2023 Fall

Mechatronics and System Design-Mechatronics IV

Final Project Proposal

Group VI: ChDennnng Design®

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Outline

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2. Mechanical Design
3. Electrical Design
4. User Interface

II. Materials

1. Material List
2. Manufactural Methods

III. Project Plans

1. Gantt Chart
2. Roles and Responsibilities

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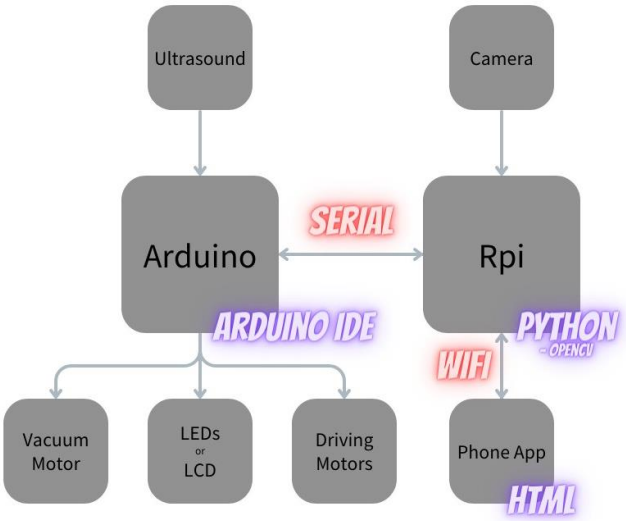
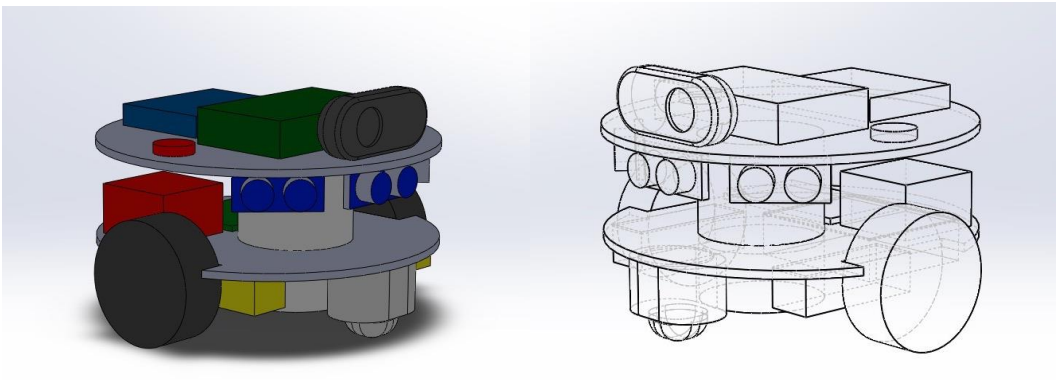
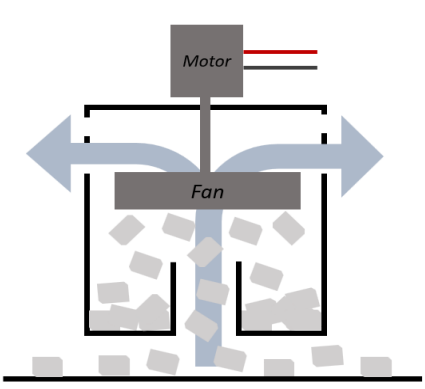
I. System Design

