Riccardo Campanella

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BACKGROUND

Creative Computer Engineer with experience in the industry. Enjoy creative problem-solving and getting exposure to multiple projects. Enthusiastic learner. Excellent analytical skills and ability to solve complex problems.

WORK EXPERIENCE

HOTDESK
IT Startup with headquarters in Dubai, UAE

Backend Engineering — January 2023 – June 2023
Software Engineer

- Developed critical components impacting the app according to rigorous standards of quality
- Developed in Python using **Django** framework, **REST APIs** and **Swagger**
- Worked with **Docker** and **Pipelines**
- Tested and debugged features by providing **automated test cases**
- Provided **Design Documents** for features
- Worked to **enhance existing systems** by providing effective and scalable code
- Coordinated with internal teams to provide technical solutions

NTT DATA
Japanese multinational information technology service and consulting company headquartered in Tokyo, Japan
Revenue: 2.31 trillion JPY (2021). Number of employees: 139,500 (2021)

Innovation Advanced Technology — Cosenza, Italy
Software Engineer — September 2022 – March 2023

Main activities:

- Worked with **Python** using **OpenCV** library to find the best algorithm to perform an **Image Recognition** task, scouted different techniques and compared results by measuring the CPUs time of tested algorithms.
- Worked with **Blockchain DLT** for Enterprise to update a **CorDapp** using **Java.**
- Updated **a Spring MVC App** working as **Java backend developer**.
- Fundamentals of **Agile** & **DevOps**, **Microservices**: Architectures & Frameworks and **JavaEE** programming.

Main Project: Updated Blockchain/DLT App for European Banking System.

Info Edge Technology — Cosenza, Italy
Software Engineering Intern — July 2022 - August 2022

- Worked with **Scala** to convert a **C++** application used in Distributed Systems.
- Fundamentals of **Scala.**

EDUCATION

M.Sc. in Artificial Intelligence — September 2023 – September 2025
Utrecht University — *Graduate School of Natural Science, Faculty of Science*

Two-years R**esearch Master** (WO) focused on a **Multidisciplinary approach** with **hands-on projects.**

Relevant projects:
April-June 2024

- Human-centered ML (HCML): Trained a Logistic Regression classifier on the COMPAS dataset to measure **Intersectional Fairness** and **Fairness** using pre-processing methods as **Reweighing**, post-processing as **Equalized odds**.
- HCML: Trained **Logistic Regression** and ChaLearn LAP-FI dataset to measure **Feature Importance** and **Feature effect**. Trained a **Multi-layer Perceptron** to interpret and explain its decision with Model-agnostic methods as **PDP, ICE and PFI**.
- HCML: Trained **Bayesian Networks, RuleFit, EBM and Neural Network** on the US-130 Diabetes dataset to identify the **factors** that contribute the most **over time** to a diabetes patient being re-admitted and the **features** that influence **readmission** risk in diabetic patients.
- NLP: Estimate **N-gram models** of different order from Treebank corpus to get **Sentence probability** and evaluate the **Perplexity**. Implemented the **Viterbi algorithm** for sequence modeling to recover the most likely sequence underlying the input sequence and the **CKY** algorithm to find all the possible ways to parse the input with a predefined grammar.
- NLP: Trained on several data from nltk two **LSTM-based UPOS taggers**, one with randomly initialized embeddings while another reusing the **GloVe** embeddings. Used **BERT transformer** model's contextualized word embeddings to tackle the **word sense disambiguation**.
- NLP: Designed and implemented **Probes** for **masked language modeling** in **BERT** to interpret the outputs of language models and probe **features** to understand how closely LLMs resembles **human language** use/knowledge.

February-March 2024

- **Computer Vision**: Geometric camera calibration, Voxel-based 3D reconstruction, Color-based voxel labeling, Trained-validated-tested **LeNet5** and variants (CNN), Created **Two-stream CNN** for Action recognition with focus on **Transfer learning**, additional use of **Optical flow** and combination of CNN outputs.
- Composed a paper about **LLM's Internal testing** involving **Mechanistic Reasoning** to assess the real model capabilities of intelligence based on Commonsense Reasoning. Using interpretability methods, the core features of **Commonsense Reasoning** are uncovered through two **Cognitive Theories of Mind**.

