Luigi Fusco

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Education

2020 - Present **M.Sc. Computer Science Engineering**, *Politecnico di Milano*.
Focus on Machine Learning, Distributed Systems, and High Performance Computing.

2017 - 2020 **B.Sc Computer Science Engineering**, *Politecnico di Milano*, 110L/110.
Thesis work consisted of the 3D online game development of the tabletop game "Santorini".

Work Experience

Jun 2021 - Sep 2021 **CERN - Software Engineering Summer Internship**.
Developed a system to provide a remote GUI for the *Alice O2* software using C++, JavaScript, and WebGL. The project consisted in the development of a custom backend for the *Dear ImGui* library, including a web app, integration with the internal WebSocket system, and supporting simultaneous clients, streaming vertex buffer data for remote visualization and control.

Projects

Mar 2022 - Ongoing **GrCUDA - Support for Sparse Computations**.
Working on **GrCUDA**, a polyglot CUDA API integrated in GraalVM, to add support for sparse data structures and computations, implementing a numpy-like interface backed by custom CUDA data structures.

Mar 2022 - Jul 2022 **Distributed Noise Level Analysis**.
Implemented a full system for capturing, collecting, and analyzing noise level data coming from mobile sensors for the *Middleware Technologies for Distributed Systems* course, using **ContikiNG** on IoT devices, **Node Red** on the edge, **Spark** for streaming data analysis, **Mosquitto** and **Kafka** for communication.

Sep 2021 - Ongoing **SHADER - Smart Home Automated DEmand Response**.
Multidisciplinary project part of the Alta Scuola Politecnica. Working on the development of cosimulation models to predict the energy usage, cost, and production of the household and perform model predictive control. The objective is to reduce HVAC systems related costs while increasing user comfort.

Mar 2021 - Jun 2021 **Hardware Acceleration of Image Registration Metrics**.
Implemented hardware accelerators targeting Xilinx FPGA systems using **HLS** tools to compute the mutual information metric and its gradient targeting image registration. Chosen as finalist for the PhD category of the *2021 Xilinx Open Hardware* competition (project name GEM: Gradient Enabled Mutual-information).

Oct 2020 - Feb 2021 **CLup: Customer Line-up - Digital Queue System**.
Design, implementation and testing a software prototype to handle queues of supermarkets in context of the global COVID-19 pandemic for the *Software Engineering 2* course. Produced the **RASD, DD, and ITD** documents, and performed testing. The implementation consisted of a React frontend and a node.js backend.

Extracurricular Programs

2020 - 2022 **Alta Scuola Politecnica**.
International honors program in parallel with the M.Sc. courses. A path of interdisciplinary training to understand the complex relationships between science, innovation, technology and socio-economic systems.

Feb 2018 - May 2018 **Cyberchallenge**.
Cyber security training program. The major Italian initiative to identify, attract, recruit, and place the next generation of cybersecurity professionals.

Publications

2020 M. Di Gennaro, **L. Fusco**, I. Di Dio Lavore, E. D'Arnese, and M. D. Santambrogio, "A faster approach to ecg analysis in emergency situations," in *2020 42nd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)*, IEEE, 2020, pp. 312–315.
DOI: 10.1109/EMBC44109.2020.9175906.

Hard skills

Languages: Python, C, Java, Javascript, C++, SQL

Others: Tensorflow, Keras, Pandas, Vivado HLS, Docker

Languages

Italian: Mother tongue

English: Level C1 – FCE 184/190

Japanese: Beginner