GROUP6
FINAL PRESENTATION

Mechatronics and System Design-
Mechatronics IV

TEAM MEMBERS

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OUTLINE

OUR DESIGN

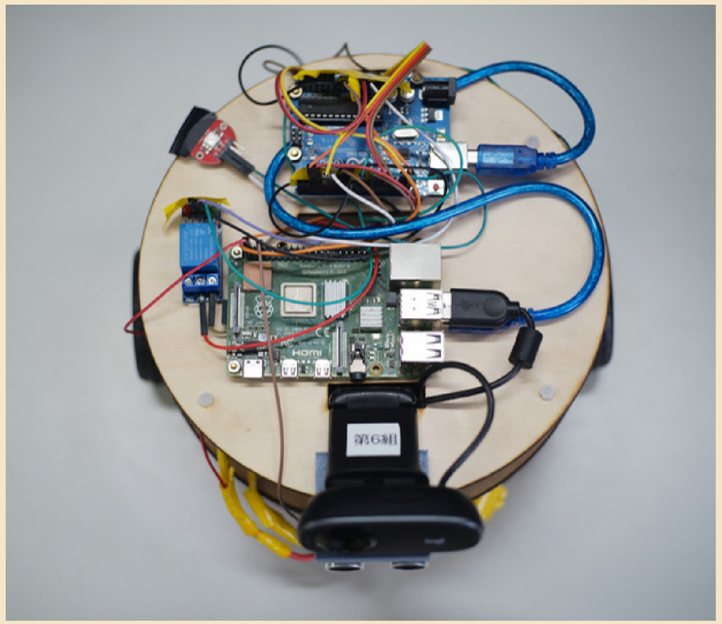
- Mechanical Design
- Hardware and Circuits
- Software Design

