# VISVESAVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangama, Belagavi-590018



A Synopsis report

On

## “SMART FLOOR CLEANING SYSTEM”

*Submitted in partial fulfillment of the requirements for the award of the degree of*

**BACHELOR OF ENGINEERING**

**In**

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**By**

|  |  |  |
| --- | --- | --- |
| **Sr.No** | **Name** | **USN** |
| **1** | **SHIVAKUMAR K V** | **4AL21EC079** |
| **2** | **SHAHSANK V SHETTI** | **4AL21EC078** |
| **3** | **SHASHANK SWAMY** | **4AL21EC077** |
| **4** | **PRASANNA KUMAR B L** | **4AL21EC064** |



**Department of Electronics and Communication Engineering**

**ALVA’S INSTITUTE OF ENGINEERING & TECHNOLOGY**

**Shobhavana Campus, MIJAR-574225, Moodbidri, D.K., Karnataka**

**MAY 2024**

## SMART FLOOR CLEANING SYSTEM

**Abstract:**

Manual work is taken over the robot technology, and many related robot appliances are also being used extensively. Here is the technology that proposed the working of robots for Floor cleaning. This floor cleaner robot can work manually. This robot contains a switch which is used to operate the motion of it. The switch is connected to the floor cleaner's wired module. This robot can perform sweeping and mopping tasks. A motor is used for wheels. In manual mode, the keypad is used to perform the expected task and operate a robot. The whole circuitry is connected to a 12V battery.

### Introduction:

A robot is an electromechanical machine used for various purposes in industrial and domestic applications. Robot appliances have entered the consumer market, since the introduction of robots. Many related appliances from various companies have been followed. Initially, the main focus was on having a cleaning device. As time passed on many improvements were made and more efficient appliances were developed. In early, 2010 a new automatic floor cleaner robot "Mint" was developed by Jen Steffen. Detachable clothes were attached for sweeping and mopping purposes. For tracking mint used the GPS-like indoor localization system. In this research work a floor cleaner robot based on AT89S52 has been developed. This cleaner robot is an electric home appliance, which works in two modes as per the user's convenience "Automatic and Manual". Unlike other floor cleaner robots, this is not a vacuum cleaner robot; it performs sweeping and mopping operations. A detachable mop is used for mopping. It works on a 12V supply. In the automatic mode, the robot performs all operations itself.

### Advantages:

Smart floor cleaners offer a compelling solution for optimizing cleaning operations within large-scale projects. These advanced machines deliver a range of benefits that enhance efficiency, productivity, and overall project outcomes.

**Operational Efficiency and Cost Savings**

1. **Enhanced Productivity:** Smart cleaners can cover vast areas rapidly and consistently, significantly reducing labour hours and accelerating project timelines.
2. **Reduced Labor Costs:** By automating routine cleaning tasks, these machines minimize the need for manual labour, leading to substantial cost savings.
3. **Consistent Performance:** Smart cleaners maintain a high level of cleaning quality, ensuring consistent results across various floor types and conditions.

**Safety and Health Considerations**

1. **Minimized Risk of Injury:** Automating cleaning tasks reduces the potential for accidents and injuries associated with manual labour, such as slips, falls, and strain.
2. **Improved Indoor Air Quality:** Effective cleaning removes allergens, dust, and pollutants, contributing to a healthier and more productive work environment.

**Data-Driven Insights and Optimization**

1. **Real-time Monitoring:** Many smart cleaners provide real-time data on cleaning performance, allowing for proactive maintenance and optimization.
2. **Predictive Maintenance:** By analyzing usage patterns and identifying potential issues, smart cleaners can help prevent downtime and reduce maintenance costs.
3. **Customizable Cleaning Plans:** These machines can be programmed to adapt to specific cleaning requirements, ensuring optimal performance for diverse project needs.

**Disadvantages:**

While smart floor cleaners offer significant advantages, it's crucial to consider their limitations in large-scale projects:

**Initial Investment and Ongoing Costs**:

High Purchase Price: Advanced models can be costly, requiring substantial upfront investment.

Maintenance and Repair Expenses: Regular maintenance and potential repairs can add to operational costs.

**Operational Constraints**:

1. Complex Environments: Smart cleaners may struggle with navigating intricate layouts, obstacles, and uneven surfaces.
2. Battery Life Limitations: Limited battery life can restrict cleaning time, especially in large areas, necessitating frequent charging or battery swaps.
3. Noise Levels: Some models can generate significant noise, which may disrupt operations in certain settings, particularly during quiet hours.

**Technical Challenges**:

1. Software and Hardware Issues: Occasional software glitches or hardware malfunctions can hinder performance and require troubleshooting.
2. Connectivity Reliance: Dependence on Wi-Fi or other network connections can lead to intermittent connectivity, impacting remote control and data transmission.

**Skill and Labor Requirements**:

1. Operator Training: While user-friendly, effective operation may necessitate initial training to maximize the benefits of advanced features.
2. Human Supervision: Despite automation, human supervision is often required address unexpected issues, complex cleaning tasks, and general oversight.

**Environmental Impact**:

1. Energy Consumption: Continuous operation can increase energy consumption, especially in large-scale projects.
2. Waste Generation: Replacement parts and batteries may contribute to electronic waste, requiring proper disposal.

By carefully considering these potential drawbacks, project managers can make informed decisions about the suitability of smart floor cleaners for specific applications and optimize their use to maximize benefits and minimize limitations.

### Components Used:

### Core Hardware Components

### Microcontrollers: These serve as the brain of the machine, processing data from sensors and controlling actuators.

### Sensors:

### LiDAR (Light Detection and Ranging)

### Ultrasonic Sensors

### Infrared Sensors

### Motors: Power the wheels, brushes, and other moving parts.

### Batteries: Provide power for operation.

### Cleaning Mechanisms: Brushes, mops, and vacuum systems for various cleaning tasks.

### Water Tanks: Store water for mopping and cleaning solutions.

### Pumps: Dispense water and cleaning solutions.

**Applications:**

1. Commercial and Industrial Facilities
2. Warehouses and Logistics Centers: Cleaning vast warehouse floors, removing debris, and maintaining a safe and efficient workspace.
3. Manufacturing Plants: Cleaning production floors, removing spills, and ensuring a hygienic environment.
4. Retail Stores and Shopping Malls: Cleaning large retail spaces, removing dirt and debris, and maintaining a pristine shopping experience.
5. Office Buildings and Corporate Headquarters: Cleaning office floors, removing dirt and grime, and contributing to a clean and professional work environment.

2. Healthcare Facilities

1. Hospitals and Clinics: Cleaning hospital floors, removing germs and bacteria, and maintaining high hygiene standards.
2. Nursing Homes and Assisted Living Facilities: Cleaning patient rooms and common areas, reducing the risk of infection and improving patient comfort.
3. Educational Institutions
4. Schools and Universities: Cleaning classrooms, hallways, and cafeterias, creating a clean and conducive learning environment.

# Figure:

# 