Vincenzo Barbuto

PhD Student

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Homepage
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SC Scopus ID

Education

Visiting Student Researcher, *University of California, Berkeley* 03/2024 – present
Leverage the Lingua Franca coordination language to enhance the determinism of Edge Intelligence-based IoT systems. Berkeley, USA

PhD in Information and Communication Technologies, *University of Calabria* 11/2022 – present
Intelligence at the IoT Edge: models and techniques for enabling smartness in IoT systems. Cosenza, Italy

M.S. Computer Engineering for the Internet of Things, *University of Calabria* 09/2020 – 09/2022
Final Score 110/110 cum laude Cosenza, Italy

M.S. in Data Science and Network Intelligence, 09/2021 – 07/2022
Télécom SudParis, Institut Polytechnique de Paris Évry, France
GAP 18,34/20

B.S. in Computer Engineering, *University of Calabria* 09/2017 – 09/2020
Final Score 105/110 Cosenza, Italy

Professional Experience

Teaching Assistant, *University of Calabria* 03/2023 – 09/2023
Assisted first-year students in learning the C programming language Cosenza, Italy

Research Trainee - IoT and Digital Twins, *DICE Lab* 02/2022 – 06/2022 Évry, France
- Implemented a **Traffic Monitoring System** based on **Digital Twins** and **Edge AI**
- **99,87% of bandwidth saved** with respect to a Cloud-centric approach
- **inferences performed from 2 to 10 times faster** in the edge device than in a remote server

Software Engineer, *Calió Informatica S.R.L* 12/2020 – 09/2021 Cosenza, Italy
- Reduced the http request throughput of a platform that manages over five million invoices per year by **using the browser cache**
- Reduced the processing time of a huge number of downloaded invoices **by exploiting threads and parallelism in C#**
- **Exploited SQL bulk functions** to reduce both the insertion and update time of warehouse's items in a Content Management System (CMS)

Projects

Lingua Franca, 03/2024 – present
A polyglot language for deterministic concurrency and timed behavior
- Implemented a Machine Learning library for **Edge AI** in Lingua Franca using the **TensorFlow Lite** framework: **edgeai-python**
- Enhanced the **VS Code Extension** with a ***Package Explorer*** for managing local and remote packages, enabling a low-code interface comparable to state-of-the-art IoT tools.

Diabetes Management System, 2022

IoT system able to manage autonomously Type 1 Diabetes Mellitus patients

- Designed an improved IoT system using an **hybrid-fog network architecture** that exploits **in-network computing**
- **Reduced computing time by 70% moving some computation from the cloud to edge and fog devices**

Health Environment, 2021

IoT system able to monitor remotely the environment of a home for elderly

- **Acquired experience with MQTT** protocol **using OMA LwM2M semantic** for the topic definition
- Acquired experience with time series databases such as **InfluxDB**
- Processed, analyzed and displayed huge amount of data acquiring experience with tools such as **NodeRed, Grafana** and **OpenHAB**

Publications

Generative Digital Twins: A Novel Approach in the IoT Edge-Cloud Continuum, 08/2024

IEEE

Savaglio, C.; Barbuto, V.; Mangione, F.; Fortino, G. in *IEEE Internet of Things Magazine*

Towards an Edge Intelligence-based Traffic Monitoring System, *IEEE* 10/2023

Barbuto, V.; Savaglio, C.; Minerva, R.; Crespi, N.; Fortino, G.
In 2023 IEEE International Conference on Systems, Man, and Cybernetics (SMC), IEEE.

Opportunistic Digital Twin: an Edge Intelligence enabler for Smart City, *ACM* 08/2023

Savaglio, C.; Barbuto, V.; Awan, F. M.; Minerva, R.; Crespi, N.; Fortino, G. ACM Transactions on Sensor Networks

Disclosing Edge Intelligence: A Systematic Meta-Survey, *MDPI* 03/2023

Barbuto, V.; Savaglio, C.; Chen, M.; Fortino, G. Big Data Cogn. Comput. 2023, 7, 44.

Awards

Most deserving student, *in Computer Engineering for the IoT* 2022

Most dedicated and highest-achieving student among the Internet of Things (IoT) students within the Department of Computer, Modeling, Electronic, and System Engineering, University of Calabria for the academic year 2020-21 and 2021-22

DIMES Excellence Program, *in Computer Engineering* 2021

Outstanding undergraduate student in the Department of Computer, Modeling, Electronic, and System Engineering, University of Calabria for the academic year 2020-21