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Nr. crt.	Titlu lucrare	Scurtă descriere	Cerințe	Nivel (licență/ master)
1	Mapping radio bandwidths with a drone	Design and study a trajectory control for mobile robots that must map an unknown surface of interest, e.g. a radio map. At each point, the robots observe the map value, and the objective is to reach the maximum map location, or to collect as much map quantity along the trajectory as possible. Algorithmic developments will be followed by real-time applications using UAVs or ground robots.	Math and programming in Matlab/Simulink.	Licență sau Master
2, 3	Simulator development for litter mapping	Simulator of a litter map sensed by a mobile robot using a 3D sensor. Sonar simulation, litter object registration, etc.	Programming (Python, ROS).	Licență sau Master
4	Drone racing	A Parrot Mambo drone detects colored markers and must race as fast as possible through each marker. A simulated solution is available, and the task is to transfer this solution to the real drone.	Algorithmics and programming in Matlab/Simulink	Master sau Licență
5	Optimistic planning for hybrid optimal control	Test in simulated problems a new algorithm for hybrid optimal control (continuous and discrete actions) using optimistic planning.	Strong analytical skills, programming in Matlab.	Licență sau Master
6	Target position control using a UAV	A target is repelled by a drone with a force that depends on the distance between the drone and the target. The objective is to design a control law for the drone so as the target reaches a desired position, or trajectory.	Math, algorithmics, and programming.	Licență sau Master
7	AI planning and learning for nonlinear control applications	In this project the student will work either on fundamental developments in optimistic planning, a model-based predictive control algorithm; on their real-time application to nonlinear control, or a combination of the two.	Math, algorithmics, and programming.	Licență sau Master
8	ROV control design	Stabilization and trajectory tracking for a BlueROV underwater robot.	Matlab and/or ROS.	Licență sau Master
9	DC motor setup for identification experiments	An Arduino-controlled, Dynamixel DC motor that should be encapsulated in a USB-connected box and usable for system identification experiments (transient analysis, step and impulse response identification, FIR and parametric models). A prototype is available.	Embedded programming, Matlab.	Licență sau Master

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10	Fast simulation on NI hardware	A National Instruments compute board is available which can take a Matlab/Simulink model and simulate it very fast. We will select a sample-intensive control design methodology, such as reinforcement learning, and use this simulator to generate the data and demonstrate the workflow up to the control of the system.	Embedded programming, Matlab.	Licență sau Master