



ELITE TEAM

OPERATING FILE

July 2021

Prepared by
Marwan Bakendwan
Hazim Bukhari
Renad Atarji

1 Project Description

It is a competition in which two robots compete inside an arena, each carrying an arm and a balloon, each trying to pop the other's balloon using the sharp end attached to the arm, and whoever succeeds in that first is the winner. It is controlled remotely via the Internet.

2 OPERATIONS

A. Robot's Dimention

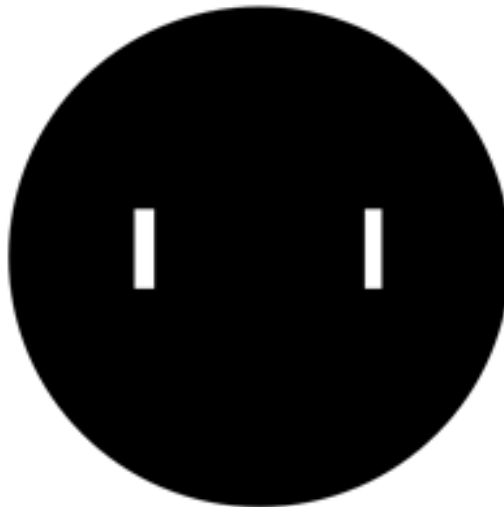
The robot has three wheels, topped by a base whose front is designed in an sharp angle, to make movement easier. Carrying a box containing the electronic tools, robotic arm, and the balloon. The arm includes a base, three joints, links, and sharp end effector that is designed in a cone shape, and five servo motors that move the arm with a specific degree of rotation

Base Height Off The Ground	6.5 cm
Base Dimensions	70 x 16.25 x 32.5 cm
Box Dimensions	15 x 9.8 x 26 cm
Arm Base Diameter	12.2 cm
Arm Height	65.5 cm

B. Arena's Dimention

The arena is designed in a circular shape, with a diameter that is sufficient for the robot to turn to the other, and raised from the ground with two lines to determine the starting distance between the two robots.

Arena shape	Circle
Arena Color	Black
Arena Hight	10 cm
Arena Diameter	300 cm
The Distance Between The Start Lines	100 cm



SUGGESTED DESIGN FOR THE ARENA



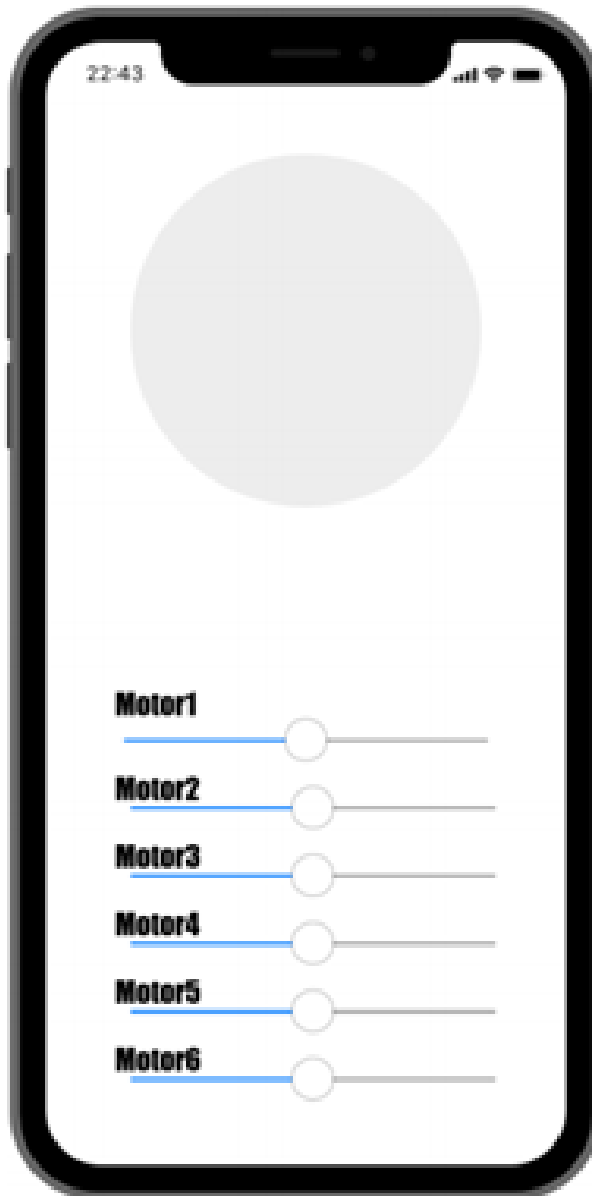
C. Operating Laws

- 1- The competition consists of three rounds.
- 2- Two minutes for each round.
- 3- not allowed to replace the robot after the start of the competition
- 4- The robots will be placed on the arena behind the starting lines by the referee.
- 5- The robots are controlled by a person outside the competition place.
- 6- The robots cannot be moved before the start of the round is announced by the referee.
- 7- The round ends when one of the competitors success to pop the balloon of the other robot or the time runs out.
- 8- A point is awarded to the robot for popping the opponent's balloon or for the opponent's fall from the Arena.
- 9- The robot that gets 2 points wins.
- 10- In the event of a tie, one extra round will be added.
- 11- The time between every two rounds is 45 seconds.
- 12- Attempts to pop the opponent's balloon using the tip of the arm only, and it is forbidden to use anything else (electric stun, laser, nail launcher, ... etc.)

