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://www.youtube.com/watch?v=lCyCAb-AQD0`

- Logic design for the control of brushless motors with the PLC and sensors implementation for axis position detection.
- Development of a supervision system with Scada as HMI. Documentation the storage usages and procedures.

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**	***Medium knowledge:*** C++, Python, PLC, Matlab, C, ***Basic knowledge:*** 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	***High knowledge:*** Italian, English, ***Basic knowledge:*** German
	Sports	Swimming and Climbing