



Project proposal

Title: Path Optimisation Algorithm
Supervisor: Alexandre Alahi
Timeframe: Fall 2020

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.

In particular, the ability of the Rover to drive autonomously will be assessed as one of the four main tasks described by the competition.

Project description

Problematic

Given an elevation map generated using lidar and camera data, the student will have to design and implement an algorithm that computes the safest path to a specified location relative to the Rover.

Since the provided elevation map will, in general, be incomplete, it will be necessary to develop a heuristic algorithm that minimises the travelled distance without navigating through parts of the terrain where the slope is exceedingly high.

Means

For sequential uses, the algorithm is expected to run on a 1.5GHz ARM CPU [1] or, if needed, on a FPGA [2].

For parallelisable algorithms, a NVIDIA Jetson GPU unit is provided with at least 0.5 TFLOPs as processing power.

At least 4GB LPDDR4 memory will be at disposal.

If budget permits, higher specifications are conceivable.

Reference documents

[1] NVIDIA Jetson Modules, <https://developer.nvidia.com/embedded-computing>

[2] Intel FPGA Modules,

<https://www.intel.com/content/dam/www/programmable/us/en/pdfs/literature/sg/product-catalog.pdf>

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