

Operation Manual

System Requirements

For Bluetooth Controller Application:

Smartphone with Android version 4.1 and up

For Arduino IDE:

Computer with Windows OS, Mac OS, Linux

Software Requirements

- A. Arduino Integrated Development Environment
- B. Bluetooth RC Car by Andi.Co (Android)

Installation

The Arduino IDE can be downloaded from the Arduino website at <https://www.arduino.cc/en/software>. The user can select the download option for their device depending on its OS and version. It is recommended that the newer releases should be downloaded to avoid unexpected errors and ensure backward compatibility.

The Bluetooth RC Car application can be downloaded from Google Play or the Android Play Store. The user is required to sign in to his/her Google mail account in the app before being able to download the app. Once signed in, the user can search and download the app, accordingly.

User Manual

For Arduino-Based 2WD Sumo Tankbot with Scraper

Intended Use

The Arduino-based 2WD Sumo Tankbot is specifically designed for participation in Sumo robotics competitions. Its primary purpose is to engage in autonomous battles within a Sumo ring, where it competes against other robots to push opponents out of the ring while maintaining its stability and control. The robot's robust mechanical design, high-torque motors, and precision-cut scraper allow it to execute agile movements and strategies, enhancing its competitiveness in the Sumo arena. Moreover, the seamless wireless control provided through the HC-05 Bluetooth module and Android mobile application enables users to direct the robot's actions during the competition effectively. While its primary focus is Sumo robotics competitions, the versatile nature of the 2WD Sumo Tankbot opens up potential applications in various real-world scenarios, research, and educational purposes, expanding its significance beyond the confines of Sumo battles.

Features

The Arduino-based 2WD Sumo Tankbot boasts an impressive feature set that makes it a formidable competitor in Sumo robotics competitions. With a maximum wireless control range of 25 meters, the robot can be effectively controlled from a distance, allowing users to strategize and execute precise movements during battles. Its operating distance of up to 1 kilometer provides ample room for maneuvering and monitoring the robot's performance in the Sumo ring. Weighing in at just 2 kilograms, the robot's lightweight design ensures easy portability without compromising its structural integrity.

The robot's agility and speed are key advantages in the Sumo arena, capable of achieving a maximum speed of 0.3 meters per second. Its mobility functionality allows it to move in multiple directions, including forward, backward, left, right, forward-left, forward-right, backward-left, and backward-right. This versatility enables the robot to swiftly evade opponents, outmaneuver rivals, and execute precise tactics to gain an edge in the intense Sumo battles.

Measuring approximately 8.86 x 8.66 x 4.25 inches without the scraper and 12.7 x 11.5 x 4.25 inches with the

scraper attached, the robot's compact size enhances its ability to navigate the Sumo ring with ease. The integration of an HC-05 Bluetooth module and an Android mobile application facilitates seamless wireless control, allowing users to direct the robot's actions intuitively during competitions.

Product Operation

- A. Power on the tank robot and onboard Arduino microcontroller. The built-in LEDs will light up when the device is on.
- B. Open and enable the smartphone's Bluetooth connectivity option. Scan and pair with the "HC-05" Bluetooth module (Pass: 1234).
- C. Launch RC Bluetooth app. Press the gear icon, select connect to car option, then choose "HC-05" from the list of paired devices.
- D. When the red light in the controller app changes to green, the robot becomes ready for controlling.

Troubleshoot and Repair

For connectivity issues:

- A. Make sure that the phone's Bluetooth connection feature is enabled.
- B. The HC-05 Bluetooth Module is blinking upon activation.
- C. The device used for controlling the prototype is compatible with the controller app.

For hardware problems:

- A. In case the prototype does not respond as expected to certain instructions or commands, reset Arduino using the onboard switch or reupload the program code.
- B. Check battery levels if the Arduino or the motors cannot maintain power or regulate speed.
- C. Check the wiring between components and the motors when the prototype is not responding to the correct mobility commands.

Contact Details

Joshua Mari M. Buenaventura

School of Electrical, Electronics, and Computer Engineering
Mapúa University
Manila, Philippines
jmbuenaventura@mymail.mapua.edu.ph

Jervin D. Louis

School of Electrical, Electronics, and Computer Engineering
Mapúa University
Manila, Philippines
jdlois@mymail.mapua.edu.ph

