

Nume cadru didactic: NATSAKIS Tassos

Nr.crt.	Titlu lucrare	Scurta descriere	Cerinte	Nivel
1	Low-level controler of a robotic arm	<p>The goal of this project is to implement a low-level controller for the robotic arm that we have in our laboratory (Cyton Gamma 1500). To achieve the low level control, the controller should be implemented in ROS (robotic operating system), a well know framework for working in robotics.</p> <p>By implementing a low-level controller, it is possible to fine tune the control parameters, optimize the controller for specific applications and to achieve types of controller (e.g. velocity or torque control), which is not available through the already implemented functions.</p>	Robotics, C++, Linux, ROS	licența
2	Design and implement a cost-effective 3 degree of freedom robot	This project is about the design and construction of a 3 degree of freedom robot and its controller. The purpose is to understand better the principles of robotics and how dynamical models are made. The physical model can then be tested with different control strategies. Finally, the design of the physical robot should be done efficiently to allow reproduction and eventually use in a teaching environment.	Robotics, 3D design, hardware	licența
3	Robotic prosthetic hand	The goal of this project is to design and construct a robotic prosthetic hand, aiming at helping amputees perform basic every day tasks. The robotic arm should be lightweight and offer a level of dexterity so that the patient can grasp objects of different sizes and shapes. Appropriate modeling and control of the robotic hand should be developed.	Robotics, 3D design, hardware	licența
4	Robotic controller using EMG signals	<p>In several applications, robots are used in dangerous, sterile or remote locations. However, the current level of sophistication of robotic controllers, does not allow them to operate without human supervision or intervention. Therefore, these robots need to be controlled by a human, usually from a distance.</p> <p>To reduce the possibility of errors during the control, and to increase the dexterity of the robot, we need intuitive methods for controlling the robot. This project is about designing a controller that translates the muscle signals from a human controller into actions for a robot. The signals need to be captured, processed, interpreted and mapped</p>	Robotics, signal processing, LabVIEW	licența

		into actions.		
5	Robotic controller using data from a depth camera	<p>In several applications, robots are used in dangerous, sterile or remote locations. However, the current level of sophistication of robotic controllers, does not allow them to operate without human supervision or intervention. Therefore, these robots need to be controlled by a human, usually from a distance.</p> <p>To reduce the possibility of errors during the control, and to increase the dexterity of the robot, we need intuitive methods for controlling the robot. This project is about designing a controller that translates the motion captured from a depth camera (Astra Pro, Orbbec) into actions of a robot.</p>	Robotics, C++, Linux, ROS	licența
6	Gesture and motion classification based on EMG signals	<p>Gesture and motion clasification has been used extensively in the gaming industry, where several vendors have created platforms that identify human motions using video cameras and allow control of their games. This workflow can be extremely useful in other areas, such as e.g. in human rehabilitation.</p> <p>The goal of this project is to clasify specific gestures and/or motions performed by human beings. The classification can be made either based on EMG signals, or through image processing techniques and using advanced learning methodologies.</p>	Matlab, Signal processing, LabVIEW	licența
7	Robotic controller for a surgical assistance robot	<p>One very elusive application for robotic arms, is for asistance during surgery. A specific application is when performing incisions or drilling for fixation of implants. Robotic arms can be more accurate and repeatable than a surgeon, and can be programmed on before-hand to assist in patient-specific operations.</p> <p>The goal of this project is to identify relevant cases where a surgery assistance robot can be used and implement the controller that will assist a surgeon in performing these operations. A specific example can be incision making, where the robot could guide the surgeon in making an accurate incision based on pre-surgical planning.</p>	Robotics, C++, Linux, ROS	licența
8	Control a robot using a mobile device	<p>Mobile devices became incredibly popular during the past two decades, with several applications that were embraced both by the industry and the consumer population. The benefits of these lightweight portable computers are numerous and they have been used for communication, healthcare, safety, recreation and a multitude of other purposes.</p>	Robotics, web technologies	licența

	<p>The goal of this project is to combine the advantages of robotics and mobile technology for automation applications. Some examples can be remote operation of robots, or notification of a user when robot needs supervision. Eventually, it is up to the student to identify such use cases and opportunities to be explored.</p>		
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