

# PBL Flagship Project 2024

## Truly Autonomous Legged Robots for Assisted Living and more

With a Bachelor / Semester / Master Thesis / FreeLancer and Staff at PBL

Would you like to participate in the design and development of an autonomous quadruped robot for real-life applications such as blind person assistance and other applications?

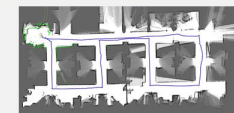
Would you like to work with embedded systems, sensors including cameras and LiDARs, embedded control, hardware and software design, controlling robotic arms, and with state of art legged robots from Unitree?

We are looking students to work in the following areas:

- Embedded control
- State estimation for autonomous navigation with novel sensors
- Computer vision for perception and planning
- Manipulation with robotic arm
- And many other topics
- Participation on students' competitions

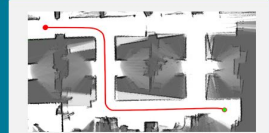


### Perception



**Mapping and Localization:**  
The robot uses Lidar and Depth Camera to create a map of the environment and locate itself

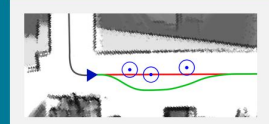
### Planning



**Global trajectory planning:**  
The optimal path to a way-point is computed using the acquired map

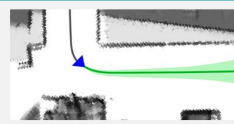


**Dynamic entity tracking:**  
Dynamic entities are detected and tracked with computer vision



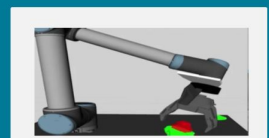
**Object avoidance:**  
The path is adjusted locally to avoid dynamic obstacles

### Control



**Model Predictive Control:**  
This technique is used to optimally follow the generate path using high-level motion control

### Manipulation



**Robotic arm manipulation to assistance living.** Control and perception will be exploited

Project sponsored by:



Project in collaboration with:



**Interested? Apply until 19.02.2024!**

Include a short motivation letter, grade transcript and the desired focus topic in your application and send to [davide.plozza@pbl.ee.ethz.ch](mailto:davide.plozza@pbl.ee.ethz.ch) [martyste@pbl.ee.ethz.ch](mailto:martyste@pbl.ee.ethz.ch)

