Project proposal

Title: Blind local planner with reinforcement learning
Supervisor: George ADAIMI (VITA)
Timeframe: Spring 2021

EPFL Xplore is an interdisciplinary project whose aim is to design and develop a Rover to participate in two international competitions: the University Rover Challenge and the European Rover Challenge.

Project description

Problematic

So far our local and global planner depend on the accuracy our of 3D LiDar sensor to detect obstacles. Unfortunately our LiDar has a min-range of 1m, and close obstacles are a terrifying threat. Even worst we do not take into consideration the types of soils the rover could be on (sand, wet sand, rocks, leafs, etc..), which risk to over-use the resources of the rover.
The aim of this project is to improve our local planner not to depend solely on the LiDar but to use the current speed, weight distribution, angles of the rover joints, etc…
In this project you will train a reinforcement learning model to adapt the rover local planner to handle obstacles (ex: rocks, holes , …) as well as different types of soil (ex: sand , gravel …).

Note : We have a Gazebo simulation for our rover that you can use but some adaptation will be needed in order to use it for training. (to make it faster).

Requirements

Interest in Reinforcement Learning
A base with ROS is a plus.

Reference documents

[1] https://leggedrobotics.github.io/rl-blindloco/

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