



## AUTOMATIC FLOOR CLEANING ROBOT

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**Abstract— Automatic floor cleaner may be a compact robotics system which provides floor cleaning service in room and massive offices reducing human labor. Basically, as a robot it eliminates human error and supply cleaning activity with far more efficiency. This robot is controlled manually with the assistance of a mobile Bluetooth. This can be where the robot comes as a bonus. Also, the robot is little and compact in size. So, we are able to carry it and place it wherever we are able to on the house. Also, in industries the robot is incredibly cost effective as compared to labor involved. The Pliability, time saving and efficiency make the robot a clean choice for cleaning the ground.**

**Index Terms— Robotic system, mobile Bluetooth, controlled manually, compact, cost effective, flexibility.**

### I. INTRODUCTION

Within the present-day scenario all relations are busy with their work and don't seem to be getting proper time to scrub the house. The cleaning robot helps to wash and mop the floor. This is often done by simply pressing a switch and also the robot does the work. This also cuts down the labour utilized in factories for cleaning floor. This robot will be controlled manually with the assistance of a mobile Bluetooth. The event of the robot starts with the look of a straightforward and only chassis for the robot which may be an important part because it must carry all the burden on the robot.

The electronics part where, the sort of motor and its specification that ought to be want to run the bot, the sensors to be used, the microcontroller, the motor drivers, the wheels and other

electronic components to be used on the robot are decided. Further, the assembling of the components are done and at last testing and calibrating the device. A robot which is capable of efficient dust cleaning and moping of the ground of a given room is that the main aim of the robot. It's aimed to form the robot economic and feasible for the economic class society.

The target time of operation of the robot is one hour. The developed robot are going to be useful for the household application and industries. This helps to stay the workspace and house clean without the physical labour. Also, the device will clean the area with one switch of button.

### II. PROBLEM ANALYSIS

Unlike the prevailing robotic room cleaners we offer a multithreading model here. Multithreading is that the ability of a central processing unit (CPU) (or one core in a multi-core processor) to produce multiple threads of execution concurrently, supported by the software system. This approach differs from multiprocessing. In an exceedingly multithreaded application, the threads share the resources of a single or multiple cores, which include the computing units, the CPU caches, and also the translation lookaside buffer (TLB). We are able to create similar robots and multiple robots are controlled simultaneously, which reduces the time and increases the efficiency.

The robot is additionally collision free. It move autonomously with out collision with the assistance of sensors. The sensors detect the obstacles which comes across the trail.

### III. OBJECTIVE

The objective of this method is to present an

automatic room cleaning robot which is capable of efficient dust cleaning and mopping of the ground of a given room. It is aimed to form the robot economic and feasible for the economic class society.

The target time of operation of the robot is one hour. The developed robot are going to be useful for the household application and industries. This helps to stay the workspace and house clean without the physical labour. Also, the device will clean the area with one switch of button. Robot is an intelligent device having its own brain fed with computer logic in order that it can do the work in step with the algorithm designed. Autonomous movement of car is guided by the logic controller designed.

**IV. SCOPE OF WORK**

Now within the automatic floor cleaner market iRobot and Scooba are playing major roles. They hold around 80% of the market. Their costs are around 25000 to 35000. Also the algorithms employed by them don't seem to be best. They're using algorithms which approximately provides 70% accuracy. They are not using any image processing algorithms to run their robot. But the robot designed by us is cost efficient which is able to cost around 15000.

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We can connect up to 120 devices which makes the system for efficient and time saving.

Also we are able to use optical lens for little dust particle detection, so that it will give more efficient decision in governing the motion of the particle which ultimately save considerable amount of power and reduce the timing with better efficiency and sensitivity.

**V. ARCHITECTURE**

The sensors sense the signal and is fed to the microcontroller ATMEGA 8A. The Microcontroller is that the brain of robot where program is written and sensors are connected as input and actuators as output. The body of the robot has many small components. Like all robots it has sensors, microcontrollers and actuators and other components.