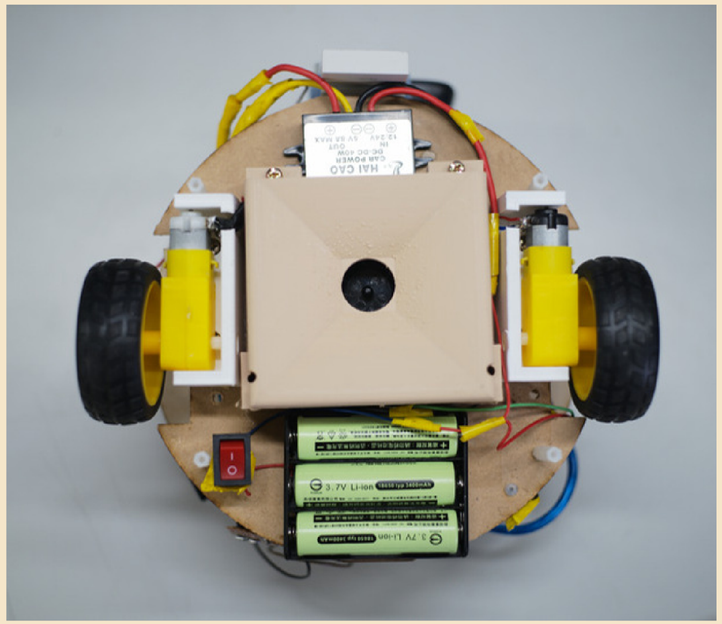
DISCUSSONS

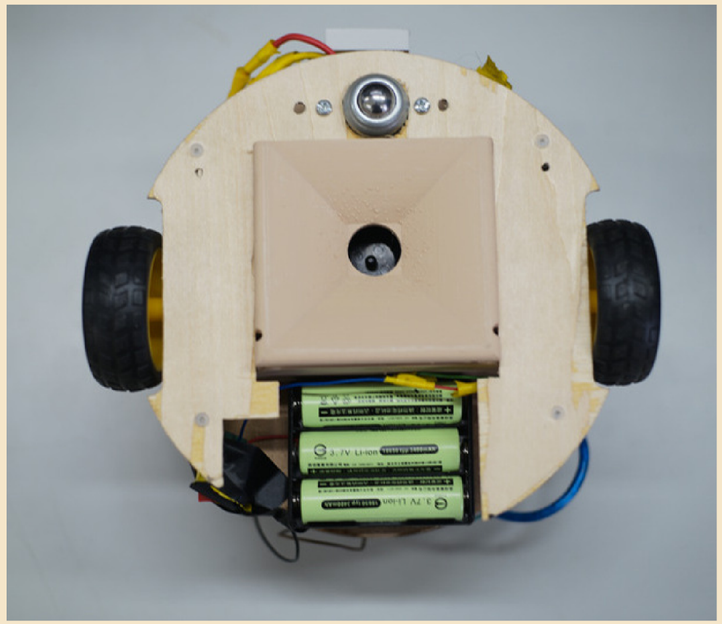
- Challenge
- Test Reviews
- Lessons learned

