

## Team Project Proposal: **Automated Vacuum Cleaner**

As a student in EPFL, I always find myself overwhelmed with work and I end up neglecting my room. Seeing my messiness everyday motivated me to find the best solution at a minimal cost. And what's better than an automated vacuum cleaner that will do the cleaning for me when I'm studying. The project I'm presenting you today will be a gain of time for every student and every overbooked person.

The Arduino based vacuum cleaner will be a cleaning device in a circular shape that autonomously cleans floors, navigating around obstacles using various sensors such as infrared, ultrasonic, and bump sensors. The vacuum cleaner will be built with an Arduino UNO microcontroller, with basic motors and 3D-printed parts, all controlled by open-source code. Additionally, it can include a smartphone app or web interface for remote operation, providing an engaging user experience. We can find ourselves with some risks related to sensor and motor integration. Nevertheless, with good planning and a lot of testing we will overcome these challenges.

Here are some examples that are similar to my idea:

<https://circuitdigest.com/microcontroller-projects/diy-arduino-based-smart-vacuum-cleaning-robot>

<https://circuitdigest.com/microcontroller-projects/build-your-own-arduino-based-smart-vacuum-cleaning-robot-for-automatic-floor-cleaning>

This similar project aims to create a cost-effective and simple Arduino-based floor cleaning robot. The robot will be compact and feature ultrasonic sensors for obstacle detection and an IR proximity sensor to prevent falls from stairs.

To build this robot, they use an Arduino Pro Mini, three HC-SR04 ultrasonic modules, a motor driver, N20 motors, wheels, a lithium-ion battery, and an IR module. The ultrasonic sensors will help the robot navigate obstacles, while the IR sensor will detect staircases to prevent falls.

The circuit will connect these components to the Arduino, using a voltage regulator for compatibility. The robot's housing, made from durable MDF in a round design, enhances its aesthetic appeal.

The code will read sensor data and control motor movements accordingly.

As presented earlier, the project aims to develop an automated vacuum cleaner tailored for busy students and homeowners, allowing for autonomous operation while effectively navigating obstacles. Moreover, students and professors will appreciate the ability to modify and enhance the vacuum by integrating new sensors or improving its code. This initiative not only provides a learning experience for IC students but also serves as a showcase for EPFL's IC public relations, potentially attracting new students.

Looking ahead, the project has some potential for expansion beyond the initial vacuum cleaner. Future CS-358 students could enhance its capabilities by adding voice command functionality or some machine learning. A preliminary cost estimate suggests that the project can remain budget-friendly, with a total projected cost of CHF 250, ensuring accessibility.