Terrain Traversability prediction by a robot

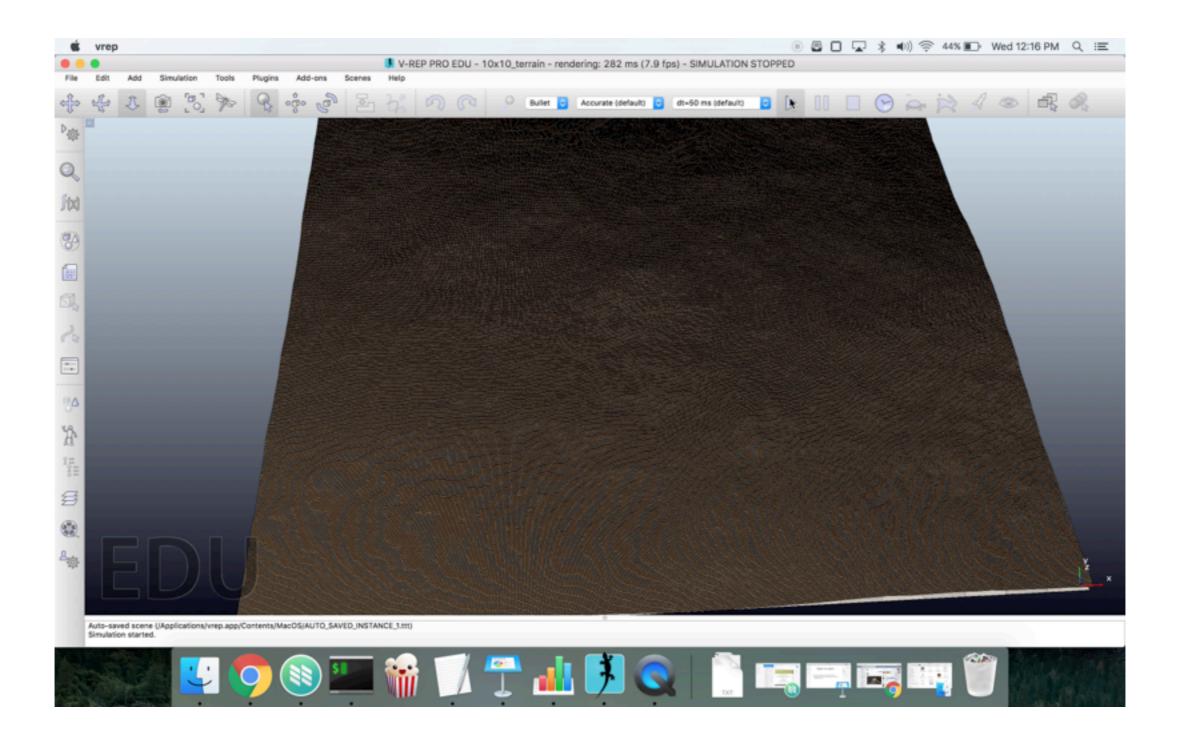
Stefano Peverelli Adv. Luca Maria Gambardella TAs: Alessandro Giusti, Jerome Guzzi

Università della Svizzera Italiana

Again our goal...

 What the project aims is a system that can guarantee a robot to estimate if a given terrain is traversable or not

The controller



In detail ...

- Familiarize with a robot experimentation platform
- Build a realistic terrain environment (height-map) and use an off-road robot model
- Writing a controller for the robot to follow a predetermined path
- Build a dataset of height-maps to represent a large variety of situations
- Run several simulations and analyze possible outcomes
- Investigate options to apply Machine Learning

Challenges faced

- Installing Lua Dependencies in VREP Environment
- Communication between various types of scripts (child scripts, main scripts)

Planning

| Detailed Tasks | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 | Week 13 | Week 14 |
|---|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|
| Literature phase | | | | | | | | | | | | | | |
| Familiarize with V-REP | | | | | | | | | | | | | | |
| Build a realistic terrain environment | | | | | | | | | | | | | | |
| Running a simple robot model on the map | | | | | | | | | | | | | | |
| Writing a controller for the robot | | | | | | | | | | | | | | |
| Control the simulation programmatically | | | | | | | | | | | | | | |
| Generate a realistic collection of 3d terrain | | | | | | | | | | | | | | |
| Run hundreds of simulation automatically | | | | | | | | | | | | | | |
| Thesis writing | | | | | | | | | | | | | | |
| Analyze the dataset | | | | | | | | | | | | | | |
| Build a classifier (Neural Network) | | | | | | | | | | | | | | |