reduce the cost.
- To prevent injuries due to tripping or slipping. Injuries due to slips and trips on level floors are a major cause of accidental injury or death. Bad practice in floor cleaning is itself a major cause of accidents.
- To remove grit and sand which scratch and wear down the surface
- To remove allergens, in particular dust.

IV. METHODOLOGY

Solar energy based on a smart vacuum cleaner circuit using Bluetooth module with microcontroller. The system is implemented in the following steps :

1.Interfacing ultrasonic sensor to microcontroller to control the DC motor.
2.Measuring the light intensity using LDR sensor to recharge the battery by the solar panel.
3.Sending notification of work done to the user phones via Bluetooth module.
4.The functional system block diagram is provided in figure 1.

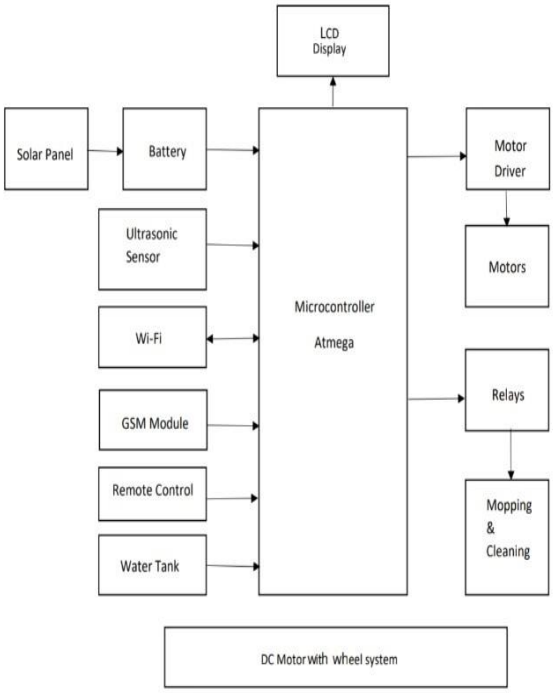

Figure 1: Block Diagram

V. SYSTEM FLOWCHART

The figure 2 shows the system flowchart. And the process starts at the vacuum power is on. The DC motor will start moving forward and the ultrasonic sensor will detect if there is an object and according to that the device directions will change. When the battery is low the vacuum will stop cleaning and search for a light source. If the vacuum is full, it will send notification to the user phone via Bluetooth and power off the vacuum.

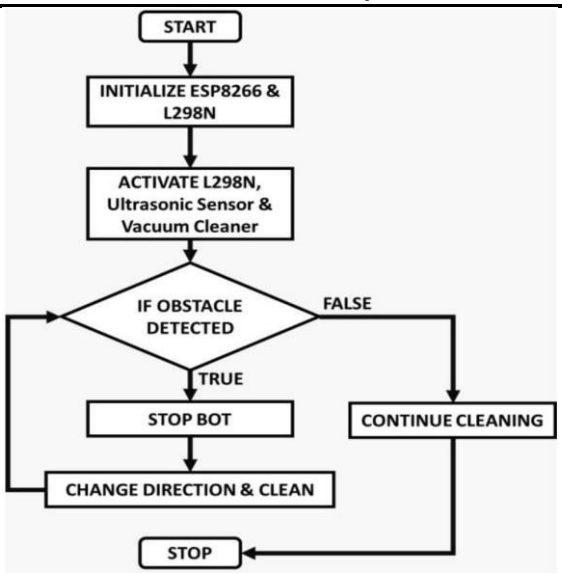

Figure 2. System Flowchart

VI. WORKING

The robot is controlled by an RF remote. The robot uses a battery that is constantly charged by a solar panel as it is drained by the motors. This provides a longer battery life when it is exposed to sun rays. The system consists of a vacuum cleaner with added ultrasonic sensor for obstacle detection. Thus the robot does not bump into any obstacle. The robot is integrated with a water tank that sprays water in front of robot which is followed by 2 brushes to clean the floor surface The GSM can send the message when the dustbin is filled, and also when the voltage goes down. The voltage is sensed by voltage sensor and it is automatically updated to the LCD display.

VII. BENEFITS & LIMITATIONS

Advantages:

1) Manual effort is reduced.
2) Operating time is less.
3) Cleaning and polishing can be done at same time.
4) Power consumption is less.
5) This machine requires low Maintenance cost.
6) In this machine Easy control of cleaning solution supply by controlling valve.
7) It can be used on various places other than rough surfaces.
8) By further modification the drive or movement can be made automatic.

Disadvantages:

1) Floor cleaning machine produces vibrations when used on rough floors or rough surfaces.
2) Floor cleaning machine is Suitable for only flat surfaces.
3) Floor cleaning machine is Semi-automated machine.
4) It is heavy to lift.
5) It is not capable to clean stair of any building.
6) Maintenance of mop is required.

VIII. APPLICATION

- This can be used for Low range Mobile Surveillance Devices.
- This can be used for Military Applications (no human intervention).
- The robot can be used for Home automation.

IX. FUTURE SCOPE

If panel used of high watt, then the machine can be used during night time for garden lighting or room lighting. Because we can store more power. And at night time however you keep it aside. So the power in the battery can be used for this purpose. By using one valve in the pipe we can also use it for gardening i.e. pouring water for plants. By connecting one box type carrier we can use it to transport files, books or other stuffs from one place to other in office or any other place.

REFERENCES

1) Solar powered unmanned cleaning robot-Rajkumar P, Abhiram K, Anushiya R, Elakkiya M, Harshidha P.R (IJEAT) - 2020
2) Manually operated floor cleaning machine-N.B Khan, G.V Ana sane, R.A Bhoyar, Y.S Shaikh (IJFEAT) - 2019
3) Solar operated multifunctional floor cleaning machine-Vikrant Bhute, Piyush Ladse, Aniket Ingle, Nitesh Rane (IRJET) - 2020