TECHNICAL EVENTS

MAZE RUNNER
On Gazebo

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Redefining Technology

Petrichor '22
EXPLORE. EXPERIENCE. EVOLVE.

ANNUAL TECHNO-CULTURAL FEST OF IIT PALAKKAD

Registration Deadline: 25 Jan'22 06:29 PM CUT

Free Registration

Team Size: 1 - 3 Members

Registration Closed

Maze Runner

Petrichor

Indian Institute of Technology (IIT), Palakkad

R AP TC

77
Registered

1,33,428
Views

19 Jan'22 06:30 PM CUT - 05 Feb'22 06:29 PM CUT

#Engineering #College Festival #Robotics #Simulation Game #Prog

Eligibility: All

Region: Online

All that you need to know about Maze Runner

Participants have to prepare a robust algorithm for a given two-wheeled mobile bot capable of solving an unknown maze. Here solving refers to the bot traversing from entry (starting point) to the exit (endpoint) of the maze.

Platform:

- It is a Gazebo-based simulation event.
- ROS Melodic and Gazebo 9 are preferred.
- ROS package containing the URDF model of the bot along with a few test worlds (mazes), we'll provide you a day before the opportunity begins.

Bot Description:

- It is a two-wheeled mobile bot, the third wheel being a castor wheel for support.
- It has velocity controllers for the two drive-wheels that can be accessed through respective ros topics.
- A LiDAR is present on the top of the bot, capable of scanning 180 degrees and sample points can be set by the participants by changing the parameter in URDF (default is 5).
- The bounding box of the complete bot measures - 1.65 m x 1.025 m x 1.35 m

Note: It is allowed to make changes in the URDF parameters and add plugins of your choice, but make sure to clearly mention them in the submission PDF (refer to the "submission making" section for more details). However, the physical dimensions of the bot, any parameters of the world cannot be changed

Maze Description:

- The maze consists of 15X15 square cells, each cell being 3.125 m X 3.125 m.
- There can be one or more solutions from start to endpoint.

- Few practice mazes are provided with respective launch files with the package for the participants to test their algorithms on. However, they are free to choose custom mazes for test runs.

Rules:

- Participants have to submit their codes along with the package (accounting for the changes done in URDF) before the date of the final competition (refer to the 'pre-submission' section in the "submission making" section). Once submitted, the algorithm cannot be changed, however, the parameters (like gains, if any) and URDF parameters can be changed if needed.

- For the final competition, the participants will have to join a zoom/google meet provided by us (better to join with a different device), and they will be given **30 minutes** to download the new maze and implement their prepared & submitted algorithm.

- The first run (from start to finish) will be considered as '**Mapping**'. Subsequent runs will be concentrated on finding the shortest path to finish and hence will be heavily penalized with time. The last recorded time will be considered among the subsequent runs.

- Participants have to start the screen recording before the start of the 'Mapping' phase and the video shall not be paused/stopped until the last satisfactory run.

- The submitted video shall not be found edited in any terms, doing so will lead to immediate disqualification.

- Multiple runs are allowed after the 'Mapping' phase until the time runs out (do check the "judging criteria", as it mentions the effect of overall time taken in the final competition (out of 30 mins)).

- A live voice-over is preferred in the screen-recording, as it will aid in the judging with ease of understanding of the starting procedure of the bots in each run as well as some critical aspects of the algorithm. However, these points should be clearly mentioned in the submission PDF (see "submission making" for more details).

- If the bot gets stuck during any run, participants are allowed to pause the simulation (not the video) and translate/rotate the bot. This will attract a penalty (see "judging criteria"). It should be strictly noted that the translation displacement (in any axis) should not be greater than the bot's bounding box (approximately).

Judging Criteria

Shortlisting will be done on the basis of least Standard-Penalty

Standard-Penalty = w*Overall_submission_time + x*Mapping_time + y*Best_run_time + z*Touches

{NOTE: w < x << y < z}

- Overall_submission_time refers to the time taken on the final competition day (out of 30 mins) to make the final submission.

- Mapping_time refers to the time taken in the first run, which is responsible for mapping on the final competition day.

- Best_run_time refers to the least time taken by the bot to clear the maze in the complete recording, again on the final competition day.

- Touches refers to the number of times the participant manually translated/rotated the bot in the **corresponding** run.

- Apart from these, the robustness of the algorithm will also carry some weightage.

- If the bot cannot clear the maze, submission can still be done without being disqualified. Appropriate marking will be done by the judging panel.

NOTE:-

Participants will not be sharing the screen in the meeting, all the above times mentioned (except for the Overall_submission_time) will be taken from the recording submitted, hence the screen recording should be done cautiously.

Submission Making

- For the pre-submission (11:59 PM 04/02/2022)

The modified ROS package containing all the scripts, dependencies/plugins should be compressed into a single folder and submitted in the link we'll provide you in the mail on the submission day.

- For the final competition day

The one-shot screen recording should be uploaded to the drive link which we'll provide you prior to the submssion and the team should message in the chat of the ongoing zoom meeting acknowledging the same. The mail time will be noted as the overall submission time.

The 'submission PDF' can be submitted via mail (same address as above) by 11:59 PM of the final competition day (i.e. 05/02/2022 tentatively).

The 'submission PDF' is meant to be a kind of summary of the work done by the participants. There is no upper bound for the contents to be present it, but it should contain the following points:-

- All the changes made in the given URDF
- Extra plugins or packages used
- Key features of the algorithm used
- The starting method of the bot for each run.
- Timestamps (simulation time) for start and end of each run (this will be cross verified)
- Updated on 27 Jan'22 11:54 AM CUT

What are the important dates & deadlines?

25 Jan'22 06:29 PM CUT

Registration Deadline

20 Jan'22 12:00 PM CUT

Package and Problem Statement Sharing

04 Feb'22 11:59 PM CUT

Submission of Code

05 Feb'22 04:30 PM CUT

Submission of Screen Recording

Contact the organisers

Helpdesk & General Queries

What's at stake - Rewards and Prizes?

Exciting vouchers are waiting for all the participants.

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Certificate
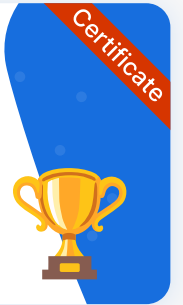
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