Automatic Vacuum Cleaning and Moping Machine

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ARTICLEINFO

ABSTRACT

Cleaning is an advancement of inhale dust on the surface of any object or wall. Nowadays dust cleaning is a tedious task in many of the industry especially for the food processing Industries which are the milk, oil, soft drinks, chocolate etc., while cleaning the ceiling there may be a possibility of dust falling into the products which may cause the serious issue in the quality control. If it is not observed during quality test and reached to the consumer it also affects the marketing of that product. Hence the cleaning process in food processing industry is important. When the workers are employed for the cleaning process, it leads to difficulties such as health issues to the workers and time-consuming job. During manual cleaning process the food processing have to be stopped to avoid the dust falling on the product. Being a repetitive process, it affects the production. To overcome all the drawbacks an automated cobweb cleaner is designed. In this paper, design and implementation of automated cobweb cleaner is presented.

Keywords: Automatic Machin, Cleaning machine, Vacuum pump, Smart Water System, Industrial Smart Work, Smart power supply etc.

I. INTRODUCTION

Industrial ceiling cleaning is a tedious task. Nowadays, this is one of the problems in every industry and is being done by manually so far. Usually, number of workers employed in this job based on the size of the industry. The workers in this job for the industries are not sufficient. The insufficient workers in the industry are due to the risk factors such as health issues and also cause life risk. Some industrial cleaning processes have to be done at the time of shutting the factory. It affects the industry working hours and there will be a delay in completing the work on time. In the residence floor cleaning is done by vacuum cleaners for ceiling cleaning no automatic device is used. 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 have assigned living being in every place. Some places are so that have a large floor area 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 operates by some personnel. To avoid this limitation of

personnel we require more technologies. Automation is a great solution of this problem. So we make an autonomous floor cleaning robot that operated by internet of things and Arduino Nano programming. Ultrasonic sensor works as eyes of robot. Ultrasonic sensor useful for turning of robot by sense the obstacle or wall. Sensing distance range of robot set by Arduino Nano programming. In this range robot sense, the obstacle and turn back. Households of today are becoming smarter and also more automated. Home automation delivers convenience and creates more time for people. Domestic robots are entering the homes and people's daily lives, but it is yet a relatively new and immature market. However, a growth is predicted and adoption of domestic robots is evolving. Several robotic vacuum cleaners are available on market but only few ones implement wet cleaning of floors. Purpose of this project is design and implement a Vacuum Robot Autonomous and Manual via Phone Application named as blynk. Vacuum Cleaner Robot is designed to make cleaning process become easier rather than by using manual vacuum. The main objective of this project is to design and implement a vacuum robot prototype by using Arduino Nano, motor driver Ultrasonic Sensor and to achieve the goal of this project. Vacuum Robot will have several criteria that are user-friendly.

II. OBJECTIVE

Objective of this project is to design the automatic floor cleaning robot in order to work Human hazards place and to skip need of personnel.
 To develop an autonomous robotics system using internet of things and to design a floor cleaning robot without human to the driving. Mainly it is used when obstacle is less and large area is required to be clean. Mostly problem occurs during large floor that the human capability. Its means that in large floor areas the human can get tired. In areas like nuclear plants or chemical industries the dangerous Radiations, chemicals, air, pollutions can make a man sick or

death. So this robot has applicable in that places. There are many features are added in this project like vacuum cleaner in front side and a wiper motor and water pump in middle for tightly wet cleaning of floor. Vacuum cleaner suck solid particle and clean floor after that wiper make tightly cleaning.

III. PARTS OF PROJECT

ARDUINO IDE: The Arduino Integrated Development Environment (IDE) is a cross platform application that is written in functions from C andC++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards .The open source Arduino software makes it easy to write code and upload it is the board .This software can be used with any Arduino board

Fig. 1) Arduino

Blynk: Blynk is a new platform that allows you quickly build interfaces for controlling and monitoring your hardware project from your ios and Android device. After downloading the Blynk app, you can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen.

