

## PERSONAL INFORMATION

## Tommaso Carraro



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Gender Male | Date of birth 9 February 1996 | Nationality Italian

JOB APPLIED FOR Machine Learning researcher

STUDIES APPLIED FOR Ph.D. in Brain Mind and Computer Science

PERSONAL STATEMENT It is from the beginning of the high school that I love computer science and new technologies. During the years, I always loved to manage my studies and solve new problems quickly. I am determined in what I do and I constantly engaged in my tasks during the years, placing the education at the first place. Thanks to the master's degree in computer science I discovered my passion for machine learning and research in general. For this reason, I decided to create a study plan focused on machine learning, data mining, and computer vision. University gave me the possibility to meet talented professors and researchers, even during my Erasmus exchange in Helsinki. Thanks to these people, I began to love reading and studying scientific papers about new artificial intelligence topics, in particular, I am fascinated by neural networks and their application in the medical field. During the writing of my master's degree thesis, I worked a lot on the application of generative methods to recommender systems, creating strong foundations on Variational Autoencoders. During this period, I have also submitted three scientific papers about recommendation systems and presented one of them at the UMAP 2020 conference. At the moment, I am working as a research assistant at the Data and Knowledge Management (DKM) unit of the Fondazione Bruno Kessler (FBK) in Trento, under the supervision of Prof. Luciano Serafini. My research is focused on the application of Neural-Symbolic approaches to recommender systems. In particular, I am studying the integration of logical reasoning and deep neural networks to improve the recommendation performance and explainability. In the future, I would apply to a Ph.D. program to continue carrying on my passion and expand my knowledge about artificial intelligence. One day, I hope to become a machine learning researcher, having the opportunity to work with experienced researchers and to provide new solutions to the world.

## WORK EXPERIENCE

Jan 2021 – Sep 2021

**Research assistant at DKM unit**

Fondazione Bruno Kessler (FBK)

Via Sommarive, 18, 38123 Povo (TN), Italy

- study of Neural-Symbolic integration and Statistical Relational Learning approaches
- study of state-of-the-art recommender systems based on the integration of logical reasoning and learning
- implementation of existing state-of-the-art recommender systems based on Neural-Symbolic integration

**Business or sector** Researcher

Oct 2020 – Jan 2021

**Teaching support**

Dipartimento di Matematica - Università degli Studi di Padova

Via Trieste, 63, 35131 Padova (PD), Italy

- teaching support for the (Python) Programming course for mathematicians
- preparation and presentation of some of the laboratory lectures
- correction of some students' homework

**Business or sector** Teaching assistant

Jul 2018 – Sep 2018

**Internship**

VISIONEIMPRESA S.r.l.

Via Monselice 16, 35020, Zona Artigianale (PD), Italy

- development of a cross-platform mobile application using the PhoneGap framework. The application was designed to make online orders. The development included requirements analysis, app design, development (front-end and back-end) and final test of the supervisor
- finish of the development of another cross-platform mobile application using the PhoneGap framework. The application was designed for searching business documents

**Business or sector** Software developer

## EDUCATION AND TRAINING

Dec 2018 – Sept 2020 **Master's degree in Computer Science (110/110 with honours)**

Department of Mathematics, University of Padova, Italy

Thesis about the application of Variational Autoencoders in the top-N item recommendation task.

Studies at Padova:

- advanced topics in computer science: project on the design and development of business processes using Petri nets
- advanced algorithms
- advanced aspects of programming languages: project on the reproducibility of the experiments of a scientific paper about FastText, an efficient library for text classification and representation learning developed by Facebook
- cognitive services: project on the development of a skin cancer classifier using Convolutional Neural Networks
- machine learning and data mining
- economics of innovation
- mobile programming and multimedia: project on the development of a cross-platform mobile application using the PhoneGap framework. Study on Flutter, a cross-platform framework developed by Google
- start-up in ICT (Information and Communications Technology): project on creating a business model canvas for a smart bin for smart cities
- computability
- artificial intelligence: project on the development of a recommendation system for hotels

Studies during the Erasmus exchange in Helsinki, Finland (Sep 2019 – Dec 2019):

- introduction to the Internet of Things
- introduction to big data management
- computer vision
- privacy and fairness in machine learning: project on the development of a membership inference attack (privacy part) and project on measuring, assessing and obtaining fairness for a ML classifier for hiring employees (fairness part)
- Finnish language

Oct 2015 – Dec 2018 **Bachelor's degree in Computer Science (110/110 with honours)**

Department of Mathematics, University of Padova, Italy

Thesis on MOVlorder, a cross-platform mobile application developed during an internship period at VISIONEIMPRESA s.r.l.

