



Industrial Cleaning Robot

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ABSTRACT-

Due to their efficacy in assisting people in floor cleaning applications at homes, hotels, restaurants, workplaces, hospitals, workshops, warehouses, and universities, robotic cleaners have received a lot of attention in robotics research in recent years.

Essentially, robotic cleaners are defined by their cleaning abilities, such as floor mopping and dry vacuuming. Some devices rely on infrared sensors to avoid obstacles, while others use a laser mapping technology. Each robotic floor cleaner cleaning and operating mechanism has its own set of benefits and drawbacks.

For example, robots that use laser mapping are faster, less time consuming, and energy efficient, but they are more expensive, whereas robots that use obstacle avoidance are slower and less energy efficient owing to random cleaning, but they are less expensive.

Introduction

What Is Industrial Cleaning?

Simply said, industrial cleaning is the process of cleaning potentially hazardous locations in industrial buildings such as factories, warehouses, power plants, and other similar structures.

There is no easier way to define the work of cleaning factories, power plants, and other industrial job sites, because the facilities that a building service provider may encounter are so diverse. Large facilities, such as factories, plants, warehouses, and other industrial settings, may be cleaned by an industrial cleaning firm.

A work like this necessitates on-the-job training and a thorough understanding of safety procedures. There may be specialised equipment or chemicals that an industrial cleaner must employ to do their tasks.

Types of Industrial Cleaning Services-

Cleaning services for industrial, manufacturing, and warehouse buildings are known as industrial cleaning services. Unlike residential or commercial cleaning, industrial cleaning is normally handled by an industrial cleaning firm.

Washing Techniques-

Asbestos removal is one of the most common forms of industrial cleaning services, as asbestos is commonly found in fireproofing, drywall, and other areas of older structures.

Pressure washing, also known as hydro blasting, is a high-pressure water blasting process for removing paint and lead. It's usually utilised for removing huge amounts of mastic and epoxy coatings from vertical and horizontal surfaces. It can also be used to remove paint from highways, parking lots, and airports.

Any chemical leak in the cosmetics or pharmaceutical industries might be hazardous. Hire an industrial cleaning firm right away to protect yourself, your employees, and your products. Professional decontamination services are provided by a good industrial cleaning company to ensure that your facility is a safe place to work.

What are the needs of cleaning machine? Cleaning machines are highly important in hospitals, houses, auditoriums, bus stops, and other public places for cleaning floors and outside ground. Cleaning, both inside and outside, has become increasingly vital in our lives in recent years. Waste clean-up is critical for our health and minimises the amount of manpower required. There are several floor cleaning machines available, but the one we invented is relatively simple to construct and run. This machine is simple to run for everyone.

Objectives-

1. Create a machine that makes cleaning simple and quick.
2. To give an alternative road cleaning approach.
3. To minimise human effort
4. In order to save time.
5. To lower the price.
6. To prevent tripping or slipping injuries. Slips and trips on level floors are a leading cause of accidental fatality, injury, and death. Accidents are frequently caused by poor floor cleaning practises.
7. To make the floor more attractive.
8. To eliminate dirt and stains.
9. To remove grit and sand from the surface, which scrape and wear it down.
10. To eliminate allergies, especially dust.
11. To clean up the environment.

Literature review-

A simplified road cleaning machine with modified technology suitable to Indian conditions has been designed as a revolutionary way of road cleaning application for Indian roads.

This equipment can be used to clean long distances and vast areas, reducing human labour and allowing cleaning to be completed in one drive. This device has been used to clear roads and is capable of cleaning various types of papers, covers, food beverages, smooth dust, and undesired garbage. It is currently seen that a person pushing machines and cleaning is done with human labour, and that this is always done when roads are not in use.

A bunch of revolving cutting blades mounted on a pole connected to the engines make up the robot rubbish collection architecture. The instrument will not function for the entirety of the vehicle's activity, but only under specific circumstances. The accumulation framework is designed to fit open spaces such as patio nurseries, transportation stations, and sidewalks.

Methodology-

For such a platform, there are numerous design options. As an engineer, though, I begin with a certain set of specifications in order to create a platform that can accommodate various sensors, microcontrollers, and computers. Furthermore, the 3D printed parts enable me to experiment with various designs in order to create the best 2WD robot chassis.

A single 12V 18Ah SLA (Sealed Lead Acid) non-spillable battery powers an FRC robot, capable of temporarily delivering over 180A and arcing over 500A when completely charged. The COTS battery, lead wires with contacts, and Anderson SB connector make up the Robot Battery assembly. Multiple Robot Batteries are recommended for teams.

Using an Arduino and the Arduino Motor Shield, you can simply control motor direction and speed. It's quite simple to incorporate a motor into your project because you can just address Arduino pins. It also enables you to power a motor using a separate power supply of up to 12 volts.

The shield is also quite easy to locate. The Arduino Motor Shield is a nice thing to have in your armoury for rapid prototyping and general exploring for all of these reasons.

Advantages-

1. Less manual labour is required
2. The electric work technology in this floor cleaning equipment reduces manual effort in surface cleaning.
3. It takes less time to operate:
4. Because this machine has motorised brushes and a mop, the cleaning time will be reduced and the job will be completed faster.

5. You may clean and shine at the same time:
6. We can clean the dirt and dust with a brush and polish the floor with a mop at the same time.
7. Less power consumption
8. The power consumption is lower because we are employing a low voltage electric dc motor.
9. This equipment has a minimal cost of maintenance.

Disadvantages-

1. When utilised on rough floors or surfaces, the floor cleaning machine causes vibrations.
2. Only flat surfaces are appropriate for the floor cleaning machine.
3. The semi-automated floor cleaning machine.

Future scope-

From an estimated USD 8.9 billion in 2021 to USD 24.8 billion in 2026, the cleaning robot industry is expected to grow at a CAGR of 22.8 percent. The rise of the cleaning robot industry has been fuelled by the Internet of Things, the increasing penetration of automation in households, and the lower size of cleaning robots compared to traditional robots.

Conclusion-

In this project, we demonstrated a mopping-capable floor cleaning robot. The project's major goal is to encompass all areas of cleanliness in society. The various applications provide a wide range of functions, including pipe cleaning, surface scrubbing for effective floor cleaning, and dust and dirt removal from the road. This endeavour is extremely beneficial to society and contributes significantly to the country's cleanliness. One of them is that the motor is not detachable, and the high rpm causes the entire system to vibrate.

This will operate well if these features are adjusted. Overall, this is a successful product that can be utilised in any modern Indian household. This automatic floor cleaning system's design can be used to clean any type of distant location. Because the motors chosen consume far less energy, they will save both energy and money. D.C. motor and wiper mechanism are used to design and manufacture automatic floor cleaning machines.

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