EL 5223 - Sensor-based Robotics

Main Course Webpage Homeworks and Solutions

EL5223: Suggestions for Project Topics

The topics 1-9 below when done for different robot manipulators (e.g., KUKA KR 16, FANUC R-1000iA, Katana, robot arm mounted on a mobile vehicle, etc.) count as different topics.

1. Modeling (kinematics and dynamics) of a closed-chain manipulator
2. Path planning for a robot manipulator within a workspace with obstacles (cluttered workspace)
3. Coordinated motion of two robot manipulators
4. Trajectory optimization for energy minimization, for velocity and torque minimization, etc.
5. Passivity-based control of a robot manipulator
6. Repetitive control of a robot manipulator
7. Fuzzy, neural network based, or adaptive motion planning/control of a robot manipulator
8. Motion planning using tactile sensors in a workspace with obstacles
9. Parameter optimization (e.g., kinematic optimization or workspace optimization) of a robot manipulator
10. Modeling and control of a robot with flexible links
11. Modeling and control of a hand-like gripper
12. Modeling and control of a robot manipulator mounted on a mobile robot
13. Localization and mapping for a mobile robot using sensors such as laser range scanners, sonars, or cameras
14. Dynamic stability and gait control of humanoid robots or multi-legged robots
15. Simulation and control of robot swarms (distributed robotic systems)

Note that these topics are intended as only a representative set and any other topic can be considered (upon approval).