Scholarship "Mille e una lode" during 2016.

Principal subjects:

- computer architectures
- operating systems
- C/C++ programming (object oriented): project on the development of an application using the QT framework
- databases: project on the analysis, design and development of a MySQL database
- network and security
- algorithms and data structures
- automata and formal languages
- concurrent and distributed programming (Java)
- web technologies: project on the development of an accessible web site
- software engineering: project on the development of a software product for IKS s.r.l. The product was designed for monitor a web application, e.g., send alerts in case of bottlenecks. Working on this project I gained a base knowledge about the ELK stack (Elasticsearch, Logstash and Kibana) and the Spring framework (Spring batch, Spring Boot, Spring Data, Spring Mail). The development of the product included:
  1. team creation (6-7 students who did not know each other);
  2. choice of tender specifications from a real computer science company;
  3. assignment of business roles to team members;
  4. requirements analysis, design, development and final test of the product.

**Sep 2010 – Jul 2015 High school diploma (96/100)**

ITIS Francesco Severi, Padova, Italy

Thesis on Google Project Loon, a Google project to bring connection to remote and rural areas of the world using air balloons.

**PERSONAL SKILLS**

Mother tongue Italian

## Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	B2	B2	B2	B2	B2

Language certificate issued by the university language center – B2

 Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user  
[Common European Framework of Reference for Languages](#)
**Communication skills**

- team work: I have worked in two types of team:
  - research team: my team submitted three scientific papers about the application of Variational Autoencoders in the top-N item recommendation task;
  - development team: my team developed a software product for the IKS s.r.l. computer science company.

**Organisational / managerial skills**

- during the project for the software engineering course of my bachelor's degree I held the role of project manager for a team of 7 people
- around the end of my bachelor's degree I wrote my bachelor thesis and did last exams while I was following the courses of the first year of my master's degree
- during the last year of my master's degree I wrote my thesis while I was preparing my application for the Ph.D. program (this included the submission of three scientific papers about state-of-the-art methods for recommendation systems, one of which has been accepted at the UMAP 2020 conference)

**Digital competences**

SELF-ASSESSMENT				
Information Processing	Communication	Content creation	Safety	Problem solving
Independent user	Proficient user	Proficient user	Independent user	Proficient user

[Digital competences - Self-assessment grid](#)
**Job-related/Computer skills**

- competent with most Microsoft Office programs
- programming languages: Java, C/C++, Python, Matlab
- web technologies: XHTML, HTML5, CSS, Javascript, PHP, accessibility aspects
- programming frameworks: PhoneGap, PyTorch, QT
- versioning: Git, GitHub
- database: mySQL, MongoDB
- writing:  $\LaTeX$

**Other skills**

I am really good in fixing broken phones and bicycles. I enjoy all sports and in particular basket. At the moment, I practice BMX freestyle and I travel around Europe for attending or just watching BMX events. I love to travel and experience different cultures, in particular I love natural parks, reserves and climbing mountains. In the last year, during the quarantine due to COVID-19, I discovered the passion for cooking.

Driving licence A1, B

## PUBLICATIONS

1. Tommaso Carraro, Mirko Polato, and Fabio Aiolli. 2020. A Look Inside the Black-Box: Towards the Interpretability of Conditioned Variational Autoencoder for Collaborative Filtering. In Adjunct Publication of the 28th ACM Conference on User Modeling, Adaptation and Personalization (UMAP '20 Adjunct). Association for Computing Machinery, New York, NY, USA, 233–236. DOI:<https://doi.org/10.1145/3386392.3399305>

## PRE-PRINTS

1. Tommaso Carraro, Mirko Polato, and Fabio Aiolli. “Conditioned variational autoencoder for top-N item recommendation”. ArXiv [abs/2004.11141](https://arxiv.org/abs/2004.11141)(2020).