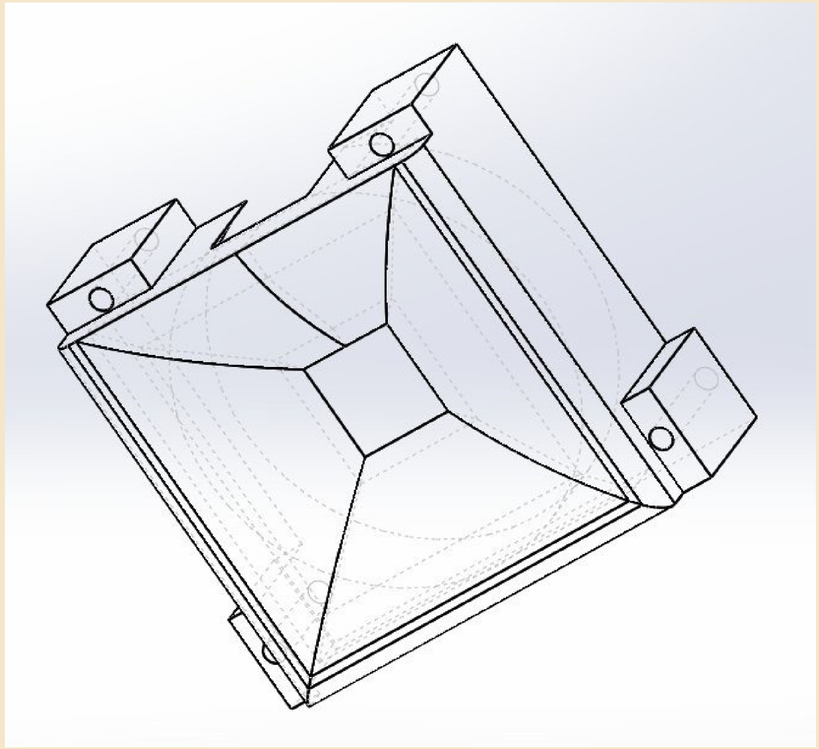
MECHANICAL DESIGN

OVERVIEW



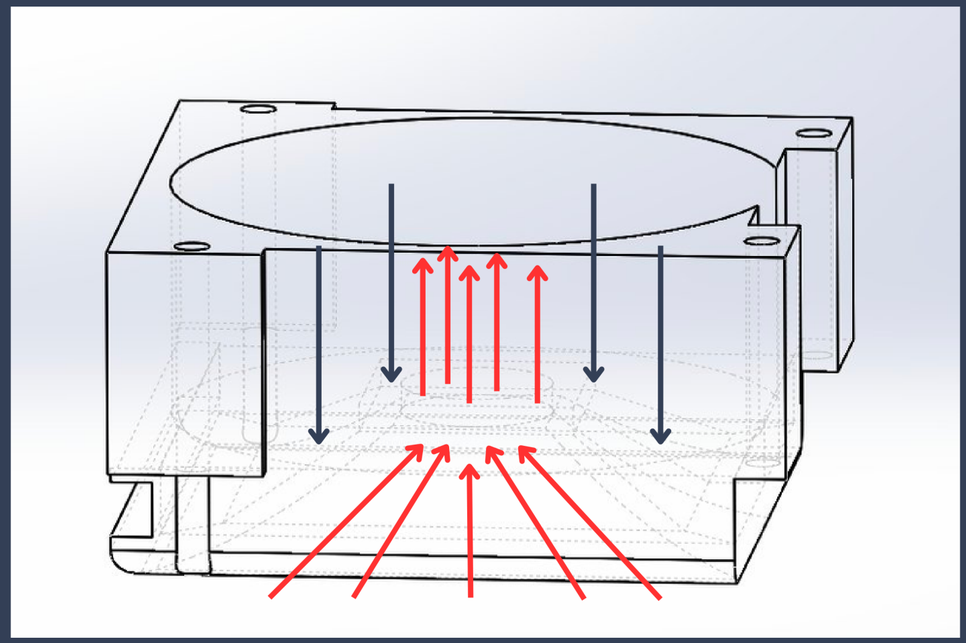




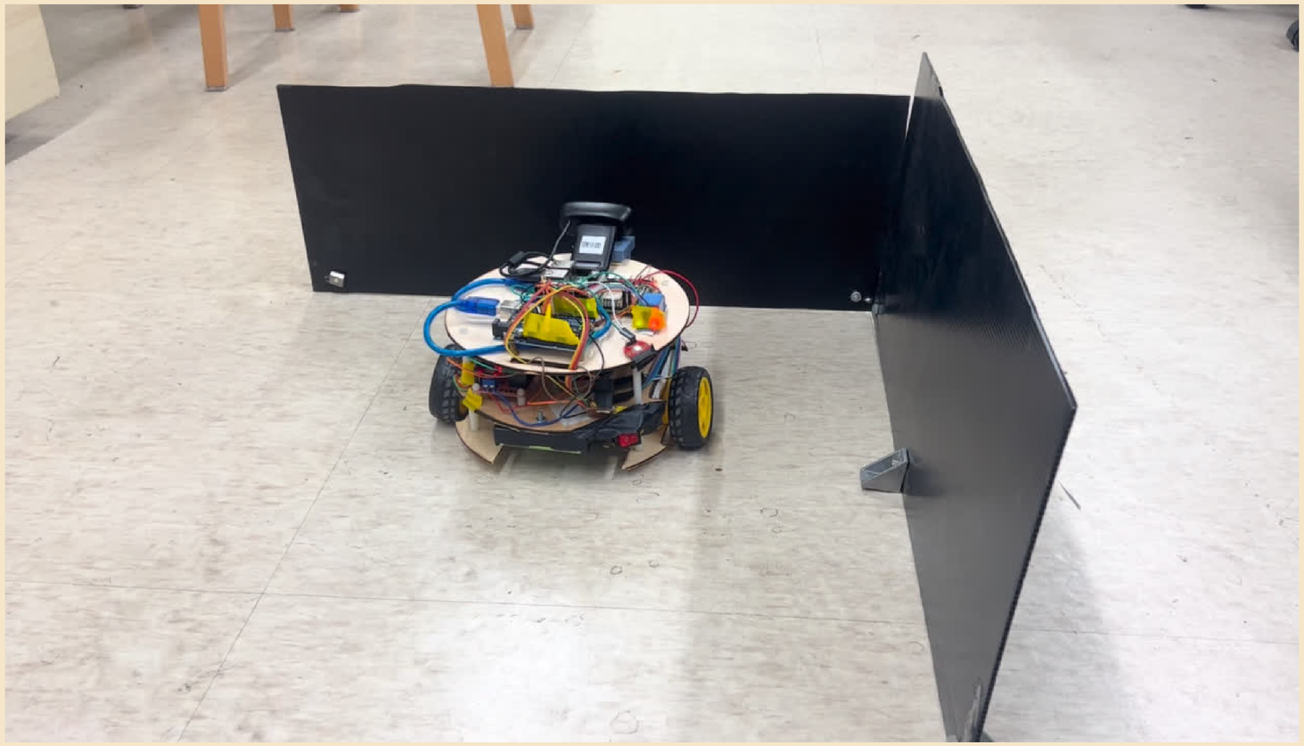


VACUUM DESIGN

