

Alessandro Pomponio

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Experience

IBM Research Europe

RESEARCH ENGINEER - NEXT GENERATION SYSTEMS AND CLOUD

Dublin, Ireland

Apr. 2022 - Present

- Contributed to the development of the Simulation Toolkit for Scientific Discovery (ST4SD).
- Blog post: <https://research.ibm.com/blog/ibm-simulation-toolkit>

IBM Research Europe

MASTER THESIS INTERNSHIP

Dublin, Ireland

Jul. 2021 - Dec. 2021

- Ran Spark benchmarks on Kubernetes and OpenShift clusters on IBM Cloud.
- Monitored performance metrics via Prometheus and Grafana.
- Developed a Jupyter notebook that estimates possible time savings by eliminating straggler tasks.

OCEM Airfield Technology

BACHELOR THESIS INTERNSHIP

Valsamoggia, Italia

Nov. 2018 - Feb. 2019

- Development of a middleware for publish/subscribe communication to be integrated in pre-existing airport control systems.
- Development of a logging system for insulation resistance measurements.
- Development of a REST API to allow access to the logging database using web technologies.
- Development of a web client to access logs via browser.

Skills

Programming languages Go, Python, C#, Java, C, SQL, Javascript, Bash, \LaTeX .

Languages Italian (mother tongue), English (level C1), Spanish (basic knowledge).

Education

Alma Mater Studiorum (University of Bologna)

MASTER'S DEGREE IN COMPUTER ENGINEERING

Bologna, Italia

Mar. 2022

Thesis "*Methods and Tools for the Diagnosis of Performance Bottlenecks in Kubernetes-based Spark workloads via Straggler Analysis*"

In collaboration with IBM Research Europe in Dublin

Alma Mater Studiorum (University of Bologna)

BACHELOR'S DEGREE IN COMPUTER ENGINEERING

Bologna, Italia

Feb. 2019

- Thesis "*Publish/subscribe monitoring of an airfield control system*"
In collaboration with OCEM Airfield Technology in Valsamoggia

Projects

Project work on "Infrastructures for Cloud Computing and Big Data"

UNIVERSITY PROJECT

University of Bologna

- Explored the FaaS landscape running tests meant to evaluate its maturity.
- Gained hands on experience with tools like Docker, Kubernetes and Helm.
- Benchmarked the main open source FaaS frameworks: Knative, Apache OpenWhisk, OpenFaaS, Fission.
- Ran tests across different container engines to evaluate their impact on performance.

Admin-bot

LEAD DEVELOPER

- Bot for the automatic moderation of Telegram groups, currently in use in a group with 3100 members.
- Anti spam and anti flooding functionalities.
- Feature-based checks on media, with automated removal of blacklisted content.
- Automated NSFW content recognition using Tensorflow models.
- Automated recognition of "bot" users using Markov chains.

Analysis API

LEAD DEVELOPER

- Microservice-based, REST-powered API for analyzing media and text.
- Feature-based media fingerprinting.
- NSFW content recognition.
- Gibberish text detector.
- Scalable architecture.

Playing Atari Bowling with Reinforcement Learning

UNIVERSITY PROJECT

Jun. 2021

- Autonomous agent playing Atari Bowling.
- Learning from experience using Reinforcement Learning.
- Using the game score and the game screen to guide learning.
- Trained using the Proximal Policy Optimization (PPO) algorithm and an Actor/Critic convolutional neural network.

Honors

1st place - CRIF Open Banking Innovation Hackathon

Bologna, Italia

TEAM CIRAM

Nov. 22-23, 2019

- Created "Perfect Split", a service dedicated to expense splitting among housemates and friends.
- Use of Open Banking APIs to automatically manage transactions between members.
- Developed the backend part in Go, leveraging AWS services like API Gateway, Lambda and DynamoDB to grant scalability.
- Awarded a 5000 Euro prize.

Huawei Seeds for the Future

Online

PARTICIPANT

Nov. 2-6, 2020

- Chosen as part of a group of 10 Italian students to receive training on ICT subjects, Chinese culture, leadership and the history of Huawei as a company.
- Followed courses on 5G, AI, Cloud, IoT, Cybersecurity, Smart Cities, Strategic Leadership and culture awareness.

Merit award for deserving students A.Y. 2020/21

University of Bologna

WINNER

Academic Year 2020/2021

- Awarded a 1500 euro study grant from the University of Bologna for academic performance.

2nd place - Fundamentals of Artificial Intelligence students' challenge

Bologna, Italia

TEAM B2P

Apr.-May, 2020

- Created "Penicilin", a Java-based intelligent agent designed to play Tablut with Ashton's rules.
- Use of bitwise operations to have a small memory footprint and better performance.
- Use of multithreading techniques to reach up to 5 million nodes explored per second.
- Became the "Reaper" record holder, for the highest average captures: 6.31 (the previous record was 5.75).

Publications

The Advent of the Internet of Things in Airfield Lightning Systems: Paving the Way from a Legacy Environment to an Open World

MDPI

CO-AUTHOR

Oct. 2019

- This paper discusses the design and prototype implementation of a software solution facilitating the interaction of third-party developers with a legacy monitoring and control system in the airfield environment. By following the Internet of Things (IoT) approach and adopting open standards and paradigms such as REpresentational State Transfer (REST) and Advanced Message Queuing Protocol (AMQP) for message dispatching, the work aims at paving the way towards a more open world in the airfield industrial sector. The paper also presents performance results achieved by extending legacy components to support IoT standards. Quantitative results not only demonstrate the feasibility of the proposed solution, but also its suitability in terms of prompt message dispatching and increased fault tolerance.
- Available at <https://www.mdpi.com/1424-8220/19/21/4724>