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Robot Hoover (Roomba Clone)

Introduction

Roomba hoovers are becoming more and more popular due to their modern design and efficiency. I aimed to create a Roomba clone that in addition to the usual vacuum cleaner tasks would also perform air quality monitoring and air purifying during downtime.

The robotic hoover was designed to:
- navigate through obstacles
- analyse dust particles assessing dust composition and quantity over time
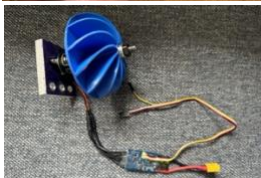- filtering dust particles and allergens

Design
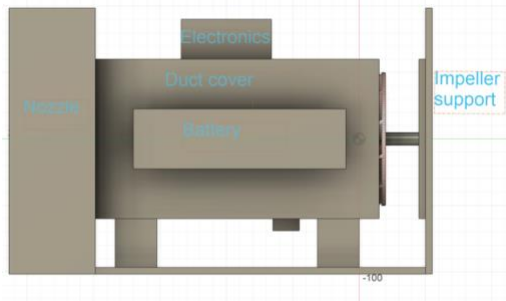
Roomba clone: Fusion design.

3D printed custom-made Duct design.

3D printed impeller connected to ESC.

Hardware

- Arduino Uno R3 microcontroller
- L293D motor driver
- XT60 connectors on heavy gauge wires
- Lithium Polymer battery 12V
- Ultrasonic sensors HC- SR04
- PMS 5003 sensor (PM 2.5 sensor)
- Infrared obstacle avoidance sensors (IR modules)
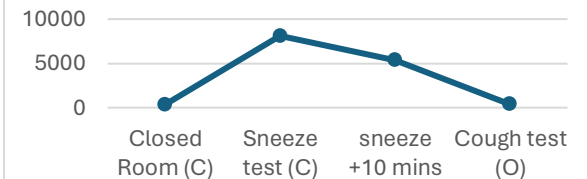- Brushless DC (BLDC) motor with an Electronic Speed Controller (ESC) for the impeller

Software
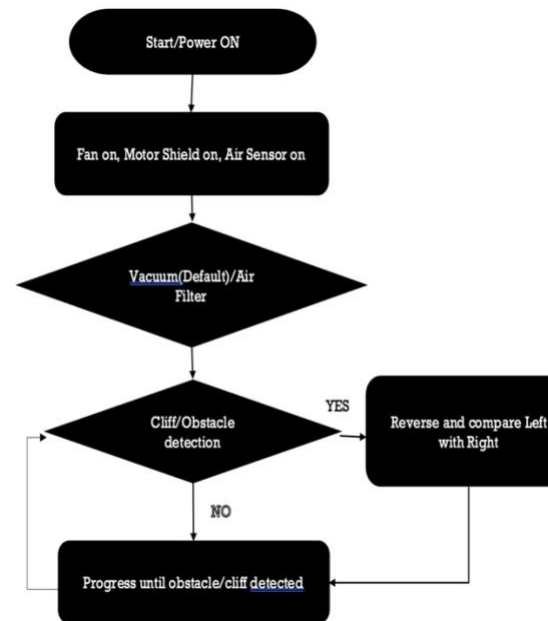
Testing and results

Air Quality Monitoring
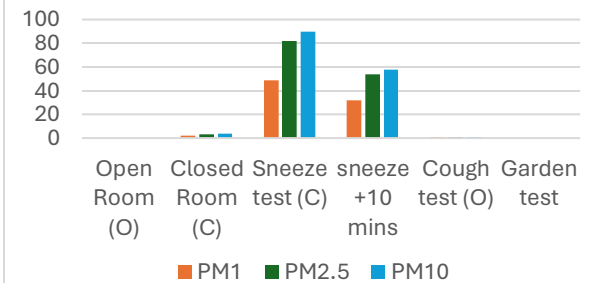
Particles > 0.3 um/0.1L air

Press release

Roomba hoovers are increasingly used in households and offices for their convenience, efficiency, and low maintenance. This Roomba clone not only performs standard vacuum cleaner tasks, but it also monitors air quality and purifies the air during the robot's downtime. Its modern design, technical specifications and efficiency make it an essential gadget in homes and offices.