Filippo Ziliotto

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ABOUT ME

PhD candidate in Artificial Intelligence, collaborating with Fondazione Bruno Kessler (FBK) in Trento. My research in Embodied AI focuses on LLM-guided robot navigation, long-tail object search, and user-personalized behaviors. I hold an M.Sc. in Physics, with a thesis on optimizing Vision Transformers in low-data regimes. Driven by a passion for AI research, I aim to contribute to advancements in this dynamic field.
Google Scholar: *https://scholar.google.com/citations?user=LaioU1YAAAAJ*

WORK EXPERIENCE

DIPARTIMENTO DI SCIENZE STATISTICHE - UNIPD – PADOVA, ITALY

SOFTWARE ENGINEER – APR 2021 – 1 SEP 2024

R Package Development and Maintenance. I am proud to have been one of the main contributors to the development of the DIMORA R package, which is the first R library to utilize innovation-diffusion models for product growth analysis. Detailed informations about the package at https://www.rdocumentation.org/packages/DIMORA/versions/0.3.4.
This library was written for the book *"Guidolin, M. (2024).* **Innovation Diffusion Models**
Understand innovation diffusion models and their role in business success*, First Edition. John Wiley & Sons Ltd."*

UNIVERSITÀ DEGLI STUDI DI PADOVA – PADOVA, ITALY

TEACHING ASSISTANT – 1 OCT 2023 – 1 MAR 2025

Teaching Assistant for the "Vision and Cognitive Systems" course in the Master's program in Computer Science. Assisted in delivering the course for two consecutive years.

CERN - EUROPEAN COUNCIL FOR NUCLEAR RESEARCH – GENEVA, SWITZERLAND

APPLIED PHYSICS – 30 APR 2022 – 31 OCT 2022

Python Software Engineer and Data Analyst for the Collimation Team at the LHC during Run-3, responsible for implementing new features on the current LHC-collimation software and analyzing all real-time data. For privacy regulations the repository is private.

EDUCATION AND TRAINING

1 OCT 2023 – CURRENT Padova, Italy
PHD CANDIDATE Università Degli Studi di Padova

Research project: "Embodied AI with commonsense". Robotic navigation.

Field of study Natural sciences, mathematics and statistics

SEP 2020 – APR 2023 Padova, Italy
MASTER DEGREE Università Degli Studi di Padova

Physics of Data.
Core Courses: VISION AND COGNITIVE SERVICES, HUMAN DATA ANALYTICS, NETWORK SCIENCE, NEURAL NETWORKS AND DEEP LEARNING, ADVANCED STATISTICS FOR PHYSICS ANALYSIS.

Address 35100, Padova, Italy | **Field of study** Physics | **Final grade** 110/110 Cum laude |

Thesis Extending SSL patches spatial Relations in Vision Transformers for Detection tasks

SEP 2015 – JUL 2020 Padova, Italy

BACHELOR DEGREE Università Degli Studi di Padova

Address 35100, Padova, Italy | **Field of study** Physics | **Final grade** 91/110 |

Thesis Amino acids sequences computational analysis for protein folding topology

CORE SKILLS

Machine & Deep learning

Analysis & Problem-Solving

Ability to work independently

PUBLICATIONS

2025

TANGO: Training-free Embodied AI Agents for Open-world Tasks

Large Language Models (LLMs) have demonstrated excellent capabilities in composing various modules together to create programs that can perform complex reasoning tasks on images. In this paper, we propose TANGO, an approach that extends the program composition via LLMs already observed for images, aiming to integrate those capabilities into embodied agents capable of observing and acting in the world. Specifically, by employing a simple PointGoal Navigation model combined with a memory-based exploration policy as a foundational primitive for guiding an agent through the world, we show how a single model can address diverse tasks without additional training. We task an LLM with composing the provided primitives to solve a specific task, using only a few in-context examples in the prompt. We evaluate our approach on three key Embodied AI tasks: Open-Set ObjectGoal Navigation, Multi-Modal Lifelong Navigation, and Open Embodied Question Answering, achieving state-of-the-art results without any specific fine-tuning in challenging zero-shot scenarios.