D. control panel

The user interface is designed to easily control the robot and arm movement. The movement of the robot is controlled by the touch panel at the top of the screen to move in all directions. The arm is controlled by the slider for each motor separately.

*Can be horizontal for easier control



3 TESTING

1. Unit Testing

The pieces are individually tested to make sure they work.

Part	Result
Motor 1	✓
Motor 2	✓
Motor 3	✓
Motor 4	✓
Motor 5	✓
Wheels	✓

2. Integration Testing

After testing the pieces individually, assembly and running experiments were conducted.

Part	Result	Notes
Arm	✓	All arm motors worked together as it was planed
Wheels	✓	All wheels worked smoothly in all directions, and withstood the load of the base



3.System Testing

Remote control panel test to control the movement of the base and arm.

Part	Result	Notes
Base (Wheels Motors)	✓	Worked well
Arm	✓	Worked well, we found if the controller was horizontal it will be easier. So we will adjust it.

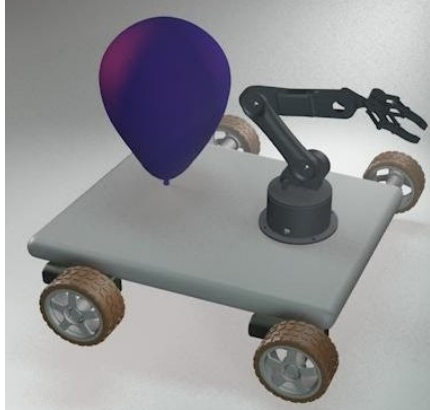
4 TOLERANCE

Industrial	
1	No previous reports available
2	Poor organization
3	Irregular follow up
4	Parts delay
Mechanics	
1	Different dimensions and weights
2	Difference in strength of robot arms
3	Incorrect Assembly
4	Wheel asymmetry compared to robot size
Electronics	
1	Batteries do not fit the required operation
2	Fast energy consumption
3	Electrical circuit damage
4	Low quality for the parts
IoT	
1	No connection available
2	Misreading of technical processes
3	Slow to receive visual data from the robot
4	Slow response of the robot to commands
AI	
1	Safety issues
2	Inaccurate calculations of the robot decisions
3	Weak technical resources
4	Weak calculations and data import
5	Errors in decisions making

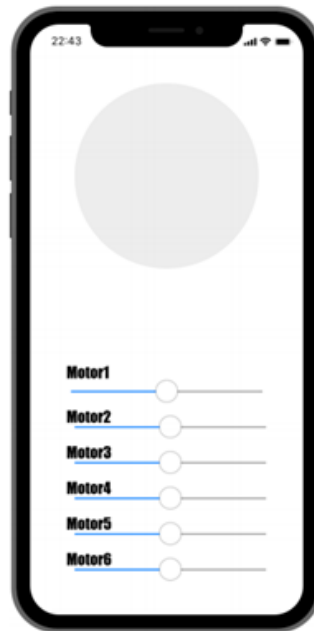
5 USER MANUAL

How to operate

First, bring the base of the robot, and then install the arm on it in the designated place, and finally place the balloon on top of it to make it look like this



In order to see the control panel, download the application for the robot and enter the serial number of your robot. Then this screen will appear



Warning: The arms is sharp, so be careful and keep it away from children

Now you can control the robot

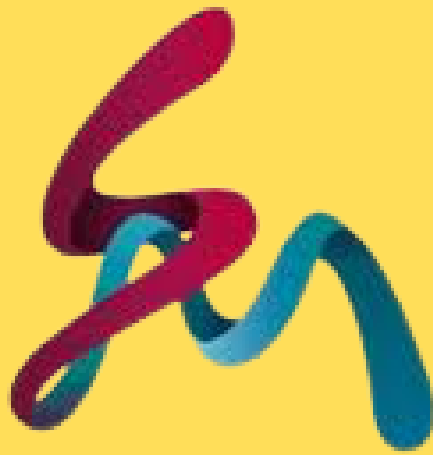
6 WARRANTY

The warranty is for one year and includes all parts of the robot and the system installed on it, which includes:

Mechanics			
4	3	2	1
The Wheels	The Base	The end Effector	The Arm

Electronics						
7	6	5	4	3	2	1
<u>BJT npn</u> <u>TRansistoe</u>	Voltage Regulation	<u>L293D H-</u> <u>Breidge</u> Motor Driver	Servo Motors	DC Motors	<u>9V</u> Battery	Arduino uno

IoT & AI	
1	Regularly update the system
2	Technical Error Maintenance
3	Improving and accelerating decision-making processes (after a period of use)
4	Renewal of SIM cards and robot control



SmartMethods
الأساليب الذكية