Vincenzo Barbuto

PhD Student

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Education

Visiting Student Researcher, *University of California, Berkeley* 🔗
Leverage the Lingua Franca coordination language to enhance the determinism of Edge Intelligence-based IoT systems.
<div align="right">03/2024 – present · Berkeley, USA</div>

PhD in Information and Communication Technologies, *University of Calabria* 🔗
Intelligence at the IoT Edge: models and techniques for enabling smartness in IoT systems.
<div align="right">11/2022 – present · Cosenza, Italy</div>

M.S. Computer Engineering for the Internet of Things, *University of Calabria* 🔗
Final Score 110/110 cum laude
<div align="right">09/2020 – 09/2022 · Cosenza, Italy</div>

M.S. in Data Science and Network Intelligence,
Télécom SudParis, Institut Polytechnique de Paris 🔗
GPA 18,34/20
<div align="right">09/2021 – 07/2022 · Évry, France</div>

B.S. in Computer Engineering, *University of Calabria* 🔗
Final Score 105/110
<div align="right">09/2017 – 09/2020 · Cosenza, Italy</div>

Professional Experience

Teaching Assistant, *University of Calabria* 🔗
Assisted first-year students in learning the C programming language
<div align="right">03/2023 – 09/2023 · Cosenza, Italy</div>

Research Trainee - IoT and Digital Twins, *DICE Lab* 🔗
- 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
<div align="right">02/2022 – 06/2022 · Évry, France</div>

Software Engineer, *Caliò Informatica S.R.L* 🔗
- 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)
<div align="right">12/2020 – 09/2021 · Cosenza, Italy</div>

Projects

Lingua Franca, 🔗
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.
<div align="right">03/2024 – present</div>

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

A Generative AI-Driven Architecture for Intelligent Transportation Systems, *IEEE*   11/2024
Mangione, F., Barbuto, V., Savaglio, C., Fortino, G. Accepted in 2024 *IEEE 10th World Forum on Internet of Things (WF-IoT)*

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 *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 and Cognitive Computing*

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