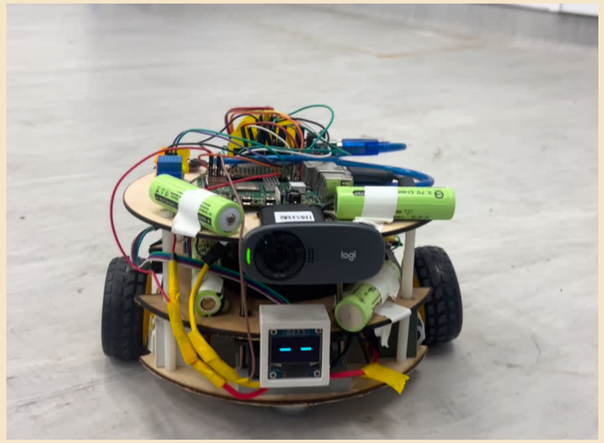
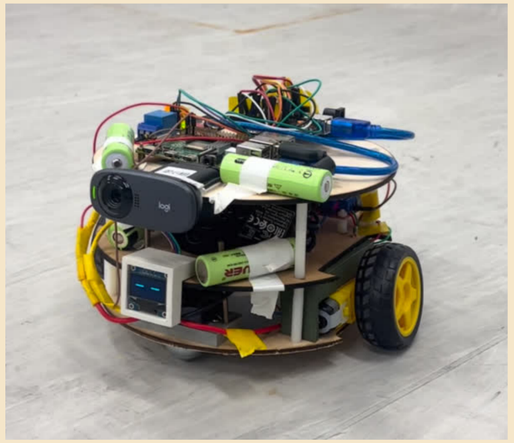
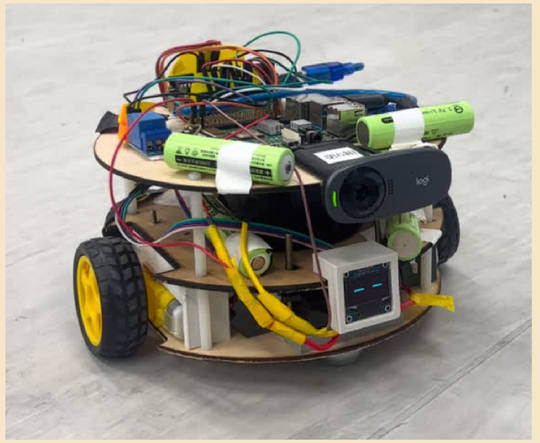
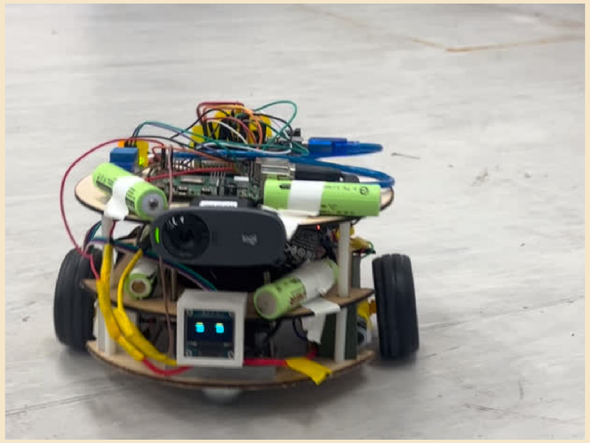
- Nozzle Design
- Suction Power
- Dustbin Design



