



Solar Powered Floor Cleaning Robot

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ABSTRACT –

Cleanliness plays a vital role in daily life. It is the process of keeping our surrounding dust-free, diseases free for social and intellectual health. With life getting busier; many of the urban families find it difficult to keep the house clean. Especially when families are becoming nuclear nowadays and both husband and wife go to work; Waiting for the maid to come early in the morning and getting satisfied unwillingly even if nothing has been properly cleaned is what we see many times in the modern families. Several cleaning solutions are available in recent years to keep your house free of dust. Machine-controlled floor cleaners were introduced for the sake of the betterment of mankind. The Vacuum cleaner is one of the best and valuable tools which in turn help homeowner to keep their floors clean so to support we have proposed a robotic automated floor cleaner. This system can be developed using an Adriano microcontroller and robotic machine is based on simple obstacle avoidance using Ultrasonic sensors. By utilizing local resources reducing power consumption they made it cost effective. Arduino is great where you want the things to respond via manual input and various sensor readings. In case where the owner loses a remote to operate the machine, wireless Bluetooth Application is connected to the Android Application to operate it manual.

I. INTRODUCTION

With life getting busier, many of the urban families find it difficult to keep the house clean. Especially when families are becoming nuclear nowadays and both husband and wife go to work; Waiting for the maid to come early in the morning and getting satisfied unwillingly even if nothing has been properly cleaned is what we see many times in the modern families. However, the robotics industry seems to have given such families a boon, the automated robot floor cleaner. They clean the house floor automatically and also get charged automatically while you are at work. Automatic floor cleaner is a system that enables cleaning of the floor by the help of highly stabilized and rapidly functionalized electronic and mechanical control system. Floor cleaning is achieved by different technique which might be of different kinds. Different types of floor need different type of treatment. The floor should be totally dry after the cleaning process. Otherwise it may result in hazard. On some floor's sawdust is used to absorb all kinds of liquids. This ensures that there will be no need of preventing them from spill of. Different types of floor cleaning machines are available today such as floor buffers, automatic floor scrubbers and extractors that can clean almost all types of hard floors or carpeted flooring surfaces in very less time than it would have taken using traditional cleaning methods. Again, the cleaning would be different for different floorings. Cleaning is the essential activity in our day to day routine to maintain hygiene. Basically, in household floors the floor has to be cleaned regularly. Different techniques are used to clean the different types of surfaces. Mostly we clean floors manually or we depend on maids. We as Indians always consider wet cleaning as a final step in cleaning process. Households of today are becoming smarter and 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. Several robotic vacuum cleaners are available in the market but only few ones implement wet cleaning of floors. Cleanliness plays a vital role in daily life. It is the process of keeping our surrounding dust-free, diseases free for social and intellectual health. Several cleaning solutions are available in recent years to keep your house free of dust. Machine-controlled floor cleaners were introduced for the sake of the betterment of mankind. The Vacuum cleaner is one of the best and valuable tools which in turn help homeowner to keep their floors clean.

II. MOTIVATION

To develop a machine those helps in easy and quick cleaning, and reduce human efforts. To save the time, minimize the cost. Solar based floor cleaning robots are environmentally friendly and it is used for various applications. To prevent injuries due to tripping or slipping on floors UV sanitization for destroying pathogens and other bacteria.

