Franco Terranova

Artificial Intelligence and Data Engineering Student, Intelligent Automation Enthusiast

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EDUCATION

Master's Degree in Artificial Intelligence and Data Engineering

University of Pisa

09/2021 - 09/2023 GPA: 30.00+/30.00

The master's degree in Artificial Intelligence and Data Engineering challenges the design and the implementation of systems able to efficiently manage large amounts of data and extract useful knowledge from this data, by exploiting the latest artificial intelligence techniques.

Thesis: Self-driving telescopes - Reinforcement learning for planning astronomical observations

Relevant Coursework:

- Internet of Things
- Data Mining and Machine Learning
- Symbolic and Evolutionary AI
- Computational Intelligence and Deep Learning
- Cloud Computing
- Distributed Systems

Bachelor's Degree in Computer Engineering

University of Pisa

09/2018 - 07/2021 Final Grade: (110/110) cum laude (with honors)

The bachelor's degree in Computer Engineering provided me an intersectoral engineering knowledge and in-depth computer skills, with a particular focus on developing and managing computer systems and networks, company information systems, and software applications.

Thesis: Artificial Intelligence for emotion recognition using data gathered from a wearable sensor network

Relevant Coursework:

- Software Engineering
- Computer Networks
- Computer Architecture
- Databases
- Operating Systems
- Digital Electronics
- Digital Communications
- Foundation of Systems and Control

EXPERIENCE

Master's Degree Thesis Research

Fermi National Accelerator Laboratory (Fermilab)

05/2023 - 08/2023 Chicago, Illinois

Over the next few months, I will be conducting research for my master's degree thesis in collaboration with the DeepSkies Lab, Fermilab, and the University of Chicago. The primary focus of my research lies in the domain of deep reinforcement learning techniques applied to a self-driving telescope, considering value-based networks, policy-based networks, and evolutionary strategies. Additionally, I aim to develop a comprehensive framework that will be applied to a ground-based telescope my group has access to. The objective of this project is to enhance astronomical observations by automating the process of how telescopes scan through their targets, thereby optimizing the process.

AI/Machine Learning Internship

European Space Agency (ESA)

11/2022 - 04/2023 Köln, Germany

During my internship with the Spaceship EAC team (ESA) in collaboration with the German Aerospace Center (DLR), my primary objective was to develop artificial intelligence methods for the detection of Spaceflight Associated Neuro-ocular Syndrome (SANS). Throughout the internship, my focus was on implementing deep learning techniques to identify SANS, utilizing object detection models, deep convolutional neural networks, computer vision methods, and federated learning. As part of this work, a web application was created to support these models, and it is currently being considered for a potential future technology demonstration on the International Space Station (ISS).

Software Engineering Internship

Fermi National Accelerator Laboratory (Fermilab)

07/2022 - 09/2022 Chicago, Illinois

During my internship at Fermilab, I was involved in software development for GlideinWMS, a workload management system enabling experiments such as CMS at CERN, DUNE at Fermilab, and others to efficiently access vast computing resources. My primary focus was the design of a flexible and modular code skeleton at the worker node. Additionally, I worked on exploring the application of machine learning techniques to tackle the job/site allocation problem.

PERSONAL & UNIVERSITY PROJECTS

• IoT Solution for a Smart Moon Transportation System (10/2022 - 06/2023)
Part of a team of students ranked 3rd position in the worldwide competition "Over the Dusty Moon Challenge", organized by the Colorado School of Mines and Lockheed Martin. Our goal has been the design of a regolith transport solution for the Moon. My contribution was the development of an IoT solution for monitoring the dust and regolith processed by the system and an AI object detection model to monitor the presence of rocks.

• Mixed Precision Support Vector Machines (12/2022 - 02/2023)
• Convolutional Neural Networks for Galaxy Classification and Detection (11/2022 - 01/2023)
• Process Mining of a potential AI-based software factory for Marine Plastic detection (11/2022 - 01/2023)
• Information retrieval based Inverted Index for massive scale search (10/2022 - 01/2023)
• Sentiment analysis on Metaverse's opinion on Twitter (06/2022 - 07/2022)
• Multi-set bloom filter in parallel cloud computing with implementation in Hadoop and Spark (05/2022 - 06/2022)
• Android pervasive and intelligent application for accessibility support to wheelchair users (04/2022 - 06/2022)
• Erlang communication layer for the support of horizontal federated learning techniques (12/2021 - 02/2022)
• NoSQL large-scale and multi-structured database for a music recommendation system (10/2021 - 02/2022)
• Machine learning techniques for clustering users according to their personality (11/2021 - 01/2022)
• Time series and residuals analysis of the ocean heat content (11/2021 - 12/2021)
• Distributed peer-to-peer application for sharing up-to-date data on the COVID-19 pandemic (12/2020 - 02/2021)

