

PORTABLE AND INTELLIGENCE ROAD CLEANING SYSTEM

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1. ABSTRACT

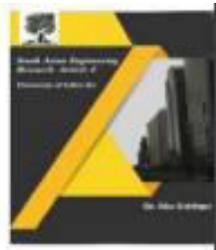
With the advancement of technology, Portable and Intelligence Road Cleaning System are getting more attention of researchers to make life of mankind comfortable. The concept is developing in economic countries but the reasons for non-popularity is the design complexity, cost of machines, and operational charges in terms of power tariff. In this project, a semi-automated road cleaning System is proposed. This is capable of cleaning roads effectively in dry as well as wet cleaning tasks. This System Prototype is designed by keeping the basic considerations for reduction in cost and efforts while being eco-friendly and easy to handle. The machine will work on Batteries using renewable energy and will consist of simple fabrication. This system is very useful to improve the life style of mankind. In this Portable & Intelligence Road Cleaning system, We are Going to use different apparatus to implement this project and they are detecting sensors, Air Compressor, detecting sensors, GSM Module, Arduino UNO, Motor Driver and DC motors and a Buzzer. It Will be designed completely in a portable system arrangement to which the sensors, Buzzer, GSM Module, Air compressor will be arranged to get the require benefits as an output for this system. Many advantages can be obtained, which will be more better than present road cleaning system which is too vast and bulk to maintain particularly without any imperfections.

Keywords: GSM module, Arduino UNO, Air compressor, Motor Driver, DC motors

2. INTRODUCTION

The Portable and Intelligence Road Cleaning System is a project with advanced technology which will embed in the road

system to clear the surface of the roads using smart technology to clear the dust particles and substances over it. It is automatically cleaning equipment which is



designed to detect and to clear the unwanted substances over the roads. We are going to use different techniques and materials to implement this project. It is Completely an automatic & portable mechanism. By implementing this project, we can reduce the vast manpower requirement and we can also see a better improvement in road maintenance at any location, as it was a portable system. There are many benefits, which will be better than present road cleaning system which is too vast and bulk to maintain particularly without any imperfections.

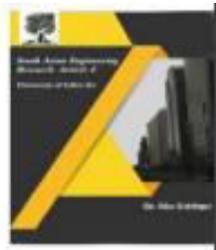
Fully automatic and Semi-Automatic machines available in the market are of high ranges and high weights. So, keeping the focus on weight as well as cost, they are not affordable to all such as organization committee of hotels, hospitals, hostels. Hence, there is need to design and develop a road cleaning machine which is multi use and cost effective. There is no machine in the markets which can be used on smooth as well as rough surface roads. Considering weight criteria, machine assembly, handling the machine is very flexible. This machine is affordable to all because of its uses and cost.

3. LITERATURE REVIEW

AKASH NAGTODE(2020)- “Solar operated floor cleaning machine[1]. He had made a project on cleaning system based on solar power. For this he has used Pv panel which convert particle of energy (photons) into electricity. He use this clean energy to power his cleaning machine.

M RANJIT KUMAR (2019)- “The regular floor cleaning machines is most generally utilized as a part of airplane terminal stages, railroad stages, healing centers, transport stands, and shopping centers and in numerous other business places. These gadgets require an electrical vitality for its activity and not easy to use. In India, particularly in summer, there is control emergency and the vast majority of the floor cleaning machine isn't utilized successfully because of this issue, especially in transport stands. In this work, demonstrating and investigation of the floor cleaning machine was finished utilizing appropriate financially accessible programming. From the limited component investigation, we watch that the feeling of anxiety in the physically worked floor cleaning machine is inside as far as possible.[2]

SANDEEP.J.MESHRA(2019)-



“Design and Development of Tricycle Operated Street Cleaning Machine.[3]” He has developed the street cleaning machine by tricycle operated. In this research article .He framed a model especially for rural area. He concluded that the cleaning is less effective in streets.

MANREET KAUR (2019) discovered the “Design and fabrication of floor cleaner robot (manual and automatic)[4] the author designed a robot to clean floor in both automatic mode as well as manual mode. His robot was equipped with sensors for obstacle detection, four motors and water pump .He concluded with convenience of dual mode operation of easy floor cleaning.

