ICT PHD

Research project for a PhD curriculum in ICT – Electronics and Telecommunications

**Tutor**: Prof. Laura Giarré

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 **(\*\*) Foreign Co-tutor:**

**Proposed Title of the research:**

Autonomous Safe Driving in crowded environment

**Keywords: (5)**

*Autonomous Vehicles, Assistive technology, sensor fusion, Robotics*

**Research objectives: --(max 10 rows)**

*The* ***challenges in*** *controlling the motion of an assistive robot used as robotic dog to help blind people in navigating and moving around are* ***1) safely interacting with the user and 2) safely interacting with the surrounding crowd****. In particular, the robot should avoid maneuvers that can lead to a collision with the user, a tether drops or sudden change in direction that may undermine the user’s confidence in the robot.*

*From a methodological point of view, the main objective of this research project is to develop* ***learning-based motion planning and control*** *algorithms, which are* ***safe by design****. Such an objective will be achieved by developing, learning and prediction tools that are intertwined with motion planning and control algorithms.*

**Proposed research activity -- (max 10 rows)**

*The research activity will initially design predictive motion planner and control algorithms for the considered class of assistive robots, which are safe by design. While predictive approaches are widespread in safety-critical applications like autonomous driving, they are not common in mobile assistive robots. This is especially because assistive mobile robots rarely are asked to operate in crowded environments. While predictive approaches are widespread in safety-critical applications like autonomous driving, they are not common in mobile assistive robots. The motion planner and control algorithms developed are expected to provide safety guarantees by design, w.r.t. both the surrounding crowd and the user. Such an objective will be achieved by resorting to preliminary results developed and tested in the context of autonomous driving.*

**Supporting research projects (and Department)**

*The project will be partly supported by 2022 PRIN funds.*

**Possible connections with research groups, companies, universities.**

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 (\*) optional

(\*\*) optional/to be completed on the second year