Problem statement

To make a remote controlled provac device that will do wet as well as dry cleaning on soft as well as hard surfaces. And be able to control the provac using Bluetooth technology.

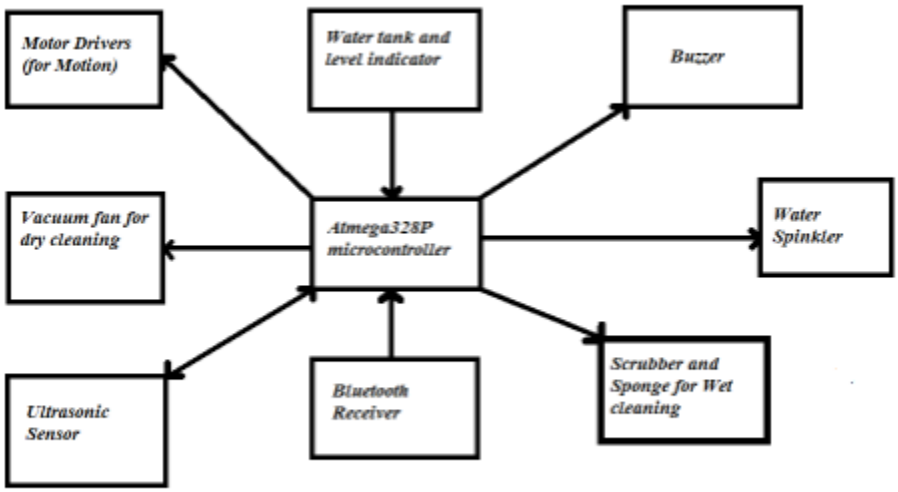
Motivation

The motivation behind the project was to reduce the manual work . Variousproducts available in market are either fully automatic or are designed in such a way that they need manual help. We also observed that these products are very big, bulky and hard to manage so we came up with the idea of bluetooth controlled mop whose size will not be that big and bulky and comparatively easy to manage. We wanted the project to have both manual and automatic mode. One of the prime motivating factor was to

reduce cost as existing devices in market are heavily priced.Most of the robotic vacuum cleaners are imported from other countries likethe United States. The cost of this products are very high because of the import duty charges. There are very less manufacturers of such automated vacuum cleaners in India. This is one of the factor which motivated us to work for making such a device which can be in the reach of common Indian citizen as well.

Also the clean India movement launched by honorable prime minister Shri Narendra Modi with the motto “one step towards cleanliness” has been a constant source of inspiration throughout the work.

Functional Block Diagram of model



- The Atmega328P is the main controlling block. It Receives commands from the bluetooth receiver connected to it which can be sent from any bluetooth enabled device i.e a laptop or smartphone.
- The Microcontroller addresses the provac to move by using the motors used for motion. These motors can‟t be directly run through the microcontroller and are run through the motor drivers. This movement are obtained from the commands by the bluetooth receiver.
- A high R.P.M motor is used as a vacuum fan for dry cleaning which collects the dust and can be disposed once the container is full.
  Water level tank is placed on the provac for wet cleaning. It has a water level detector which detects whenever water in the tank is less .
- When the water level in the tank is less the microcontroller turns the buzzer on which indicates the user that the tank is empty and has to be filled.8

- The water sprinkler pump sucks water from the tank and drops to the scrubber.
- The scrubber motor turns on once it receives command from bluetooth via the microcontroller.
- All the motors mentioned above are connected to microcontroller by current driver circuits. The current driver circuit provides the motors current which is required to drive them.
- The ultrasonic sensor is the device which provides the provac with some decision making skills. It works on the principles of acoustics in the same ways as bats use to find their prey.
- When the ultrasonic receiver receives a pulse from the microcontroller it

generates a ultrasonic wave. When this waves travels and strikes any object it gets reflected back.

- This reflected wave is sensed and the time interval between the sending of wave and its detection as a reflected wave is measured by microcontroller.
- As the speed of sound in air is known to be 330 m/s ,we can find the distance the obstacle is present from the provac.i.e Distance=(Speed * Time) / 2
- This parameter is used for making the provac automatic.
- The microcontroller is powered from a 5 volts supply which is derived from a 12 volts battery using voltage regulator.
- The 12 volts high current battery is required to provide required current to all the motors in the device.

Result:

The design of Bluetooth controlled pro-cleano was successfully designed. The Ergonomics and cost analysis was also done. Field testing was also done. The prototype has the potential of being a successful product in the market if one day launched.

Future Scope:

- Hot water and soap cleaning can be enabled.
- Floor sensor for uneven floors.
- Artificial intelligence can be incorporated to remove manual control completely.
- The design can be used in combination with existing manual vacuum cleaners With slight modifications.
- Image processing techniques can be used to provide artificial intelligence.