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Nr.crt.	Titlu lucrare	Scurta descriere	Cerinte	Nivel
1	Grapsing strategies for a smart actuated grapple	This thesis is connected to the SEACLEAR2 project (https://seaclear2.eu), and our involvment in developing a smart grapple for handling heavy underwater litter. Our current design allows for complex grasping techniques, which requires defining grasping strategies based on the shape, size, and weight estimation of the object. This work would be able defining the grasping strategies and testing them in a simulated environment.	Robotics ROS	Licența
2	Design and implementation of a zero-backlash motor module	In robotics, we are constantly in need of accurate motors that can consistently drive their shafts at specific positions. Due to the fact that electric motors usually operate at high speeds and low torques, we often rely on gearboxes to reduce the speed and increase the torque. However, gearboxes come with a lot of disadvantages, backlash being one of the greatest. Backlash introduces non-linearities in the output of the motor, which makes the controllers work much more difficult. Several methodologies for gearboxes without backlash have been proposed in the literature, and this project is about evaluating existing ideas and building a motor/gearbox module that incorporates a driver and interfaces with a controller.	3D CAD Mechatronics	Licența
3	Lego sorting machine - Hardware	These thesis topics are connected on the common theme of constructing and operating a sorting machine for Lego pieces. This task can be a tedious one, as there are countless different types of lego pieces in a varierty of colours. However the benefits from having the pieces sorted are numerous, since this allows children to express their creativity faster and easier. There are two parts for this project. One concerns the mechanical construction of the sorter, and the second the software and control part.	3D CAD Mechatronics	Licența
4	Lego sorting machine - Software		Software design	Licența
5	Path planning optimization for mobile robots	This thesis is connected to a possible participation at the European Rover Challenge (https://roverchallenge.eu/en/erc-robotics-competition/). The challenge is about designing an autonomous rover that explores Mars. This subtask is about optimizing the trajectory planning of a mobile robot to reduce energy consumtpion and avoid dangerous terrain.	Robotics ROS	Master

6	Torque control of a BLDC for haptic applications	Traditionally, electrical motors are controlled either in position or in velocity mode, since we usually want to implement robots that follow predefined positions. However, there are numerous advantages to torque control of electric motors, since that can affect the amount of force they deliver to the environment. Using devices that can be controlled under torque we can implement more advanced control strategies (e.g. impedance control), that are safer and more compliant than traditional position or force control. Furthermore, we can explore haptic feedback to humans.	Microcontrollers System theory	Master
7	EMG activated robotic glove for rehabilitation	A stroke is a medical condition that affects the quality of life of millions of people worldwide. A usual symptom of a stroke is the inability to control the motion of ones fingers, resulting in problems achieving every day tasks. The goal of this thesis is to design and implement a device that will perform a passive motion of the fingers of a patient. The device should be easily attached to the patients hand and should control the extention and flexion of each finger separately. Furthermore, the device should interpret the intention of a person for movement based on measurements of surface electromyography (sEMG).	Signal acquisition Biomechanics	Master
8	Online intention prediction of upper limb motion	With the advent of collaborative robots, the opportunity to use robotic arms in the vicinity of humans has emerged. Human-robot collaboration is a rapidly developing field for industrial applications, but can also have significant impact on healthcare related applications, such as rehabilitation. However, in order to implement human-robot collaboration, there has to be real-time and objective communication to the robot about the intentions of the human. The goal of this project is to implement in ROS an already existing algorithm for the prediction of the intention of motion. The training of the algorithm is happening currently offline, but it would be very beneficial to perform this online and in real-time.	Python Signal processing ROS	Master

9	Real-time obstacle avoidance for UAVs	Flying an unmaned aerial vehicle (UAV) can be a challenging task. Especially when flying in narrow spaces or indoors, the user needs to be very well aware of the drone's surroundings to avoid collisions. However, due to difference in perspective, this can often be very demanding. In this project we aim at developing techniques that augment the capabilities of a UAV pilot and ensure and enforce safety margins on the flying paths of UAVs	ROS Mapping	Master