

Project proposal

Title: Terrain Analysis
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

The purpose of this project is to create a 2D elevation map representing the terrain as perceived by the Rover. Using a lidar and several cameras, the student is asked to convert the 3D projected camera view, along with the 3D depth map, to an elevation map, which will then be used by a navigation algorithm.

Means

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

For parallelisable computations, 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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