PRODUCT DESCRIPTION

Project: Tabletop Cleaning Zamboni

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Client: CPSC 1491 – Langara College

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1. PRODUCT DESCRIPTION HISTORY

1.1. Revision History

Revision date	Previous revision date	Summary of Changes	Changes marked
04-13-24		First issue	

1.2. Approvals

This document requires the following approvals.
Signed approval forms should be filed appropriately in the project filing system.

Name	Signature	Title	Date of Issue	Version
David On		Project Manager	04.15.24	1.0
Cesar Lopez Castellanos		Instructor		

1.3. Distribution

This document has been distributed to:

Name	Title	Date of Issue	Version
Cesar Lopez Castellanos	Instructor	04-15-24	1.0

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2. OVERVIEW

2.1. Identifier

CPSC1491-Section 2-Team 6

2.2. Title

Tabletop Cleaning Zamboni

2.3. Purpose

The Tabletop Cleaning Zamboni was created to help reduce the time and effort required to maintain clean surfaces. The cleaning robot is built using a car chassis with two DC motors connected to a motor shield powering the wheels. Once power is provided to the device, it is turned on by pushing a button. After the button is pressed, a red LED turns on to indicate that the device is running. Equipped with IR line tracking sensors, the Zamboni is capable of traversing elevated surfaces without falling off the edges. The back of the car chassis is outfitted with a dusting pad that cleans the table's surface while it travels across it. The total weight of the Tabletop Cleaning Zamboni is under 3 pounds, making its functionality well suited to those with disabilities.

The completed device is of intermediate quality and robustness. In its current form the device can compete its task with minor deficiencies that require further work. For example, an additional sensor will help ensure correct edge detection in all possible orientations of the device.
Additionally, a housing compartment for the electronic components needs to be created. This will improve product robustness and provide waterproofing.
Finally, a power off button must be installed to allow the user to stop the program while the Tabletop Cleaning Zamboni is running.

Prior to product approval, there are several aspects of the completed device that must be reviewed for quality assurance.
Firstly, all hardware components must be inspected to ensure faulty equipment is removed and replaced.
Secondly, all wire connections must be solid and not prone to coming loose. The solder of the motor shield to the Arduino micro-controller must also be of good quality.
Finally, the software must be tested on many different surfaces. These should include tables of various sizes, colours and textures.

This review of the hardware and software can be completed by quality assurance engineers on prototypes prior to manufacturing. Following manufacturing, product testers can be selected to assess the quality and functionality of the device in real use settings.
Feedback from these product testers should be taken into consideration when completing product improvements in the future.

2.4. Composition

Product Description   Tabletop Cleaning Zamboni

The Tabletop Cleaning Zamboni is a combination of hardware and software components working together to complete its task. Additional documentation deliverables allowed us to stay on track while developing the device. Below is more information regarding the components.

Hardware components
- JSumo RoboMOD 2WD Mobile Robot Chassis Kit
- DC motors (2)
- DFRobot Line Tracking Sensor (3)
- Adafruit motor shield V2
- Arduino Mega 2560
- Breadboard
- 24-gague wires
- Red LED
- Resistor (470 Ohm)
- Power bank

Software
- Arduino IDE

Documentation
- Project Charter
- Work breakdown structure
- Product demonstration
- Risk register
- Issue log
- Actual cost reporting worksheet
- Lessons learned

3. USING THE PRODUCT

3.1. Special considerations

- Access the charging port at the back of the Zamboni. Do not attempt to remove the battery pack while charging, as this can damage the device.
- Handle the Zamboni with care. The structure may become compromised if subjected to rough handling.
- Avoid using the Zamboni on black or glass surfaces. The sensors may not function correctly on these types of tables, leading to device malfunction.

3.2. Safety recommendations

- Keep the Zamboni away from water. Its electrical components are sensitive to moisture, which can cause malfunction or electrical hazards.
- Ensure the Zamboni is used under supervision, especially around children, to prevent accidents.

3.3. Instructions for use

1. Ensure the Zamboni is fully charged before use. Clear the table of any objects that might obstruct the path of the Zamboni.
2. Find the power button on the side of the device. Press and hold this button for a few seconds until the red LED turns on, indicating that the Zamboni is powered up.
3. After the red LED is on, the Zamboni will automatically start its cleaning. The device will move in a pre-programmed pattern to efficiently clean the surface of the table.
4. Keep an eye on the Zamboni to ensure it stays on the table and avoids obstacles. It is designed to navigate away from table edges automatically.
5. To stop the Zamboni, locate the power connection to the Arduino. Carefully disconnect the power source from the Arduino to immediately turn off all operations.
6. After turning off the device, clean the brushes and the underside of the Zamboni with a cloth or change the brushes.
7. For recharging, Plug the charger into the charging port located at the back of the Zamboni.