

Nicola Franco

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Experience

Toposens-GmbH

Munich, Germany

ROBOTICS ENGINEER (INTERNSHIP)

Sep. 2019 - Feb. 2020 (6 months)

A 3D ultrasound sensor is able to extract a point cloud from a near-field environment for slowly moving robots. With well-known machine learning techniques, I have created a surface classifier in a three steps procedure: segmentation, fitting and classification.

<https://toposens.com/>

- Creation of a surface classifier with cutting-edge machine learning techniques.
- Design and development of a constrained least-squares algorithm in python, applied after segmentation.
- Built a plugin in Gazebo (C++) to simulate the model and classify several different surfaces.
- Wrote a scientific paper to explain the model and show the result associated.

National Institute for Nuclear Physics, Legnaro national laboratories, INFN - LNL

Padova, Italy

MECHATRONICS ENGINEER (INTERNSHIP)

Feb. 2017 - Sep. 2017 (8 months)

An automatic storage facility of exhausted targets used to allow a drop in radioactivity. The movement was fully autonomous, from target extraction until the storage phase, a prototype of the deposit system has been designed and implemented.

<https://agenda.infn.it/conferenceDisplay.py?confId=13948>

- Logic design for the control of brushless motors with PLC.
- Development of a supervision system with Scada as HMI.
- Sensors implementation for axis position detection.

Projects

Distributed controls

- Implementation in **Gazebo** (C++) of the distributed version of the well-known simplex algorithm, for a tasks assignment problem with multiple **TurtleBots**.
- Design of a **distributed observer** for estimating the state of a continuous-time, linear system, for research activities of a swarm of **quadcopters** (Matlab and Simulink).

Computer vision

- Barcodes detection in a dataset of images and extraction of quality parameters for the evaluation of print execution, with **OpenCV** in C++.

Machine learning

- Developed an algorithm to extract all basic road elements from **apolloscape** dataset of RGB image frames, by training a CNN with **Pytorch** (Python).

Industrial Robotics

- A line-following and **obstacle avoidance** LEGO robot provided with an ultrasonic sensor and a light intensity camera, programmed in **Java** to participate in a university competition.

Mechatronics

- Design and implementation of a **sliding mode control** for a shape memory alloy connected to a spring-mass-damper system, with **Arduino** programmed in Matlab and Simulink.

Education

University of Bologna

Bologna, Italy

M.S. IN AUTOMATION ENGINEERING, 101/110

Sep. 2017 - Dic. 2019

Thesis Title: "Distributed Observer Analysis and Design."

<https://amslaurea.unibo.it/19642/1/Nicola%20Franco.pdf>

University of Padova

Padova, Italy

B.S. IN MECHATRONICS ENGINEERING, 90/110

Sep. 2013 - Jul. 2017

Thesis Title: "Definition of use procedures for a storage prototype of radioactive targets in the SPES system".

<http://tesi.cab.unipd.it/56397/>

Skills

Progr. Languages	<i>Medium knowledge:</i> C++, Python, PLC, Matlab, C, <i>Basic knowledge:</i> JAVA, VHDL
Libraries	Pytorch, Pandas, scikit-image, PCL, OpenCV, Eigen
OS	Linux, ROS, Mac, VxWorks
IDE	CLion, Jupyter Notebook, PyCharm, Visual Studio, Vivado, Unity Pro, Simulink, TIA portal, Eclipse, Arduino IDE
Languages	<i>High knowledge:</i> Italian, English, <i>Basic knowledge:</i> German
Sports	Swimming and Climbing

References

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HEAD OF ROBOTICS

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Toposens GmbH

Munich, Germany