January 2024

- Magnetoencefalography **(MEG)** data classification to infer brain states with **CNNs, RNNs** and **Transformers**. Based on the paper *Deep brain state classification of MEG data (2020)*
- Estimated the **causal-effect** of patient's drug dosage taken on the recovery based on observational and experimental data of a **Structural Causal Model**.
- Implemented the PC algorithm to discover causal relations on sachs2005_combined dataset, following the paper *Causal Protein-Signaling Networks Derived from Multiparameter Single-Cell Data*

December 2023

- Implemented two **Reinforcement Learning** agents using **Semi-gradient SARSA** and **Q-learning** algorithms with a **Linear Approximation** function to complete an **Episodic MDP** task

November 2023

- Handwritten digit classification, MNIST dataset, using **Logistic regression** and **Support Vector Machines** with **handcrafted features**
- Implemented Reinforcement learning **Epsilon-greedy algorithm** to solve a k-armed bandit problem in custom environment based on **Open-AI gymnasium framework**. Evaluated on a 10-armed Testbed

October 2023

- Learned **Word vectors** based on *Pennington J, Socher R, Manning C (2014)* **GloVe**: Global Vectors for Word Representation, and developed **Recurrent Neural Network**-based **Sequence model**
- Designed and conducted a user study to **evaluate a chatbot system** by gaining experience in **hypothesis formulation**, experimental design, **data analysis**, and scientific report writing

September 2023

- Designed, implemented, evaluated, and reported about a **Recommendation Dialog System** by employing Domain modeling and Text classification leveraging **Supervised Machine Learning** algorithms
- Identified handwritten numbers and objects from images using the **Keras** library for Python to implement **Deep Convolutional Neural Networks**

InnovAId Hackaton (AI and Healthcare) Utrecht Medical Center, November 2023

- Proposed **NLP-based approaches** to solve a predictive troubleshooting problem: used **BoW**, **Google Word2Vec** model using SONAR-combined dataset, and **Google Transformer BERT** to recommend preemptive actions on infusion pumps.

AI Safety Fundamentals Course September 2023 - December 2023
Effective Altruism Utrecht Utrecht, Drift 23

- Course curriculum developed with Richard Ngo (**OpenAI**) with input from David Krueger (**University of Cambridge**), Adam Gleave (FAR) and Beth Barnes (Alignment Research Center Evals) to better understand **AI alignment**, and extreme **risks** posed by misaligned AI.
- Final-project: demonstrated **Goal Misgeneralization** with a **DeepQlearningNetwork (DQN)** on a **Reinforcement learning** task.

Mathematics for Machine Learning Specialization, Imperial College London Coursera, 2023

B. Eng. in Computer Engineering Cosenza, Italy
University of Calabria Graduation date - June 2022
Computer Science, Electronics, Pattern and System Engineering Department

Relevant Activities
- Created Custom circuit working with **Xilinx Vivado** using **VHDL**
- Developed Web-app based on **Java** using **IntelliJ**, **PostgreSQL** for the backend and **Flutter** for frontend.
- Graduate Thesis: title - "Deep Neural", topic - "**Deep Learning and Neural Networks**"

TECHNICAL SKILLS

Programming Languages
- **Backend** development: **Java, Python**
- Proficient with languages for AI: **Python**, **R**
- **Blockchain**: Java, Kotlin, Scala

Frameworks
- AI: **TensorFlow, Scikit-learn, OpenCV, Pytorch**
- Backend: Spring, Django
- Frontend: Angular, Flutter
- Blockchain: Corda

OTHER SKILLS
- Italian Native speaker; Fluent in English (C1 IELTS)
- Actively collaborated with different teams during my professional career and successfully led my teams to consistently deliver projects on time during my academic studies
- Rock guitarist and seasoned basketball player