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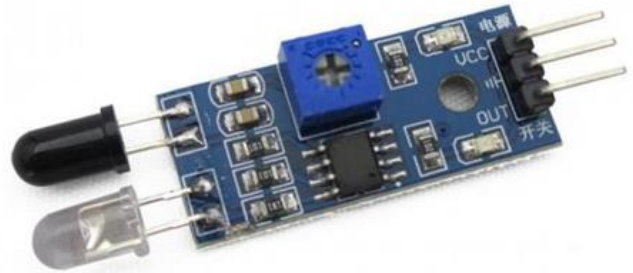
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Vacuum Pump: The vacuum pump functions by removing the molecules of air and other gases from the vacuum chamber (or from the outlet side of a higher vacuum pump if connected in series). While the pressure in the chamber is reduced, removing additional molecules becomes exponentially harder to remove.
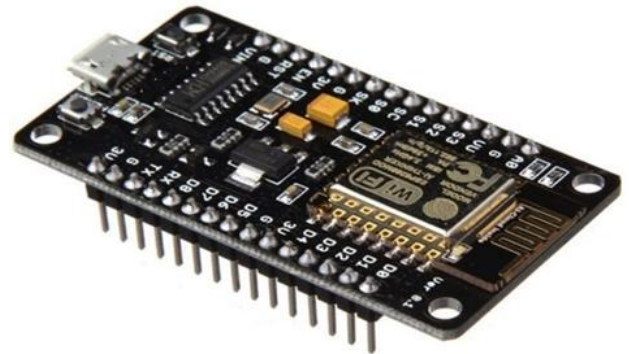
It is defined as a device that removes gas molecules, or water molecules from a particular enclosed space and leaves a vacuum behind. The vacuum is defined as the absence of air. So the vacuum pump removes air for air conditioning systems, or water for refrigeration systems to create a vacuum behind. A vacuum pump is a set of systems combined together for the application.

ESP8266: ESP8266 is a computer on a chip. It is an integrated chip that is usually a part of an embedded system. It is a self-contained, independent and yet function as a tiny, dedicated computer. It also supports IOT Applications due to built-in Wi-Fi. The cost of this Controller is 500/-

IR SENSOR: It operates on Infrared Technology Operating Voltage is 5V DC and the Controller supplies it.It is a digital sensor The cost of this Sensor is 350/- IR sensor is an electronic device, that emits the light in order to sense some object of the surroundings. An IR sensor can measure the heat of an object as well as detects the motion. Usually, in the **infrared spectrum**, all the objects radiate some form of thermal radiation. These types of radiations are invisible to our eyes, but infrared sensor can detect these radiations.

WATER PUMP: Pump is used to pump the water on the floor It operates on 5v DC from Microcontroller. The cost of the Pump is 500/-

MOTOR: An electric   motor is   an electrical machine that   converts   electrical energy into mechanical energy. Most electric motors

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operate through the interaction between the motor's magnetic field and electric current in a wire winding to generate force in the form of torque applied on the motor's shaft. Electric motors can be powered by direct current (DC) sources, such as from batteries, or rectifiers, or by alternating current (AC) sources, such as a power grid, inverters or electrical generators

A series DC motor is basically called a universal motor. The universal motor is specially designed to operate on AC current called alternating current as well as on DC which is called direct current. The universal motors are basically light in weight, these motors operate at high speed and the universal motors have high starting torque. The main quality about the universal motors that are used in the vacuum cleaners is that they are very easy to control. The universal motors for vacuum cleaners are generally noisy. The reason they become noisy are the commutator brushes attached in the vacuum cleaner. The wear in these commutator brushes makes the motor noisier and that is why these type of motors is not preferred for continuous use.

Basic Specifications

- Model: ATO-80WDM02430
- Matched Controller Model
- Rated Power: 1 hp (750W)
- Rated Voltage: 24V DC / 48V DC /72V DC /96V DC /180V DC
- Rated Current: 39.27A at 24V, 19.5A at 48V, 13.09A at 72V, 9.82A at 96V
- Phase: 1 phase

- Holding Torque: 2.4 Nm
- Peak Torque: 7.5 Nm
- RPM 1750

SMALL WATER TANK : Water tanks are used to provide storage of water for use in many applications, drinking water, irrigation agriculture, fire suppression, agricultural farming, both for plants and livestock, chemical manufacturing, food preparation as well as many other uses. Water tankparameters include the general design of the tank, and choice of construction materials, linings. Various materials are used for making a water tank: (polyethylene, polypropylene), fiberglass, concrete, stone, steel (welded or bolted,[1] carbon, or stainless).

FINAL DEMO OF MODULE

ADVANTAGE

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- Robotic vacuum cleaners clean without man interference.
- Perform best on hard floors.
- Can clean underneath of furniture.
- Require only weekly maintenances.
- Easy to use and maintain.

IV. CONCLUSION

This project demonstrated for vacuum cleaning floor and cobweb cleaner. To overcome the vacuum cleaners' drawbacks while cleaning the wall ceiling the proposed method is efficient and reduces the man power, consumes less time reduces the accident during cleaning process. Machine cleaning is proper compared to the manual cleaning. In the proposed cleaner Collecting the dust is simple. Hence it is concluded that the proposed system is efficient in cleaning.

To further enhance the navigation performance of the robot, feedback sensors such as optical encoders can be integrated. Cleaner brushes can be added to vacuum cleaning mechanism to increase the efficiency of dust collecting. Lithium polymer batteries can be used to reduce the weight of the robot which can further lead to the reduction of power consumption.

There are so many cleaning and mopping robots present in the market but only some of them are affordable and economic. There are very fewer robots that include both cleaning and mopping. With this work, we tried to reduce the cost of the robot and make it more compatible with the Indian Users and the Industries.

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