CORNER DETECTION & CLEANING

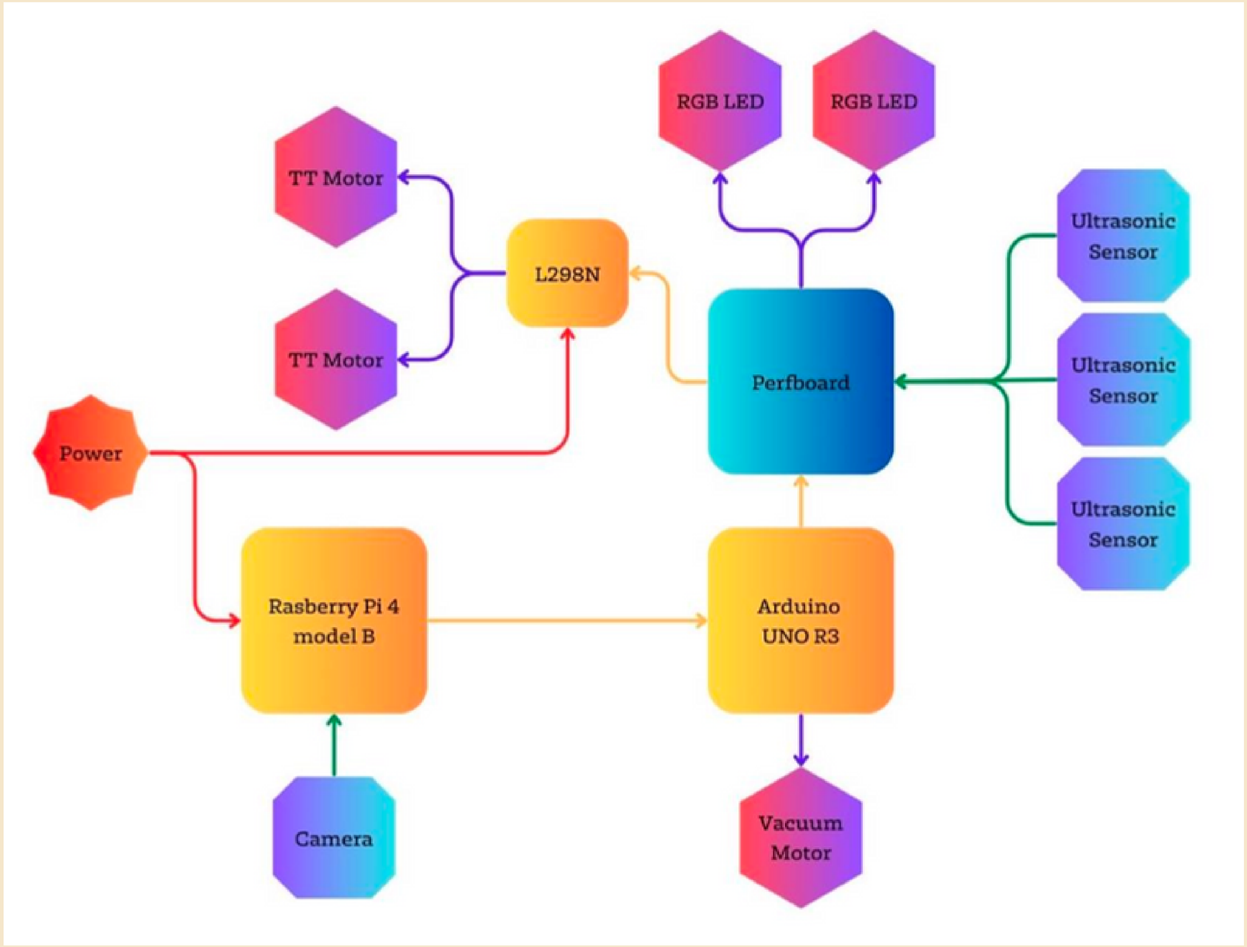


ROBOTIC EYES

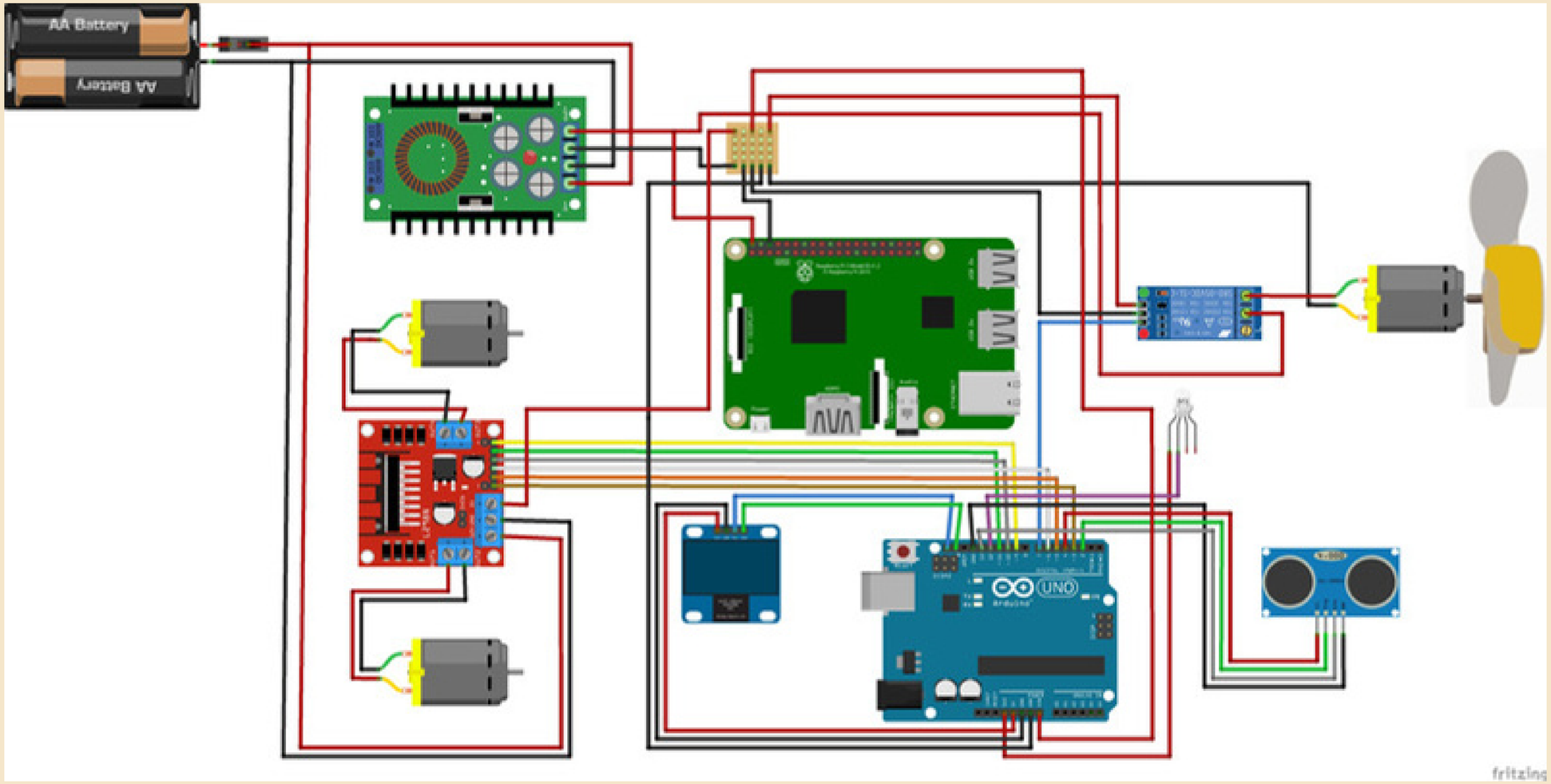





HARDWARE AND CIRCUITS

MIDTERM

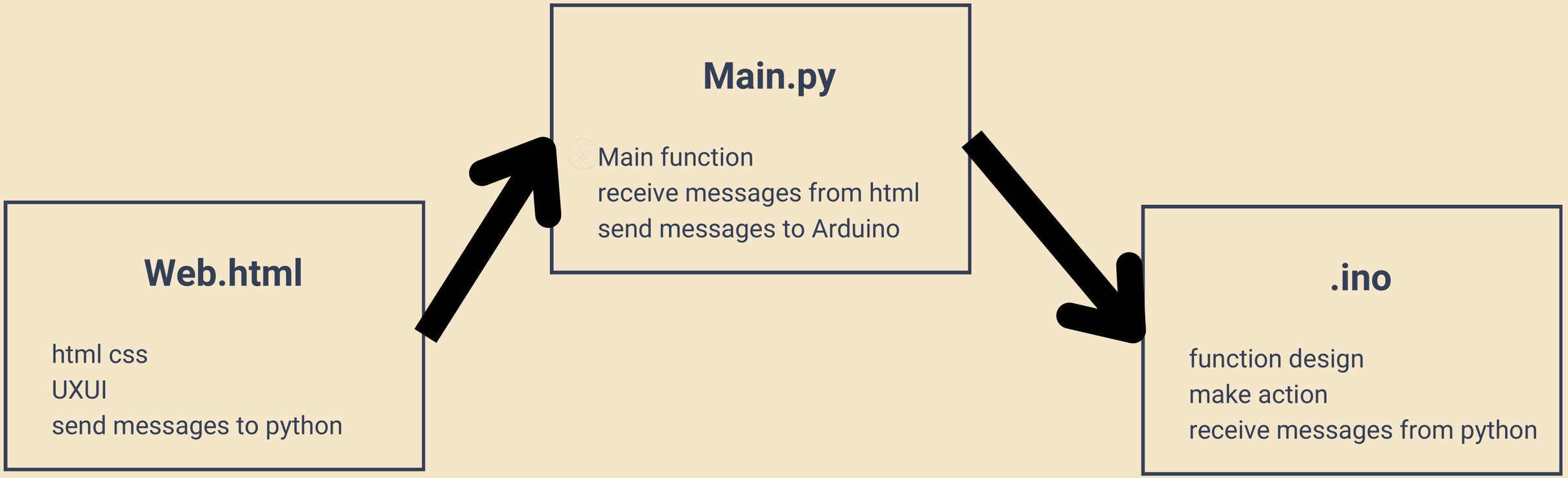

RGB LED
RGB LED
TT Motor
TT Motor
L298N
Perfboard
Ultrasonic Sensor
Ultrasonic Sensor
Ultrasonic Sensor
Power
Rasberry Pi 4 model B
Arduino UNO R3
Camera
Vacuum Motor

FINAL



SOFTWARE DESIGN

SOFTWARE DESIGN



UXUI DEMO

DISCUSSION

OUR CHALLENGES

- Mechanical Design

PROBLEM

- Our vacuum was designed to be placed under the body of the vehicle, close to the ground.
- The wheels often become **splayed outward** after running for a while, which caused our vehicle to get stuck during the journey.

SOLUTIONS

- Adjusted vehicle’s height by adding a layer.
- Made precise adjustments of the omni-wheel.
- Redesigned the shape of the vacuum nozzle.
- Designed and installed a bracket for motors.

OUR CHALLENGES

- Software System

PROBLEM

- **Delay** when using UI buttons during the Mid-term Test, leading to **multiple presses**.
- Excessive turning angles for left and right movements, making it difficult to accurately reach the targets.

SOLUTIONS

- Introduced a **buffer** in the main program to alleviate the delay issue.
- Adjusted controls for forward, backward, left, and right movements.