SAHIL BHARTI, S.R. SANDHAVE (2018)-“To develop an automated cleaning assistance”[5] This helps in cleaning flat surface with the ease of remote control with greater efficiency at work. The surface cleaning machine that is proposed in this project is the device that helps in cleaning of surface. There are many functions that have to co-ordinate for the motion control.

MANYAJAIN, PANKAJ SINGH RAWAT (2018)-“This project is used for domestic and industrial purpose to clean the surface automatically”[6]. When it is turned on, it

sucks in the dust by moving all around the surface (floor or any other area) as it passes over it. In the modern era, the automatic floor cleaner is required. Thus, the cleaner is designed in such a way that it is capable of cleaning the area reducing the human effort just by starting the cleaning unit.

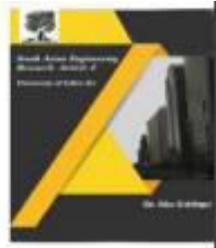
EXISTING METHODS

Human Power: Using Human Power, There is more physical pressure is required and it is a time consuming process which is not suitable for over populated areas. Despite advancements in street sweeping technology, the mechanical broom type street sweeper accounts for approximately 90 percent of all street sweepers used.

Sweeping Machines: Using this technology, we can clean the surface of the roads .But, it will cause the traffic disturbances and it will also need some human power to operate efficiently. street sweepers were just rotating disks covered with wire bristles. These rotating disks served as mechanical brooms that sweep the dirt on the streets.

PROPOSED METHOD

The Portable and Intelligence Road Cleaning System is a project which is designed to clean the surface of the roads using pressurized air to clear the dust particles and substances over it. As per our



project, The main objective is to maintain the roads in eco-friendly manner which is to be clean and hygiene. In This Portable and Intelligence Road Cleaning System , we are going to use different apparatus such as Air compressors, Arduino UNO, Servo motors, Gear Motors, Solar Panels, Ultrasonic Sensors are used.

This system was developed with a portable System which includes Robot uses a Renewable energy 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. Here, the Air compressor will suck the dust particles on the surface of roads, only after the detection of obstacles.

In the proposed system the sensor nodes are designed to collect the data of the objects information from the path the system is travelling and send that to the Cleaning node through Arduino board. Here the sensor node consists of the sensors like two ultrasonic sensors places in different positions and used for different purposes. The first ultrasonic sensor is placed in the front of the whole system to detect the obstacles to change the direction. It is

named as motion controlling sensor of our system. The other ultrasonic sensor is called as detecting sensor which is placed at the bottom side of vaccueme cleaner. The detecting sensor detects the objects that are not removable by our system the data is send to Cleaning node via Arduino.

In the proposed system the Cleaning node is designed to collect the dust/garbage and sends the message to our mobile through GSM module those are controlled by the information that is gathered from sensing node. Here cleaning node consists of Vaccumme cleaner for cleaning the surface of the road. It cleans the particles that are in the range of the vaccueme cleaner. If any obstacle in the path of system was detected then it changes its direction. If any particle that is not removable by our vaccueme was detected by detecting sensor and sends data to GSM module. GSM module sends a message to the user where the obstacle was not removable by our system through wireless.

Block Diagram

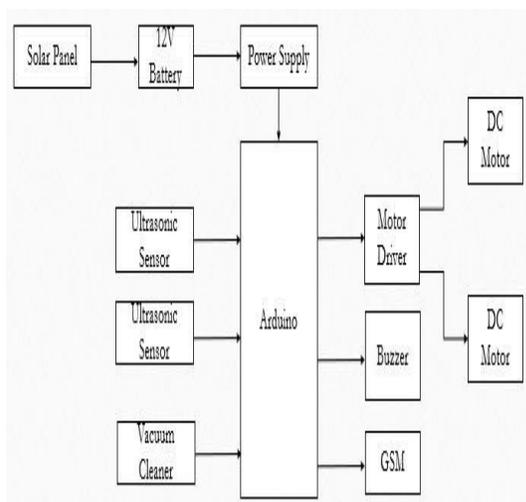


Fig. 5.1: Block Diagram of Proposed System

4. METHOD OR TECHNIQUES USED

Software:

Arduino IDE Software - Arduino UNO is an open-source microcontroller board that is based on the Microchip ATmega328P microcontroller and is developed by Arduino.cc. The Arduino board has different sets of digital and analog input/output pins that can be integrated to different expansion boards (shields) and other circuits.

