Davide Basso

Curriculum Vitae

Personal Information

nationality Italian

Summary

I'm a 3rd year PhD candidate in Applied Data Science and Artificial Intelligence and MSc graduate in Data Science and Scientific Computing at the University of Trieste (Italy). My passion lies in bridging the gap between industrial applications and groundbreaking research, which I believe is my true calling. I'm thrilled to work in dynamic environments where I can contribute to collective goals while pursuing personal and professional growth.

Research Experience

2022 - 2025 **Ph.D. Applied Data Science & Artificial Intelligence**, *Università degli Studi di Trieste, Infineon Technologies*, Research Subject: Automated floorplanning and routing algorithms for layout of AMS circuits

- SMACD 2024 - Winner of EDA Competition paper: "Fast ML-driven Analog Circuit Layout using Reinforcement Learning and Steiner Trees". A full RL approach, and a combination with Simulated Annealing, are proposed together with Minimum Steiner Trees global routing technique. Both techniques are integrated into a procedural generator, shrinking layout generation time from 3 working days to just 21 minutes on circuits up to 8 components.
- DATE 2025 Accepted Paper: "Effective Analog ICs Floorplanning with Relational Graph Neural Networks and Reinforcement Learning". A combined Relational Graph Neural Network (RGCN) based representation learning and RL agent approach is proposed to generate analog circuits floorplan. Floorplans can satisfy typical topological constraints as symmetry, alignment and fixed aspect ratio arrangement. Overall layout time is reduced by 67.3% with a 8.3% mean area reduction compared to manual layout on complex 17-block driver circuit.

Education

2020 - 2022 **M.Sc. Data Science & Scientific Computing**, *Università degli Studi di Trieste, Università degli Studi di Udine, Sissa, ICTP*, Curriculum: Artificial Intelligence and Machine Learning. Final Grade: 110/110 cum Laude

Relevant skills and projects:

- Designed and implemented a command line version of the Italian Draughts game, written in Java and following Test Driven Development approach combined with Build Automation and Continuous Integration tools (Gradle, TravisCI) (**GitHub link**).
- Implemented Conditional Deep Convolutional GANs, applied to the MNIST dataset, and Pix2Pix, for Image-to-Image Translation, using PyTorch and offering CUDA support (**GitHub link**).
- Implemented a convolution algorithm in order to blur an image in a parallel way, using both MPI and OpenMP standards, with also availability to choose between different Kernels (Mean, Weight and Gaussian).

2017 - 2020	**B.Sc. Electronic and Computer Engineering**, *Università degli Studi di Trieste*, Curriculum: IT Applications, Final Grade: 108/110

Work Experience

Mar 2022 - Sept 2022	**AI for Analog & Mixed Signal MSc Student**, *Infineon*, Villach (AT)

- Designed and implemented three algorithms to automatically place chip components on a canvas. Project developed using Python.
- Achieved optimal solutions in terms of area minimization by using Simulated Annealing alone and combined with Reinforcement Learning.
- Embedded the algorithms into company proprietary software to generate circuits' layout and tested on multiple chip configurations with an improvement of 28% on average in terms of reduction of circuit's occupied area.

Nov 2021 - Feb 2022	**AI & Machine Vision SW Engineer Intern**, *beanTech*, Udine (IT)

- Designed and developed a microservices architecture for industrial applications of Machine Vision and Deep Learning, implemented in Python.
- Achieved multithread data sharing and message passing between the different microservices by using respectively Redis Lists and MQTT protocol.
- Made the microservices architecture available as a Python library on company's private repository in order to be used as basis for future projects.
- Designed, implemented and tested Machine Vision algorithms (preprocessing and classification) through OpenCV to solve problem of defect detection on washers.
- Experience with version control, git, gitflow and continuous integration.

Languages

Italian	Native proficiency
English	FCE attested B2 level
German	Elementary

Trieste, January 2025