Gianluca Scarpellini

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EDUCATION

ITALIAN INSTITUTE OF TECHNOLOGY
PhD in Computer Science
Present | Genoa, Italy

UNIVERSITY OF MILANO-BICOCCA
MS in Computer Science
Oct 2020 | Milan, Italy
BS in Computer Science
Jul 2018 | Milan, Italy

LINKS

gianscarpe
gianlucascarpellini

COURSEWORK

UNIVERSITY
Advanced Machine Learning
Computer Vision
Robotics
Probabilistic models
Machine Learning

ONLINE COURSES
AGI Safety Fundamentals [BlueDot]
Deep Reinforcement Learning [GitHub]
Probabilistic Machine Learning (Coursera)

SUMMER SCHOOLS
Probabilistic AI Summer School 2022
Eastern European Summer School 2021
Mediterranean Summer School 2021

SKILLS

PROGRAMMING LANGUAGES
Python • C++ • Node.js • C# • Matlab

Proficiency with:
Opencv • Pytorch • Pytorch-lightning
Jax • Haiku • Beam • Habitat

ABOUT ME

- Ph.D. student and former intern at **DeepMind** with experience in leading projects on Computer Vision and Reinforcement Learning with 2 published papers, 4 papers under review, and 1 patent application;
- Significant contributions to the open-source community of **PyTorch Lightning** with 4 merged PRs and 1,000 lines of code.

EXPERIENCE

DEEPMIND | Research Engineer Internship
Sep 2022 - Jan 2023 | Robotics Team, London, UK

- Conducted extensive research and developed a novel algorithm to optimize **offline policy evaluation on real robots**, improving efficiency by up to 10x;
- Adopted best practices for scaling jobs (Beam) in a complex distributed environment (thousands of GPUs and CPUs);
- Submitted **paper** to top-tier conference (under review) and for **patent** examination.

ITALIAN INSTITUTE OF TECHNOLOGY | PH.D. Student
Mar 2020 – Present | Genova, Italy

- Contributed to *Positional Diffusion*, a novel **Diffusion Models** formulation based on graphs that achieves state-of-the-art results on ordering text and outperforms long-lasting optimization methods for solving puzzles (over 98% accuracy on puzzles of any size) [1] [Github]
- Designed a pipeline that leverages **curiosity-driven exploration** to improve a robot **object-detector** by 6% in challenging photorealistic scenarios (Habitat) without any human interventions [2, 3];
- Devised the first pipeline for solving **3D human pose estimation** with a single **event camera**, outperforming stereo-based approaches [4][Github | Blog];
- Collaborated on proposing a novel method for person re-identification with event-cameras [5];
- Mentored 2 **master students** working on Diffusion Models.

PYTORCH LIGHTNING | Open Source Contributions
Sep 2020 - Present

- Implemented an instance segmentation metric for Pytorch Lightning - Torchmetrics [PR]
- Refined multi-gpu utilities [PR]
- Refactored tests for single and multi-gpus [PR]
- Reviewed internal design choices [PR]

ARGO VISION | Research Engineer Internship
May 2019 - Jan 2020 | Milan, Italy

- Directed a project on **aerial semantic segmentation** through deep learning, achieving IOU > 80% through hyperparameters optimization (Keras, Hyperopt);
- Improved models for **car model and maker classification** (200 classes) with accuracy > 80% (Keras);
- Engineered a **plate detection & OCR** pipeline on Raspberry PIs for real applications;

PUBLICATIONS

[1] Francesco Giuliari*, Gianluca Scarpellini*, Stuart James, Yiming Wang, and Alessio Del Bue. Positional diffusion: Ordering unordered sets with diffusion probabilistic models. Under review, 2023.

[2] Gianluca Scarpellini, Stefano Rosa, Pietro Morerio, Lorenzo Natale, and Alessio Del Bue. Self-improving object detection via disagreement reconciliation. *arXiv preprint arXiv:2302.10624*, 2023.

[3] Gianluca Scarpellini, Stefano Rosa, Pietro Morerio, Lorenzo Natale, and Alessio Del Bue. Look around and learn: self-improving object detection by exploration. *arXiv preprint arXiv:2302.03566*, 2023.

[4] Gianluca Scarpellini, Pietro Morerio, and Alessio Del Bue. Lifting monocular events to 3d human poses. In *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, pages 1358–1368, June 2021.

[5] Shafiq Ahmad, Gianluca Scarpellini, Pietro Morerio, and Alessio Del Bue. Event-driven re-id: A new benchmark and method towards privacy-preserving person re-identification. In *Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, pages 459–468, 2022.

[6] Gianluca Scarpellini, Ksenia Konyushkova, Claudio Fantacci, Tom Le Paine, Yutian Chen, and Misha Denil. π2vec: Policy representations with successor features. Under review.