Embedded C - The embedded system software is written to perform a specific function. It is typically written in a high level format and then compiled down to

provide code that can be lodged within a non-volatile memory within the hardware.

Hardware components:

Arduino UNO R3 Model, Motor Driver(L298D), GSM Module, Ultrasonic Sensor, Gear Motor, Vacuum device and Solar Panel & Batteries.

5. RESULTS

This system was a simple architectural design which was in-built with an Arduino and GSM module, solar panel, battery and buzzer. This Project enlightens about the advancement of the existing cleaning systems.



Fig. 7.1: Top Side View of Robot Fig. 7.2:

Bottom View of Robot

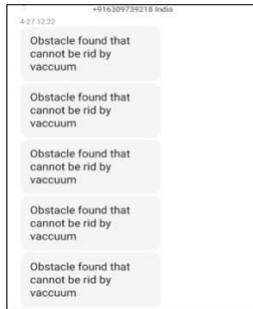


Fig. 7.3: Message to the User

If a Irremovable Object was detected by our system then a message is sent to the owner or any person whose phone number is provided in the GSM module as shown in the above results. As shown in the above results, a buzzer is on until the message is successfully sent to the corresponding person.

6. ADVANTAGES

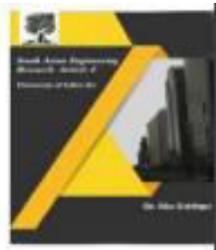
- This system can be implemented in different areas where it needs automation as it's main requirement.
- It can be used in the harmful hazardous areas for humans by replacing it with the portable and intelligence road cleaning system.
- It can improve the quality of cleaning system by providing great results within less time with better accuracy in its output.
- As it was a portable system, it can be

utilized in any areas with an ease in its adjustments. It will reduce the work completion time as it was an automated system.

- With the advancement in technology for cleaning system will provide a better improvement in our life style. This system is economical and cost-efficient with quality work.

7. APPLICATIONS

- This can be used in bot manufacturing industries to reduce the human interruptions to avoid accidents.
- This system is used in IoT based automatic home appliances to provide a hygiene and clear wandering area with automation.
- It can also be used in the areas where most of the humans are restricted to work with an access.
- This system can also be implemented in research centers and laboratories where harmful chemicals and delicate equipment's will be placed.
- It can also be implemented in some areas like libraries, restaurants, campus circumstances, malls and so on., to reduce the human requirement.



8. CONCLUSION

Portable and intelligence road cleaning system is an implementation of new equipment to achieve the best clean with hygiene to provide the desired better environment.

the main impact of this system was to make every individual prioritize cleaning as it has huge impact on every living organism's health. as there is dire need to implement automated cleaning system with less human intervention.

Automation plays the major role in our daily life. Since automation reduces the labor work, time and cost etc. Many automation processes in industry, hospitals and offices can be done with the help of robotics. Automating cleaning operation is one of the important processes which is needed to be concentrated. This project enlightens about the advancement in vacuum cleaners.

9. FUTURE SCOPE

The Portable and Intelligence Road Cleaning System is the subject of our discussion today that is focused on the technology impacting the cleaning sector. These revolutionary gadgets are costly, with the high accurate outputs. This system will achieve a great clean with the support

of the humans to evaluate the output. This multifunctionality gadgets will be available with their energy source capabilities.

The system of these future intelligent devices will be able to learn, think, and act with evolving management capabilities with monitoring the data and managing the process remotely. By introducing this system, the face of the cleaning system will be changed by enhancing the relevance of the services and further attracting developed functions. Accuracy will be strengthened; productivity and different types of safety standards will be raised. Portable and intelligence road cleaning system is an implementation of new equipment to achieve the best clean with hygiene to provide the desired better environment.

10. REFERENCES

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