

Alessio Gravina

PHD STUDENT IN COMPUTER SCIENCE

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Education

PhD in Computer Science, UNIVERSITY OF PISA, ITALY

Nov. 2020 - PRESENT

- Main Theme: *Representation learning for dynamic graphs.*
- Supervisor: Prof. Davide Bacciu.

Oxford Machine Learning Summer School, VIRTUAL

Aug. 2021

- 15-days specialized AI school that covers the topics of Rep. Learning & Statistical ML, ML in Healthcare, NLP, and AI for Good.
- Acceptance rate 15%.

MSc in Computer Science, UNIVERSITY OF PISA, ITALY

Sep. 2018 - Mar. 2020

- Curriculum: Artificial Intelligence.
- Thesis: *Machine Learning prediction of compounds impact on Schizophrenia treatment* (110/110 Hons., equiv. GPA: 4/4).

ERASMUS+ Student Programme, UNIVERSITY COLLEGE DUBLIN, IRELAND

Jan. 2019 - May 2019

- Student at the Computer Science Department in the framework of the EU Erasmus+ programme.
- Main Theme: *Artificial Intelligence and Cognitive Science.*

BSc in Computer Science, UNIVERSITY OF PISA, ITALY

Sep. 2014 - Mar. 2018

- Thesis: *Machine Learning for the prediction of Bronchopulmonary dysplasia risk* (103/110, equiv. GPA: 3.75/4).

Experience

Teaching Assistant, UNIVERSITY OF PISA, ITALY

Feb. 2021 - May 2021

- Course: Introduction to Programming and Algorithms.
- Weekly office hours for homework assistance and reinforcement of learned concepts.

Research scholarship, UNIVERSITY OF PISA, ITALY

Jul. 2020 - Nov. 2020

- Released a resource that collects all the clinical evidence on COVID-19 and the human genomic and proteomic information to foster COVID-19 research.
- Developed Deep Learning for graphs method in *Python* to repurpose drugs given sets of proteins. The model has been used to propose a list of 27 COVID-19 candidate drugs.

Machine Learning Engineer, VYDIANT

Jan. 2020 - Jun. 2020

- Developed an NLP model in *Python* to identify sentences containing relations between entities from a biomedical corpus, improving precision by 3%.

Visiting Student Researcher, STANFORD UNIVERSITY, USA

Sep. 2019 - Dec. 2019

- Developed a Graph Deep Learning model in *Python* to automatize drug repurposing screenings in the field of Schizophrenia treatment, discovering 64 new candidate drugs.
- Research in collaboration with SPARK research group.

Publications

- D. Bacciu, F. Errica, A. Gravina*, L. Madeddu, M. Podda, and G. Stilo. *Deep Graph Networks for Drug Repurposing with Multi-Protein Targets*. Submitted for journal publication. (*** First Author - Alphabetical Order**)
- A. Gravina, J.L. Wilson, D. Bacciu, K.J. Grimes, and C. Priami. *Controlling astrocyte-mediated synaptic pruning signals for schizophrenia drug repurposing with Deep Graph Networks*. Submitted for journal publication.
- A. Gravina*, F. Rossetto*, S. Severini*, and G. Attardi. *A comparative study of models for answer sentence selection*. In CLIC-it, 2019. (*** Equal Contrib.**)
- A. Gravina*, F. Rossetto*, S. Severini*, and G. Attardi. *Cross attention for selection-based question answering*. In NLAI@AI*IA, 2018. (*** Equal Contrib.**)

Projects

Deep Graph Networks for Drug Repurposing with Multi-Protein Targets

2021

- Developed Deep Learning for graphs method in *Python* and *Pytorch* to repurpose drugs given sets of proteins instead of single-protein/single-drug associations (as widespread in literature), increasing the AUROC by 9% with respect to the single-protein repurposing scenario.
- The model was used to discover 27 new potential COVID-19 candidate drugs.

Graph learning for Schizophrenia treatment

2020

- Used *Python* and *Pytorch* to develop a ML for graph framework to predict compounds that can reduce glial phagocytic activity in Schizophrenia patients.
- The framework was used by SPARK research group at Stanford to optimize drug phenotypic screens, discovering 64 new potential drug candidates.

Cross-Attentive CNN for QA, GROUP PROJECT

2018

- **1st Place, Fujitsu AI-NLP Challenge, Prize \$20,000**
- Implemented a Cross-Attentive Convolutional Neural Network (using *Python* and *Keras*) to tackle the task of Answer Sentence Selection. The model was assessed over SelQA and WikiQA datasets with different types of word embeddings: FastText, GloVe, and ELMo.

Skills

Programming Python, Java, C, C++

Frameworks/Libraries Pytorch, Sklearn, Numpy, Pandas, Keras

Languages Italian (*Native*), English (*Fluent*), Spanish (*Elementary*)