TEST REVIEW

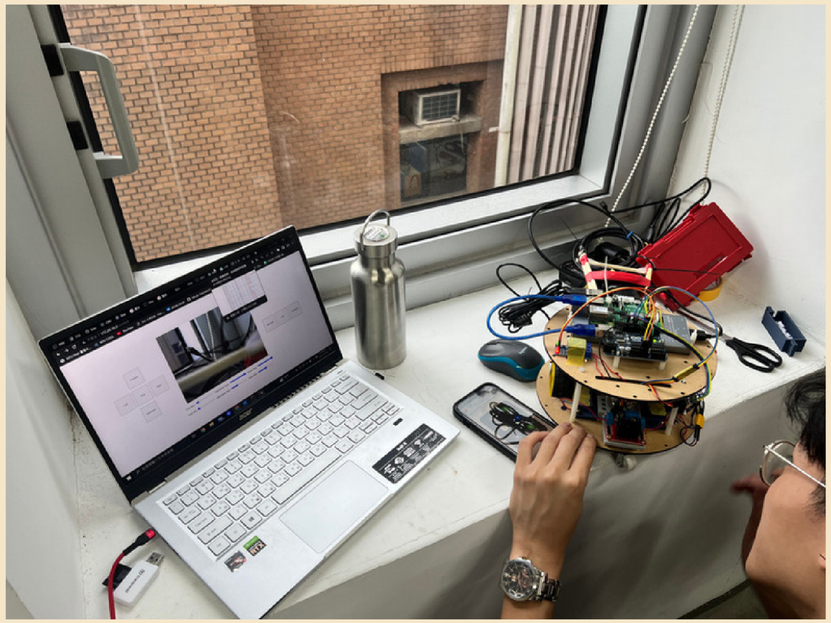
- Our Strategies

PROBLEM

- **Insufficient testing** before the mid-term.
- **Couldn't view the floor**, preventing us from determining whether we had aligned with the target.
- Wasted time wandering.

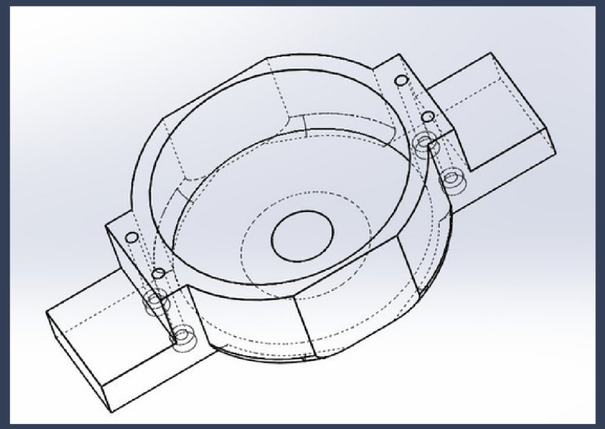
SOLUTIONS

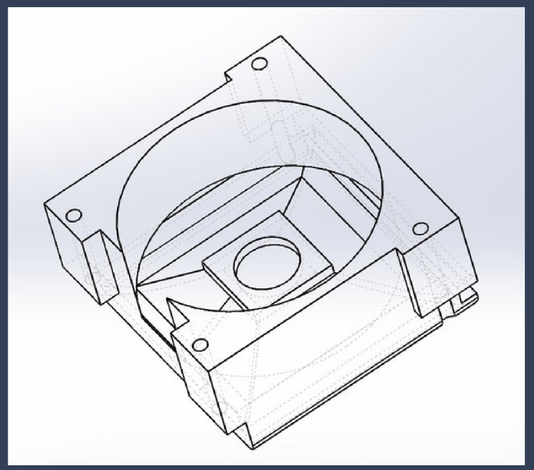
- Conducted **more practice sessions** for both manual and screen control.
- Introduced **corner detection** and **‘storm’ mode** to efficiently complete the task.
- Saved over half of the time during the final test.



LESSONS LEARNED

‘ITERATIONS’





CONCLUSION

In this project, we achieve:

- Space-optimized Mechanical Design
- Innovative Vacuum Design
- Corner Detection and Cleaning
- Efficient Hardware and Circuit Design
- User-friendly Robot Control System
- Lessons Learned during Development and Collaborative Experience

THANKS FOR LISTENING :)