Francesco Pio Briuolo

Curriculum Vitae

francescobriuolo@gmail.com
Nationality: Italian Date of birth: 23 April 1999

Current Position and Research

PhD Student in Information Technologies for Engineering
University of Sannio, Department of Engineering, Benevento, Italy
40th cycle November 2024 – Present

Doctoral research project: Computer Vision for Mobile Robotics

Research on computer vision and autonomous manipulation for robotic surface sampling in healthcare and pharmaceutical environments, in collaboration with Mosaico Monitoraggio Integrato s.r.l., which co-funds the PhD scholarship.

The research uses the Boston Dynamics Spot quadruped robot equipped with a six-degree-of-freedom robotic arm and gripper, within the FREKI application developed by Mosaico. The overall aim is to support environmental monitoring through automated swab sampling of surfaces.

Current activities include:

- Scene perception using object detection, segmentation, and depth information to identify target surfaces and obstacles.
- Selection of suitable sampling regions based on surface geometry, obstacle clearance, and task feasibility.
- Generation and validation of sampling trajectories, considering manipulator reachability and motion constraints.
- Experimental evaluation of robotic sampling and comparison with manual sampling.
- Simulation in MuJoCo to develop and evaluate classical planning and control methods, providing a baseline for future learning-based approaches.

Additional research interests include reinforcement learning for the control of threshold Boolean networks and the study of opinion dynamics.

International Research Experience

Visiting PhD Student
Norwegian University of Science and Technology (NTNU), Trondheim, Norway October 2026 – Present

Host supervisor: Professor Eleni Kelasidi.

Research on robotic manipulation and surface sampling, with a focus on simulation, task-feasibility analysis, and trajectory planning and control.

Publications

[1] **F. P. Briuolo**, A. M. Di Giacinto, J. Lovecchio, O. R. Natale, C. Del Vecchio, and L. Pecchia, "Vision-Based Autonomous Surface Sampling in Healthcare Robotics: An Integrated Perception-Control Framework with Experimental Validation," in *2026 12th International Conference on Control, Decision and Information Technologies (CoDIT)*, 2026, pp. 3322–3327. doi: 10.1109/CODIT70676.2026.11631223.

Education

MSc in Computer Engineering January 2022 – June 2024
University of Sannio, Department of Engineering
Final grade: 110/110 cum laude

BSc in Computer Engineering September 2017 – October 2021
University of Sannio, Department of Engineering
Final grade: 99/110

Scientific High School Diploma 2012 – 2017
Istituto di Istruzione Superiore Galilei-Vetrone, Benevento, Italy

Master's Thesis

Evaluation of Graph-Based Techniques for Fake News Analysis and Propagation Metrics

Supervisors: Professor Antonio Pecchia and Professor Francesco Vasca.

Investigation of graph-based methods for analysing fake news propagation and supporting its detection. The work included:

- Collection of PolitiFact data through web scraping and construction of a bipartite source–keyword graph, followed by analysis of its projections.
- Analysis of propagation-network features using the FakeNewsNet dataset.
- Development and evaluation of machine learning classifiers and a feedforward neural network, including sensitivity analysis with respect to the selected features.

Technical Skills

Programming: Python, MATLAB, C, Java, R, SQL.

Robotics and computer vision: Boston Dynamics Spot SDK, MuJoCo, object detection, image segmentation, depth-based geometry processing, and trajectory planning.

Machine learning and data analysis: PyTorch, TensorFlow/Keras, reinforcement learning, graph-based analysis, clustering, and principal component analysis.

Databases and data processing: MySQL, MongoDB, Apache Hadoop, Apache Storm, Apache HBase, and Apache Spark.

Software development and infrastructure: Git, GitHub, Linux, Docker/Kubernetes-based environments, Selenium, pytest, pylint, and Sphinx.

Other tools: Xpress Mosel, Microsoft Office.

Selected University Projects

Paper Assignment System

Development of a system to rank potential peer reviewers according to the similarity between their publications and the topics of submitted papers. Activities included publication retrieval, text extraction, and comparison using Jaccard and cosine similarity.

Technologies: Python, Selenium, pytest, pylint, and Sphinx.

Monitoring of a Microservices Application

Deployment and monitoring of the SockShop benchmark application to investigate correlations

between etcd health checks and service interaction failures observed through Istio.

Technologies: Kubernetes, OpenShift, Rancher, Istio, Kiali, and Locust.

Dark Web Monitor

Development of a system to monitor potential credential exposure in data breaches and notify users through email and application alerts.

Technologies: IntelX scraper, MongoDB, MQTT, and Kali Linux.

Data Science and Machine Learning

- Reliability analysis of failure data from a Blue Gene supercomputer using R and Python.
- Clustering and principal component analysis using R.
- Development of a Java MapReduce application and exploration of stream processing with Apache Storm.
- Implementation of feedforward neural networks and autoencoders using TensorFlow/Keras.

Parallel Gaussian Elimination

Implementation and optimisation of parallel Gaussian elimination on the University of Sannio computing cluster.

Technologies: C, MPI, and Linux.

Internships

Research Internship — University of Sannio 2024

Literature review on information disorder, machine learning for fake news detection, and graph-based analysis. Evaluation of public datasets, with particular attention to FakeNewsNet and news propagation data.

Supervisor: Professor Antonio Pecchia.

Software Development Internship — SADAS 2021

Design and implementation of a web application and its database.

Supervisors: Professor Lerina Aversano and Engineer Vincenzo Minei.

Language Skills

Italian: Native language.
English: Good listening, reading, and writing skills (self-assessed).

Interests

Football and sport, with experience in amateur football at We'll Come United Benevento, a club promoting inclusion and social integration.