Ziliotto, F., Campari, T., Serafini, L., & Ballan, L. (2024). TANGO: Training-free Embodied AI Agents for Open-world Tasks. arXiv preprint arXiv:2412.10402.

2023

JACOW: Mitigation of losses at injection protection devices in the CERN LHC

During loss maps performed with beam at injection energy in the LHC to validate collimation settings, with the high octupole and chromaticity settings used for multi-train operation, large beam losses were observed at an injection protection device (TDIS). Although these losses did not present a threat to machine operation or protection, mitigating them is of high importance to reduce the local radiologial-activation. Various strategies were developed to mitigate these losses, such as octupole setting optimization at constant Landau damping and vertical tune reduction. Further optimization of collimator settings is also considered. Results of experimental tests and first simulations are reported here together with considerations for the future.

Co-author

2023

Advanced Loss Map Analysis for Performance Assessment of the LHC Collimation System

Due to the rapid progress of the LHC performance, it is essential to monitor the damage potential of the circulating beams. For this purpose, loss maps are done regularly during beam operation by intentionally inducing controlled beam losses. Loss map analysis is a fundamental tool to assess the performance of the LHC collimation system. Here, we further develop the available analysis tools by integrating new features in the existing framework, such as the possibility to normalize beam loss signals to the flux of lost particles or to the total power lost during the loss map. These methods were tested on measurements performed during Run 3 and used to evaluate and compare the performance between crystal and standard collimation, as well as to calibrate the BLM beam dump thresholds for a more efficient operation. We present a theoretical overview of the features, as well as some practical code examples.

Co-author

HONOURS AND AWARDS

20 NOV 2024

Prize for youth entrepreneurship – StartCup Padova

Awarded for excellence, **SAFIRIS** a innovative startup specializing in *cybersecurity and artificial intelligence*. The goal is to safeguard organizations against the unauthorized dissemination of sensitive content through cutting-edge add-ons and AI solutions.

CERTIFICATES

OCT 2021

SQL for Data Science

Coursera

Link https://www.coursera.org/account/accomplishments/certificate/MV5Y7TKTNDC3

JUN 2021

Advanced NLP with Python for Machine Learning

LinkedIn

MAY 2021

Julia for Data Science

LinkedIn

PROJECTS

Deep Posture multitasking Recognition in Smart Beds with Deep Multitask Learning

Computer Vision project. I studied and outperformed state-of-the-art models in the classification of both subjects and 17 different in-bed postures using a dataset made up of pressure maps from a smart bed. Our proposed model was built from scratch and implemented a simplified version of the GoogleNet that makes use of stacked inception blocks (GitHub)

Link https://github.com/ZiliottoFilippoDev/Human-Data-Analytics/blob/main/Crudele-Ziliotto.pdf

Self-Supervised Image Colorization through Segmentation Networks

Computer Vision project. I implemented image colorization with standard CNNs (Resnet) by adding the additional information of segmentation networks to apply different training weights. We took a grayscale image as input and attempted to produce a coloring scheme (GitHub).

Link https://github.com/ZiliottoFilippoDev/Image-Colorization-through-Segmentation-Networks/blob/faed6d1a0730de39ff9d89021fa3510ade49281b/paper.pdf

Neural Visual Stimuli Reconstruction using kinetic Ising model

Computational Physics project. I programmed and reconstructed the response of real brain signals from Zebrafish through the maximization of a log-likelihood. The final goal was to scale the project through Big Data tools to thousands of neurons and understand the relative importance of each one (GitHub).

Link https://github.com/ZiliottoFilippoDev/Neural-activity-analysis-and-inference/blob/main/LoCP_presentation.pdf

LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
ENGLISH	C2	C2	C2	C1	C2
FRENCH	A1	A1	A1	A1	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

HOBBIES AND INTERESTS

Developing programming projects

Participating in hackathons

Playing music

CONFERENCES AND SEMINARS

10 JUN 2025 – 15 JUN 2025 Nashville
CVPR25

The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR)

11 JUN 2025 – 16 JUN 2025 Catania, Italy
ICVSS25

International School of Computer Vision

Link https://icvss.dmi.unict.it/icvss2025/

I hereby authorize the use of my personal data in accordance with the EU Regulation 2016/679 (GDPR).