Francesco Montagna

Resume

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Education

Academic Qualifications

Sep 2019 - Oct 2021 **Master's Degree**, *Polytechnic of Turin*, Italy, Data Science and Engineering. Expected final grade: 110/110.

Sep 2016 - Sep 2019 **Bachelor's Degree**, *Polytechnic of Turin*, Italy, Physical Engineering.

Sep 2011 - Jul 2016 **High School Diploma**, *Liceo Classico*, Italy, French and Italian double highschool diploma.

Other Experiences

Nov 2020 - Present **MALTO team**, *Polytechnic of Turin*, Italy - Turin, Member of Polytechnic of Turin Machine Learning team.

Work Experience

Oct 2020 - Dec 2020 **Internship**, *LINKS Foundation*, Italy - Turin, emergency impact assessment from text data using NLP deep learning algorithms.

Skills

- **Programming Languages:** Python, Java, R.
- **Data Analysis:** SQL, PySpark, Hadoop.
- **Machine Learning and Deep Learning:** PyTorch, TensorFlow, Scikit-learn, Pandas.
- **Other skills:** GitHub, Linux, LaTex.
- **Language:** Italian native speaker. Full professional proficiency in English with C1 Cambridge Advanced English certificate. Intermediate French speaker with B2 Baccalauréat certificate.

Research Projects

- **NLP algorithm for emergency impact assessment:** *Oct 2020 - Dec 2020*

  As an intern at LINKS foundation, I worked in the implementation with PyTorch framework of an NLP deep neural network algorithm to process users posts from Twitter, with the goal of detecting and estimating the impact of emergencies situations and disasters in real time. Due to the lack of significant literature on the topic, I had to compare and implement several solutions on my own, which lead me to adapt a state of the art Question Answering system augmented with basic numerical abilities (counting, adding/subtracting), called NAQANET. The code is available at this GitHub repository.

- **RecSys Challenge 2021:** *April 2021 - June 2021*

  With Politecnico di Torino Machine Learning team we participated to RecSys Challenge 2021 . Together with two teammates we have developed a machine learning algorithm to provide fair recommendations to users on Twitter. The majority of our efforts focused on data processing activities and feature engineering: for this reason we built a "feature store", a framework to accelerate experiments with different combinations of features engineered. Our work has been mainly carried out using

PySpark framework and Pandas library. Link to the challenge website is available here.

- **Incremental learning Computer Vision project:** *May 2020 - Jul 2020*

  Computer vision project for the university course of Deep learning, on the incremental learning problem. We started approaching the task studying and implementing several existing solutions. Then, following a deep analysis of the limitations affecting the given baselines, we developed and deployed new ideas able to increase of a 1% value the accuracy score with respect to the best algorithm so far. The project has been evaluated with maximal grades with honors by the course teacher Barbara Caputo. The code is available at this GitHub repository.

- **Master Thesis - Quantum Machine Learning:** *Mar 2021 - Jul 2021*

  I am working on a Quantum-enhanced Reinforcement Learning research project, supervised by Dr. Davide Girolami, professor at Politecnico di Torino. The goal is to train an RL agent to design a quantum circuit transforming a system from a given initial state into a target state of interest (e.g. a highly entangled state). For the Reinforcement Learning part I implemented a TD Learning algorithm with linear function approximation. Theoretical results obtained have been compared in terms of fidelity score with those provided by a real quantum device, on the IBM Quantum Lab cloud platform. Code for the experiment has been written using Qiskit framework. The code can be found here.

- **ADAGEO: Istituto Italiano di Tecnologia and Politecnico di Torino:** *Jul 2021 - Present*

  I am working on the extension of the published paper *Adaptive-Attentive Geolocalization from few queries: a hybrid approach*. The original paper implements state of the art deep architecture for cross-domain visual place recognition, with the goal of geolocalizing a query image against a labeled gallery, in the case where query images belongs to a different domain than those in the gallery. My work consists of extending the research, implementing domain adaptation via Fast Fourier Transform, which does not require any training, and implementing all the experiments needed to compare with the existing baselines. We plan to publish the project with these and other extensions to be defined. I am working under the supervision of PhD candidate Gabriele Berton, and Dr. Barbara Caputo and Dr. Carlo Masoni.

Click for the complete list of my public GitHub repositories.