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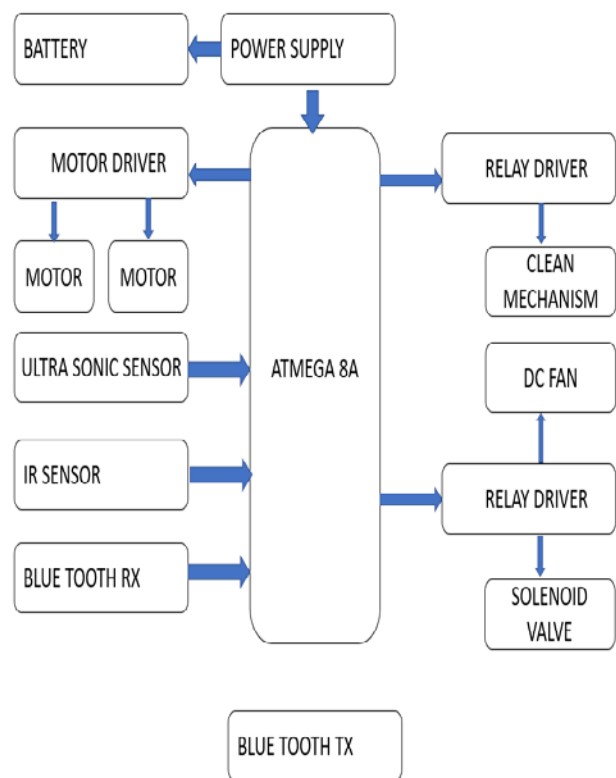


Fig: System architecture

**SENSORS :-**

A sensor could be a device that detects the change within the environment and responds to some output on the other system. A sensor converts a natural phenomenon into a measurable analog voltage (or sometimes a digital signal) converted into a human-readable display or transmitted for reading or further processing. An ultrasonic sensor is an instrument that measures the gap to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information

about an object's



Fig : sensor HC-SR04  
**MOTOR DRIVER:-**

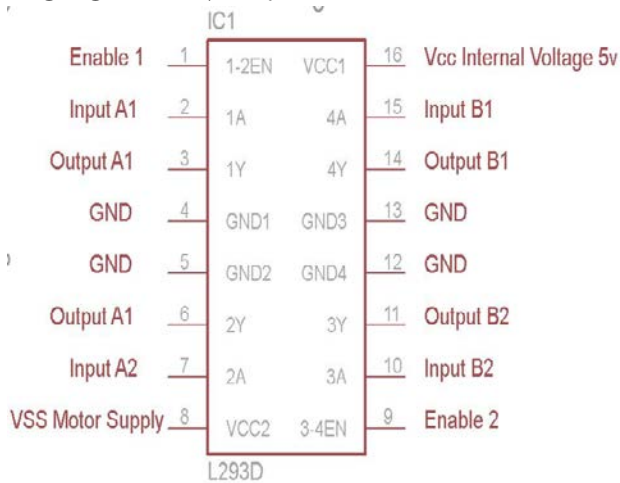


Fig : L293D pin configuration

The motor driver IC is a microcircuit chip used as a motor controlling device in autonomous robots and embedded circuits. We use these ICs in autonomous robots mainly to regulate them. Microprocessors care for on low-level voltage/current, unlike motors. During this case if we wish to provide the ability to the motor, we want a high voltage. But we all know that microprocessor output is low, and it cannot give enough power from its I/O pin to drive a motor. To produce this voltage/current from microprocessor to the motor, we'd like this Motor driver IC in between our motor and controller.

**RELAY DRIVER:-**

A relay, as we all know is a mechanical device which is employed within the variety of a switch. It's a sort of mechanical Switch which is pulled by a electro-magnet so its resistance is extremely low and thus it can control large power appliances. An electronic circuit will normally need a relay stage so as to converter it's low power DC switching output into a high power mains AC switching output.

**BLUETOOTH TRANSMITTER AND RECEIVER :-**

Ultrasonic range finder may be a circuit for measuring distance by the assistance of ultrasonic sound. First the ultrasonic burst is transmitted from the transmitter so receiver receives the ultrasonic burst.