III. LITERATURE SURVEY

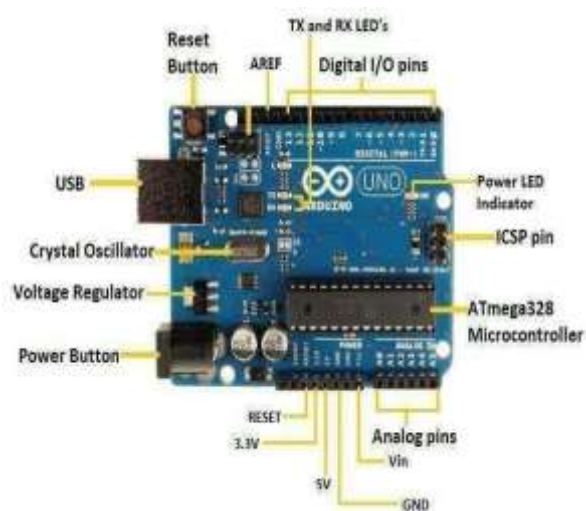
A robotic device created to automatically clean floors using solar energy is known as a solar-powered floor cleaning robot. These robots move and carry out cleaning activities thanks to the electricity generated by solar panels that transform sunshine into electricity. It combines solar power and robotics technology to effectively clean a variety of surfaces, including laminate, hardwood, tile, and carpet. They can be set to avoid obstructions and efficiently cover the full floor space or controlled remotely. The robot can recharge its batteries during the day when exposed to sunshine thanks to the solar panels built into its design. This renewable energy source eliminates the need for traditional power outlets or frequent battery replacements, making the robot more environmentally friendly and potentially cost effective in the long run. Moreover this solar powered floor cleaning robots has additional features such as mopping capabilities, UV sanitization, water sprinkler etc. It's important to note that while solar powered floor cleaning robots exist, the specific models and capabilities available on the market can vary. Solar floor cleaning robot is a Environmentally Friendly Solar energy is a clean and renewable power source. These robots contribute to a greener, more sustainable future by harnessing solar electricity, which also improves energy efficiency. Solar panels may collect solar energy and transform it into electrical power, giving the robot a constant and renewable power supply. As a result, there is no longer a requirement for periodic battery replacement or conventional electrical outlet charging. Saving money by utilizing solar energy, these robots can function without using the grid, potentially saving money on electricity costs. Solar-powered robots with more autonomy can function longer without human interference since they can recharge using solar energy. This enables them to cover bigger floor surfaces and complete their recurring cleaning duties with little supervision. Additionally, reliance on weather Robots that run on solar energy are very dependent on the weather. The robot's charge may be significantly impacted by prolonged rain or cloud cover, which will lower its cleaning capacity. The robot's performance may be variable in places with erratic or unpredictable sunshine. It also has a small battery capacity. Due to space limitations and financial considerations, battery storage capacity on solar-powered robots is often limited. The robot could not have enough energy stored to finish the cleaning duty if it takes a long time to operate or if it doesn't get enough sunshine exposure, necessitating human assistance or recharging from an external power source.

IV. IMPORTANCE

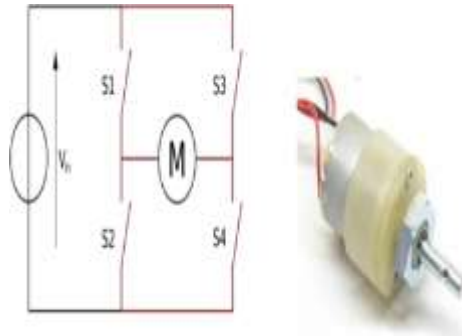
The usage of cleaning machines in hospitals, homes, auditoriums, stores, bus stops, and other public places is very beneficial for keeping the floors and outdoor ground clean. Interior and exterior cleaning are more crucial in today's society. The removal of waste is crucial for our health and requires less labor than other tasks. There are several floor cleaning machines on the market, but we created one that is incredibly straightforward to build and manage. As a result, it is highly helpful in hospitals and other vast spaces. Cleaning takes very little time and costs very little money. Maintenance expenses are lower. Machines of many kinds are frequently employed for this.

It is crucial in all hospitals, lodging facilities, bus stops, etc. In recent years, conventional floor cleaning machines have been employed extensively in airports, train stations, shopping centers, hospitals, and many other commercial locations since cleaning is a crucial component of sanitary conditions and legal requirements. The essential task that must be completed in order to maintain such locations is floor cleaning. In the aforementioned locations, standard floor cleaning equipment is available to complete floor cleaning tasks. Typically, a traditional floor cleaning machine needs electricity to operate. India experiences widespread power outages, particularly during the summer. Therefore, using traditional floor cleaning equipment without power is challenging. In order to provide a backup for traditional floor cleaning machines during a power outage, an attempt has been made to develop both automatic and manual floor cleaning machines. The development of both automatic and manually controlled floor cleaning has two main goals: first, to achieve simultaneous dry and wet cleaning in a single run; and second, to make the equipment affordable, practical, and simple to use.