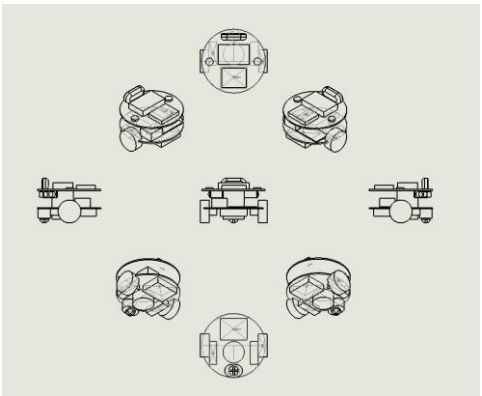
1. System Diagram



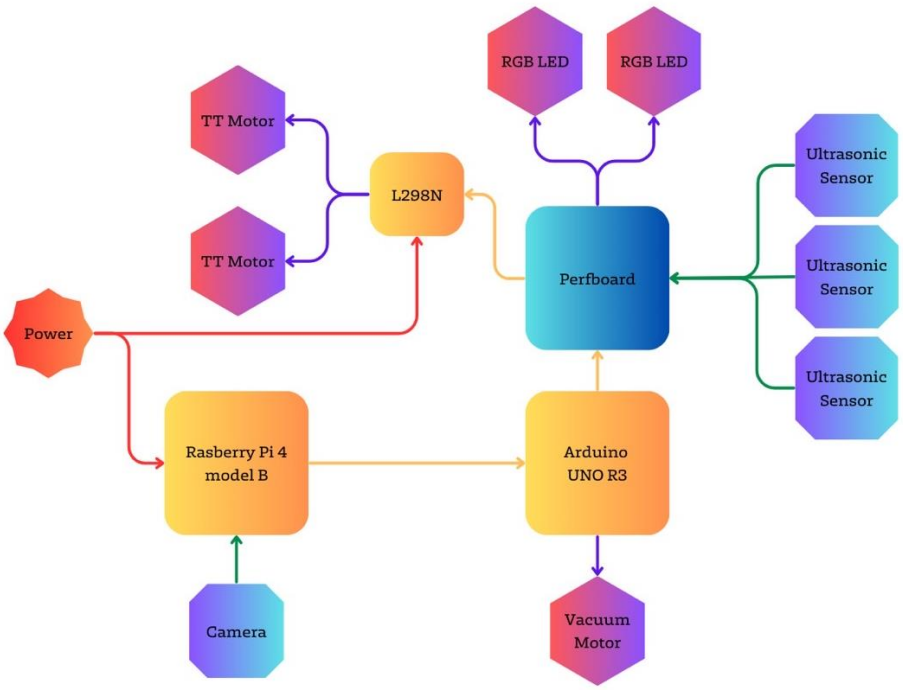
2. Mechanical Design



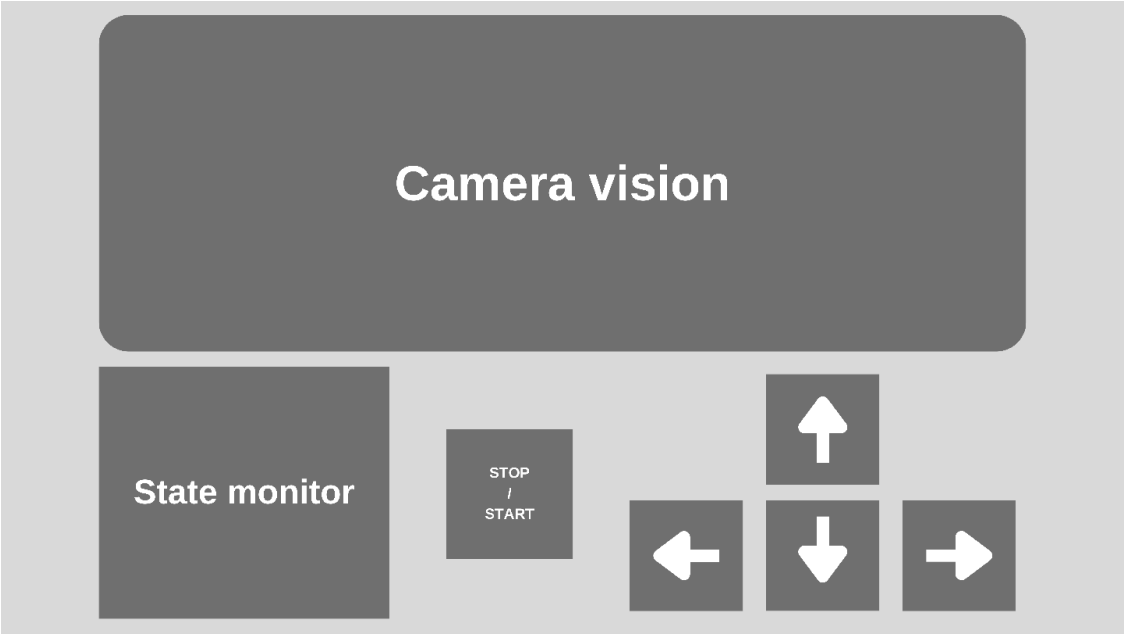




3. Electrical Design



4. User Interface



II. Materials

1. Material List

ID	Part	Source
1	Raspberry Pi 4 model B	BB Lab
2	Arduino UNO R3	BB Lab
3	Arduino cable	Mechatronics IV
4	VGA-HDMI cable	Mechatronics IV
5	DC motor	Mechatronics IV
6	TT motor*2	Mechatronics IV
7	Wheel	Mechatronics IV
8	Ultrasonic sensor*3	Mechatronics IV, BB Lab
9	L298N	Mechatronics IV
10	Bread Board	Mechatronics IV
11	Perfboard	BB Lab
12	MicroSD card	Mechatronics IV
13	Logitech webcam	Mechatronics IV
14	18650 Lithium battery*3	Mechatronics IV
15	Battery case	Mechatronics IV
16	RGB LED	BB Lab

*Additional parts to be purchased: None

2. Manufacturing Methods

ID	Component	Method
A	Undercarriage	Laser cutting
B	Upper Layer	Laser cutting
C	Camera Mount	3D printing
D	Ultrasonic Sensor Mount	3D printing
E	Omni-wheel Connector	3D printing
F	Vacuum Bracket	3D printing
G	Rpi, Arduino, Perfboard, L298N, TT Motor, RGB LED, Battery Fixtures	Keyholes and Standoffs

III. Project Plans

1. Gantt Chart

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Development</td><td colspan="2">System
Integration</td></tr>
<tr><td>HW</td><td colspan="2">Unit
Testing</td><td colspan="5">Hardware
Integration</td></tr>
<tr><td>Pres</td><td colspan="2">Project
Proposal</td><td colspan="7"></td><td colspan="3">Final
Presentation</td></tr>
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2. Roles and Responsibilities

Work Assignment	Responsible Individual
Mechanical Design	Po-Lin
Manufacturing & Assembly	Po-Lin, Guan-Lin
Hardware Development	Shih-Chun
Hardware Integration	Shih-Chun, Guan-Lin
User Interface Design	Kuan-Yu
Software Development	Kuan-Yu
System Integration	Po-Lin, Shih-Chun, Guan-Lin, Kuan-Yu
Final Presentation	Shih-Chun, Kuan-Yu

IV. Difficulties

- How to prevent paper from falling out before the motor is turned off.

  Create a curved structure in the vacuum cleaner hose similar to a drainage pipe, ensuring sufficient duration of suction and a strong suction force.

- Both the camera and ultrasonic sensor are located in the front, and it may take some time to adjust their angles for sensing.

  Both are placed in the front for the sake of front-to-rear weight balance, and the vehicle's circular body design is intended to minimize friction during rotation.