**DC MOTOR :-**

A DC motor is any of a category of electrical machines that converts electricity wattage into mechanical power. Two 30 rpm DC motor is connected within the middle of the robot with the scrubber. 4 DC motors of 10 rpm are connected to the wheels

**SOLENOID VALVE :-**

A solenoid valve is an electromechanically-operated valve. Solenoid valves differ within the characteristics of the electrical current they use, the strength of the field of force they generate, the mechanism they use to manage the fluid, and therefore the type and characteristics of fluid they control. The mechanism varies from linear action, plunger-type actuators to pivoted-armature actuators and rocker actuators. Solenoid valves are the foremost frequently used control elements in fluidics. Their tasks are to shut off, release, dose, distribute or mix fluids.

**DC FAN :-**

DC fan is employed for removing moisture content.

**HARDWARE IMPLEMENTATION**

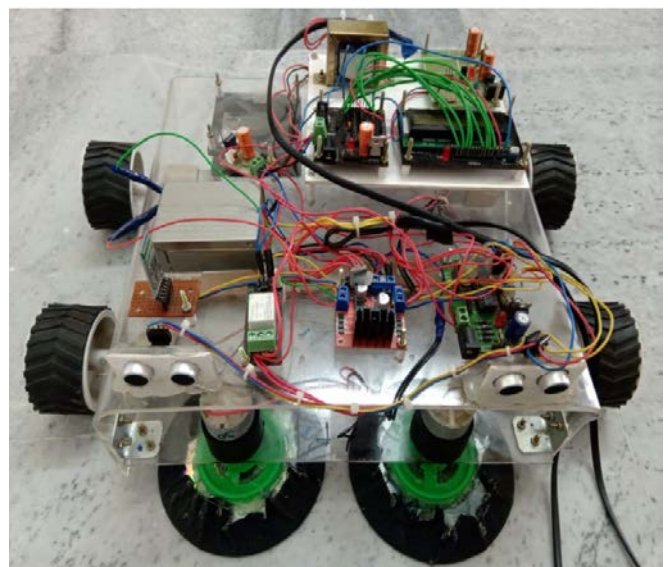


Fig : Hardware image

## VI. RELATED WORKS

The research paper details the development of Automatic Floor Cleaner. The project is used for domestic and industrial purpose to clean the surface automatically. 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. The controller is used to drive the motors and the suction unit also a couple of sensors are used to avoid the obstacles. This can be useful in improving the lifestyle of mankind.

In the paper, main focus is to build and program it in such a way, that it can move around freely and clean a specific area by the vacuuming process. Brushes are attached at its side in order to collect the dust while moving. It uses Ultrasonic sensors to detect the obstacles and hence change its direction while moving and also preventing the cleaner to fall from height.

Microcontroller (ATmega 328p) is used which is provided with clock signal (quartz crystal operating at 16 MHz frequency). DC motors attached to motor drivers to provide high current and most importantly it is installed with a sensors and suction unit to perform vacuum operation effectively. For Power Supply two separate batteries are used. One is used to turn on the cleaning unit and other is used to provide power to the suction unit

## VII. CONCLUSION

The Product developed is certainly a awfully important product in robotics and floor cleaning area .The robots developed uses 2 air pumps which ultimately provides plenty of vibration and power loss within the system. Also the algorithm implemented is'nt very effective. So there is definitely current scope for improvement and optimization till the foremost effective product is being developed. After optimizing the algorithm and taking it to the heuristic based search like bee algorithm it will be an excellent product and may revolutionize this industry. Definitely it has very huge potential. Also we will use 1 air pump instead two so it will be cost effective and really energy saving product with less vibration and far control over the robot. The robot having 33\*30\*8 cm in dimension is very compact in nature and may go beneath any furniture and bed. This is often very handy in portability. The scrubber of the robot now

consists of small plastic fibers .But it may be further improved so that the area of the scrubber will come 90% involved with the ground.

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