PRESENTATIONS & POSTERS

- Ritter, S., Terranova, F., Stern, C., Tuohy, E., Cowley, A., Drescher, J. & Sznitman, R. (2023). "Federated Learning for Space Medicine Research and its application for Spaceflight Associated Neuro-ocular Syndrome (SANS)", Abstract accepted to be presented at the International Astronautical Congress 2023, Baku, Azerbaijan, Oct 2023.
- Ritter, S., Terranova, F., Stern, C., Tuohy, E., Cowley, A., Drescher, J. & Sznitman, R. (2023). "An Artificial Intelligence Method for Autonomous Monitoring of the Retina for Medical Applications in Space and Extreme Environments", Abstract accepted to be presented at the International Astronautical Congress 2023, Baku, Azerbaijan, Oct 2023.
- Terranova, F., Voetberg, B., Nord, B. & Neilsen, E. (2023). "Telescopes Drive Themselves: Optimizing Cosmic Survey Scheduling with Reinforcement Learning", Abstract accepted to be presented at Fermi National Accelerator Laboratory New Perspectives 2023 Conference, Chicago, Illinois, USA, Jun 2023.
- Bourdarie, C., Chaussard, J., Conway, C., Ghaffari, F., Lesenne, C., Milian, O., López, M.R., Terranova, F. & Veronese, N. (2023). "Modular Regolith Transport Solution for the Moon", Abstract presented at the Space Resources Roundtable Conference at Colorado School of Mines, Golden, Colorado, USA, 06 Jun 2023.
- Terranova, F. & Mambelli, M. (2022). "Flexible Pilots Jobs Framework for Distributed High Throughput Computing", Final Report presented at the Fermi National Accelerator Laboratory, Chicago, Illinois, USA, 21 Sep 2021.
- Terranova, F., Tessa, B., Tempesti, P. & Pezzuti, F. (2022). "WheelFlow: AI smart assistant for urban wheelchair accessibility", Poster presented at the FIAB European Mobility Week 2022, Pisa, Italy, 16 Sep 2022.

CERTIFICATES & COURSES

- Cisco Certified Network Associate (CCNA), Cisco Systems, Inc., Mar 2022, Expiration: Mar 2025.
- TOEFL iBT Test, ETS, Oct 2021, Expiration: Oct 2023
  Total score: 101/120 (Reading: 28/30, Listening: 24/30, Speaking: 23/30, Writing: 26/30), equivalent to the C1 CEFR level.
- CyberChallenge.IT, Cybersecurity National Lab, Mar 2019.
  I've been selected by the University of Pisa as one of the 25 students involved in this cybersecurity training project.
- Huawei Seeds for the Future, Huawei Technologies Co., Ltd, Nov 2020.
  I've been selected by Huawei as one of the 50 Italian students participating in this program, regarding 5G technologies, cloud computing, and artificial intelligence.
- Samsung Innovation Camp, Samsung Electronics, Oct 2018.
- Ethics of AI, University of Helsinki, Feb 2020

HONOR & AWARDS

- National Winners of the High School Program "Code the Rules", Italian Ministry of Education, June 2018.
- Top 10% of my degree program, University of Pisa, 2018-2023 (throughout all academic years).
- ISSNAF Scholarship for Master Thesis Research in North America, Italian Scientists and Scholars in North America Foundation (ISSNAF), Dec 2022.
- Selected by AlmaLaurea as part of the best 20 high-potential current and prospective graduates in STEM disciplines in Italy for the High-flyers STEM Day.

TECHNICAL SKILLS

Languages
Java, Python, Erlang, PHP, C, C++, R, Verilog, Matlab, JavaScript, CSS, HTML, SQL, Cypher Query Language, Assembly, UML, XML, JSON

AI/ML Libraries and Frameworks
Tensorflow, Keras, PyTorch, TFOD API, scikit-learn, Matplotlib, NLTK, Numpy, Pandas, Scipy, Gym

Database Technologies
MySQL, MongoDB, LevelDB, Neo4J, Redis

Cloud Technologies
OpenStack, Docker, Kubernetes, Hadoop, Spark, QEMU, Virsh

Networking
TCP/IP protocol suite, Ethernet, DHCP, DNS, ACL, NAT, VLAN and Trunking, Routing Protocols, Cloud, IoT, Network Security

LEADERSHIP & MENTORING

- VicePresident of SEDS (Students for the Exploration and Development of Space) federation at the University of Pisa (2023)
- Mentee for the LeadTheFuture Mentorship Program. Mentored by Davide Belli, Senior Deep Learning Researcher at Qualcomm AI Research (2022-2023)
- Mentee for the Young ISSNAF (Italian Scientists & Scholars in North America Foundation) Mentoring Program for Students. Mentored by Prof. Ferdinando Fioretto, assistant professor in the EECS department at Syracuse University (2022-2023).

LANGUAGES

Italian
Native or Bilingual Proficiency

English
Full Professional Proficiency

French
Basic Proficiency level