

Innovation

Water Filter:

Reengineered an economical, sustainable, non-electric water filter using Solidworks (CAD software) and installed it in houses of underprivileged through 'Adopt a Filter Campaign.'

Used Ultrafiltration (UF) membrane, instead of sediment filter. The UF membrane is smaller in size and less expensive.

Unlike reverse osmosis, UF retains minerals in the water while filtering out the bacteria, viruses, and parasites such as E. Coli. Furthermore, it is an excellent separation technology for desalination and production of potable water. It can also act as an effective means of reducing the silt density index of water and removing particulates that can foul reverse osmosis membranes.

Additionally, removed TDS controller which is present in most of today's water filters. This can be done by modifying the pore size of UF filter to 0.1 micron which is ideal to filter water with low TDS – a common characteristic of municipality's water.

Removal of these parts drastically reduced the manufacturing and working costs of the filter. The shrinking of tank storing purified water also helped us reduce cost and plastic footprint in the filter.

The filter only consists of basic parts such as UF Membrane for filtration and a small storage tank; no electricity is needed for the filter's functioning as pressure difference required by the UF membrane is created by gravity.



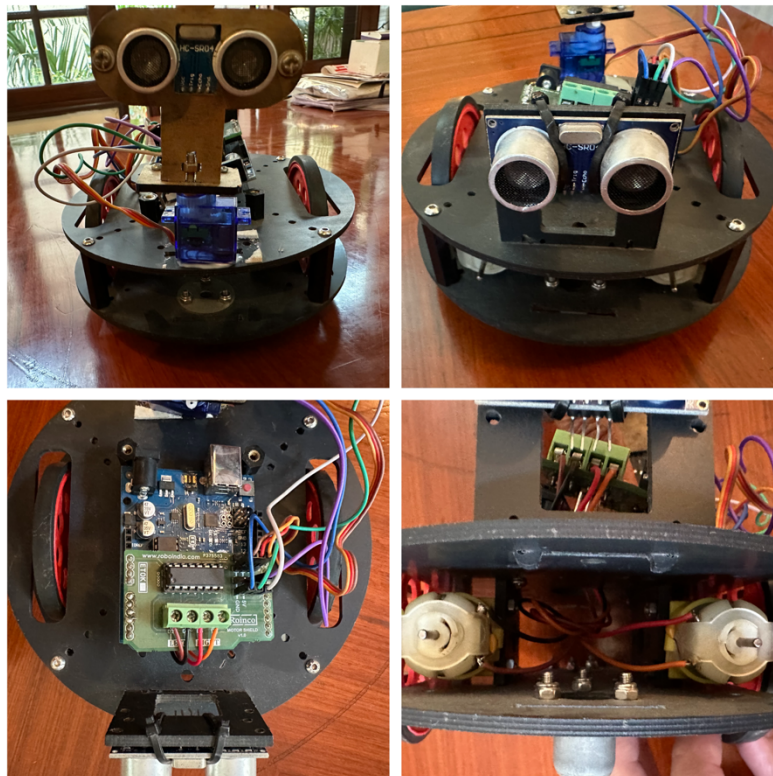
Line Following Robot:

I created a robot using Arduino Uno microprocessor. The main aim of the robot was to follow a path and avoid any obstacles in its path.

This function was achieved using two ultrasonic sensors (placed on the front and back of the robot). These sensors were connected to a motor shield connected to the Arduino Uno. The motor shield gives additional flexibility and ease to control all motors.

Whenever the sensor sensed any object less than 25 cm from it, the robot stopped; the sensor rotated on the servo motor it was connected to. If the path was clear, the robot turned in that direction to continue moving. The rear ultrasonic sensor ensured that the robot did not hit anything behind it.

The robot moved when Arduino sent a signal to the two motors connected on either wheel of the bot.



Multipurpose Liquid Dispenser:

I engineered a multipurpose liquid dispenser, wherein any liquid filled in the bottle will be dispensed by the system after the switch is turned on.

CIRCUIT

Used a 12V DC Mini Pump connected to a 9V battery and a switch using connecting wires.

MECHANICS

I took a plastic bottle and pierced two holes on its cap. Two pipes were put through these holes. One pipe fully submerged into the bottle whereas the other only a few centimetres in. The free end outside the bottle of the shorter pipe was connected to the motor.

WORKING

When the switch is turned on, the motor starts to suck the air creating a pressure difference inside and outside the bottle. This pressure difference causes the liquid in the bottle to rise up through the long tube and come out from the other end.

