Nicola **Franco**

Entusiastic Robotics Geek · AI/machine learning engineer

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Skills

Progr. Languages	***Medium knowledge:*** C/C++, Python, Matlab, Bash, PLC's standards ***Basic knowledge:*** Java, Scala, Go, Prolog, VHDL, Verilog
Libraries	Numpy, Pandas, Pytorch, Keras, scikit-learn, PCL, OpenCV, Eigen
OS	Ubuntu, Mac, ROS, VxWorks
IDE	CLion, Jupyter Notebook, PyCharm, VSC, Vivado, Unity Pro, Simulink, TIA portal, Eclipse, Arduino IDE
Languages	***High knowledge:*** Italian, English ***Basic knowledge:*** German

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 cutting-edge machine learning techniques, I have created a surface classifier in a three steps procedure: segmentation, fitting and classification.

`https://toposens.com/`

- Implementation of an adaptive Gaussian threshold to polar range measurements.
- 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-AQDO`

- 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/`