User Manual: Arduino Smart Vacuum Cleaner

Table of Contents

1. Introduction

The Arduino Smart Vacuum Cleaner is an autonomous cleaning device designed to efficiently clean various indoor environments.
It uses ultrasonic sensors to navigate and avoid obstacles, providing a convenient and hands-free cleaning solution.

2. Operating Instructions

2.1 Getting Started
- Ensure the battery is fully charged.
- Place the vacuum cleaner on the floor in the area you want to clean.
- Turn on the power switch.

2.2 Cleaning Operation
- The vacuum cleaner will start to move autonomously, using its ultrasonic sensors to detect and avoid obstacles.
- For remote control, connect the device to your smartphone via Bluetooth using the mobile application.
- You can monitor and control the cleaning process through the user interface.

2.3 Charging
- When the battery is low, the vacuum cleaner will automatically return to its charging station (if implemented) or needs to be manually plugged in.

3. Maintenance & Troubleshooting

3.1 Dustbin Emptying
- Regularly empty the dustbin to maintain efficient suction.

3.2 Sensor Cleaning
- Keep the ultrasonic sensors clean to ensure accurate obstacle detection.

3.3 Battery Care
- Follow the recommended charging instructions to prolong the battery life.

3.4 Wheel Maintenance
- Check the wheels periodically for any obstructions and clean them to ensure smooth movement.

4. Safety Guidelines

4.1 General Safety
- Keep the device away from water and wet surfaces.
- Do not use the device to clean up flammable or explosive materials.
- Ensure that cables and small objects are removed from the floor to prevent entanglement.

4.2 Battery Safety
- Use only the specified charger for the lithium-ion battery.
- Do not expose the battery to extreme temperatures or fire.
- Handle the battery with care to avoid damage.

4.3 Supervision
- Supervise children and pets when the device is in operation.

4.4 Repairs
- Do not attempt to repair the device yourself. Contact qualified service personnel for any repairs.

5. Troubleshooting

5.1 Device Not Turning On
- Check the battery and ensure it is properly connected.
- Verify the power switch is in the "ON" position.

5.2 Poor Cleaning Performance
- Empty the dustbin.
- Check for any obstructions in the suction path.

- Clean the vacuum motor and fan.

5.3 Navigation Issues
- Clean the ultrasonic sensors.
- Ensure there are no significant changes in the environment that may confuse the device.

5.4 Battery Not Charging
- Check the charger and power connection.
- If the problem persists, contact customer support.

6. Additional Information

- For more details on the components and technology used, refer to Chapter 3 and Chapter 5 of the project report.
- Future enhancements may include AI-based decision-making, enhanced obstacle avoidance, smart home integration, and automatic dust collection.

This user manual provides essential guidelines for operating, maintaining, and ensuring the safe use of the Arduino Smart Vacuum Cleaner.