V. COMPONENTS REQUIRED



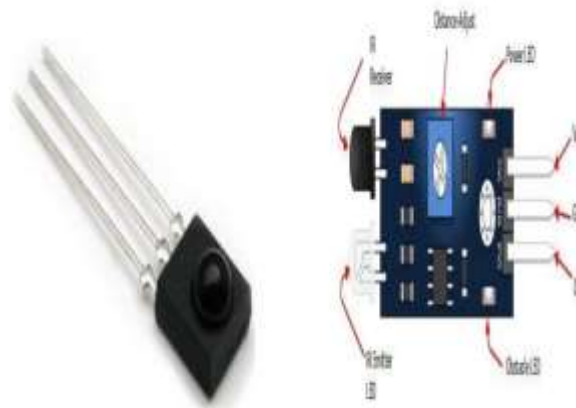
Arduino UNO



H-bridge



Battery



IR Sensor



Power Supply



Solar Panel



Bluetooth module



UV Led



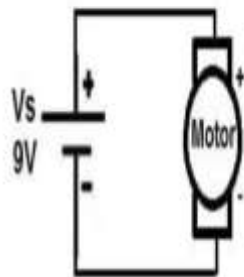
Ultrasonic sensor



Water Pump

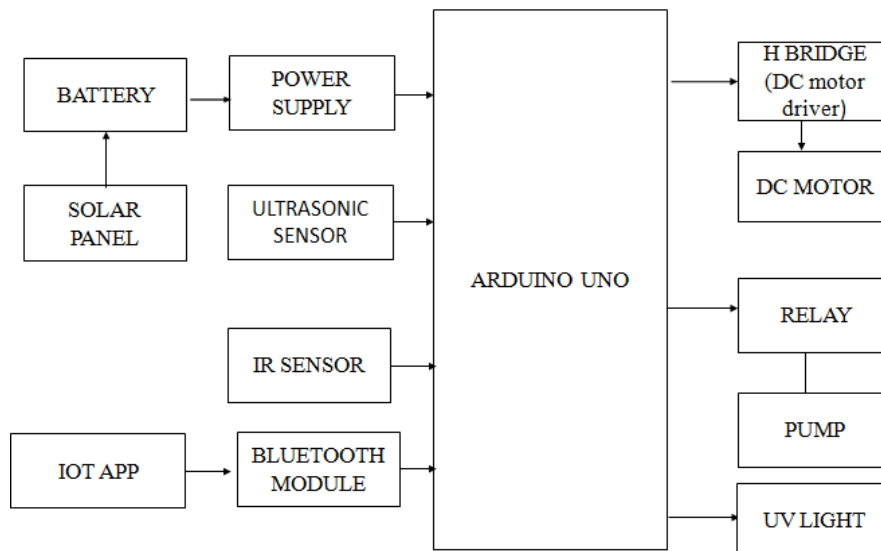


DC Motor

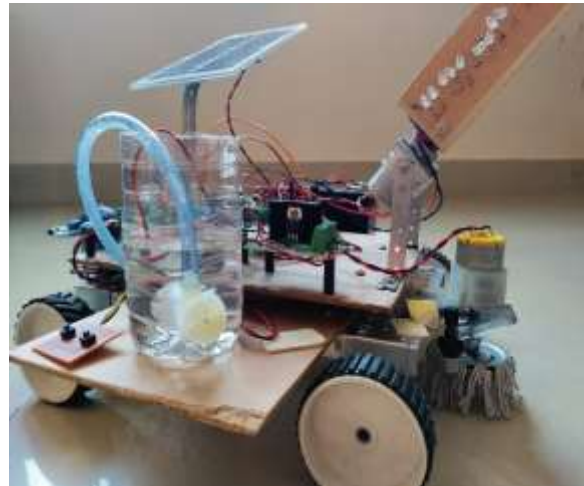


VI. WORKING

The Arduino UNO, H-bridge (DC motor driver), DC motor, Ultrasonic sensor, IR sensor, Relay, UVLED, vacuum, Battery, Solar panel, WIFI-module, Arduino suit, and Embedded-C are the components of the solar-powered floor cleaning robot. The battery that powers the robot supplies power to the components while being charged by a solar panel and the power supply. Power is delivered to the IR and ultrasonic sensors, which detect impediments and cause the robot to move in predetermined directions. If Hoover cleaning is available, we can clean the surrounds by sprinkling water and mopping. If a barrier is found, a detour is taken. Finding every single instance of a real-world thing, such as a human face, a flower, an automobile, etc., in photos or videos in real-time and with the highest degree of precision is called object detection. To detect pathogens, the robot is equipped with UV sanitization. Robot is controlled via a mobile phone application in manual mode so that the user can control the robot. Automatic mode: When in automatic mode, the robot handles every task on its own.



VII. HARDWARE CONNECTION



VIII. CONCLUSION

We unveiled a floor-cleaning device driven by solar energy. Covering the societal dimensions of cleanliness was one of the main goals of our project. A wide range of functions are provided by the numerous applications. Our solar-powered equipment made it possible to create an environmentally beneficial project. The utilization of cutting-edge technology in our project reduces the need for human labor and speeds up the cleaning process. Pathogens and other bacteria, viruses, and other microorganisms that are present in air and moisture can be effectively eliminated by adding UV sanitization. This and other little modifications to technical developments would increase societal pleasure

IX. FUTURE WORKS

If a high-wattage panel is utilized, the device can be used at night for room or yard lighting. because we have greater power to store. Therefore, this can be accomplished using the battery's power. We can utilize the pipe for gardening purposes, such as watering plants, by using one of the pipe's valves. We can move documents, books, and other items by attaching one box-type carrier to another

X. REFERENCES

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