

Sumo Wars 2020' Feb

About the Event

In this autonomous robotic event, bots have to search and push the opponent bot out of a specified arena in order to win, all the while keeping itself inside the aforementioned arena.

Goals

Constructing a mobile bot fully capable of detecting objects in its proximity, and with the ability to distinguish between black and white strips.



Motivation

Sumo Wars allows its participants to learn, and at the same time, implement their first project in the field of Embedded Systems. Also, several skills from different fields including, but not limited to, Physics, Mechanics, Design, Programming are also employed.

The primary motivation of this event is for the participant to get at least a rough idea of the underlying workings of an arduino bot, how it is programmed, and how the bot can be further modified for even more exciting projects.

In addition to this, this event also hones the understanding of electronic circuits, sensors and the use of IDEs and numerous other softwares in the developmental process.

Sumo Wars is a one of a kind event, and a must for anyone looking to dive into the field of Embedded Systems. However, it's speciality lies in the fact that it requires an expertise in a considerable amount of areas, and hence good communication among teammates also becomes an essential part of this event.

About the Workshops

A 4-7 days workshop will be organized for the participants to teach them everything from scratch. All skills required to build an autonomous bot competent enough to participate in Sumo Wars will be taught in this workshop.

The following areas will be covered in the workshop :

- ❖ An introduction to C/CPP (loops, conditional statements, basic knowledge of programming)
- ❖ Dealing with Embedded C
- ❖ Designing circuits with Proteus
- ❖ Uploading code to Arduino with Arduino IDE
- ❖ Dealing with different sensors and integrating them with Arduino



Equipment Provided

The following equipment will be provided to everyone paying the nominal registration fee:

- ❖ Arduino Microcontroller
- ❖ Ultrasonic Sensor (1)
- ❖ Infrared Sensor (2)
- ❖ Motor Driver
- ❖ Wheels (2)
- ❖ Motor (2)
- ❖ Jumper Wires Set
- ❖ Castor Wheel (1)
- ❖ Breadboard

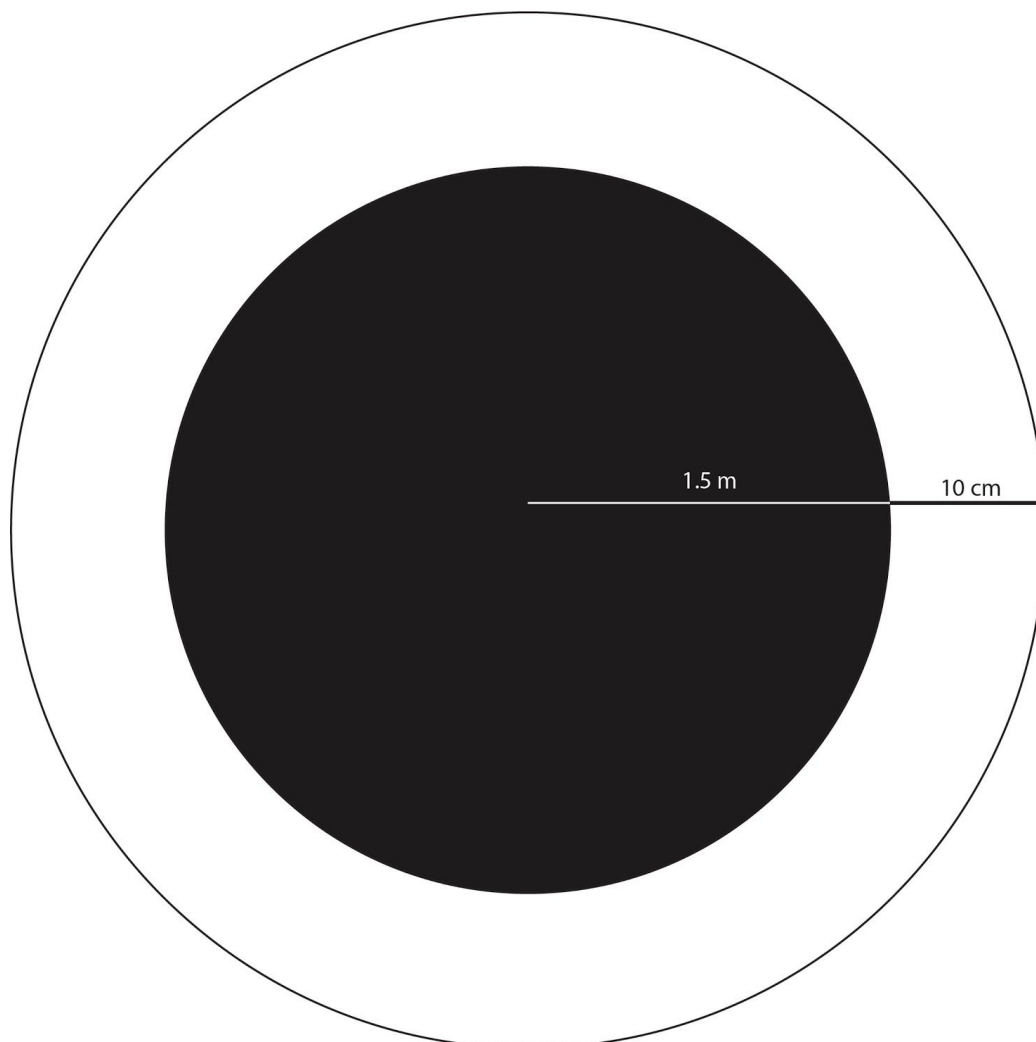
The participants can keep the equipment with them after the event is over.

Specifications

- ❖ The bot will be automated and should be running on an 11.1V LiPo battery (which will be provided during the event itself).
- ❖ Battery dimensions are 10.5 x 3.5 x 3 cm.
- ❖ Arena will be a circular black disk of radius 1.5m and 10-15 cm white strip on the boundary (+5% error).
- ❖ Weight limit of bots is 1.5 kg (without the Li Po battery).
- ❖ Bot size : Maximum Length = 25 cm(Including wedge and sensors), Maximum Breadth = 20 cm.
- ❖ The maximum RPM of motor should be 150 and maximum rated torque should be 1.5 kg-cm.
- ❖ Ground clearance should be of at least 3 cm.
- ❖ Maximum number of sensors allowed (including infrared and ultrasonic sensors) is 6.

About the Arena

The color scheme and dimensions of the arena are given below in a pictorial representation.



Sumo Wars Arena



Rules

- ❖ Team may consist of maximum 5 people.
- ❖ Each battle will consist of a best of three rounds scenario with each round having a time limit of 120 seconds.
- ❖ Technical time out 10 minutes will be given per team, per match.
- ❖ Any mechanism which can be used to dismantle the opponent bot is not allowed.
- ❖ The chassis of the bot cannot be readymade.
- ❖ The exact format of the matches will be decided by the organizers once entries for the event are received.

Judging Criteria

- ❖ In order to win a round, the opponent bot has to be completely pushed out of the arena.
- ❖ If the time limit has been reached with both bots inside the ring the entire time, a tie breaker round will be held.
- ❖ The tie breaker will be of one minute and the victory condition will be dictated by the net distance of the bot from the center of the arena after the tie breaker ends.
- ❖ The complexity of the bot will not be considered for judgement, however it may be considered for an alternate category, i.e. Sumo Smart Bot.
- ❖ The decision of the judges will be final and abiding throughout the entire competition.
- ❖ These rules are subject to change and the concerned participants will be informed beforehand before such a change is made.



Organisers

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Note

The rules and specifications given are viable to change and the participants will be notified at an appropriate time before the event via a new iteration of this document.