Daniel Scalena

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Education

University of Milano - Bicocca | University of Groningen, CLCG — *Milan, Italy / Groningen, Netherlands*
Joint Doctorate (Ph.D) in Computer Science - NLP — *Nov 2023 – Present, exp. 2026*
Research focuses on the use of interpretability as a tool to make generative models safer, more reliable and less toxic in order to extend and improve their real-world applications

University of Milano - Bicocca — *Milan, Italy*
Master of Science (M.Sc) in Computer Science — *Oct 2021 – Oct 2023*
Thesis: On the explainability of Large Language Models detoxification
Curriculum: AI & Machine Learning
Final Grade: 110/110, with honors

University of Milano - Bicocca — *Milan, Italy*
Bachelor of Science (B.Sc) in Computer Science — *Oct 2018 – Jul 2021*
Thesis: Hate speech detection on social networks using state-of-the-art Natural Language Processing techniques
Final grade: 110/110, with honors

Work Experience

University of Groningen, Center for Language and Cognition — *Apr 2023 – Jul 2023*
Research Intern — *Groningen, Netherlands*

- Study, research and development of RLHF/RLAIF and fine-tune algorithms applied to generative language models to modify their behaviour in generating hate speech, effectively automating and controlling the detoxification process and counter-narrative generation;
- Research on the interpretability of the models themselves, analyzing their shift as a result of the post-training procedures adopted.

C.I.N.I. & University of Milano - Bicocca — *Jun 2022 – Apr 2023*
Assistant Researcher — *Milan, Italy*

- Research project commissioned by the Italian Ministry of Justice and CINI (Italian Interuniversity Consortium for Computer Science).
- Open Relation Extraction on criminal sentences - Improving state-of-the-art for Italian technical and legal texts understanding using text mining techniques and seq2seq transformer-based Language Models.

TESTUDO — *Jun 2022 – Aug 2022*
Intern Machine Learning Engineer — *Milan, Italy*

- Designed and created with University MIND Lab team deep learning models to predict timestamps regarding working hours;
- I had the opportunity to explore and train deep neural networks on complex and non-ideal data, improving the productivity of the company's automatic systems.

University of Milano - Bicocca — *Mar 2021 – May 2021*
Intern — *Milan, Italy*

- University internship in the field of Hate Speech detection using NLP techniques on Tik-Tok social network;
- Achieved excellent performance thanks to the use of lexicons and large language models with transformers-based architecture.

Publications

Let the Models Respond: Interpreting Language Model Detoxification Through the Lens of Prompt Dependence
Daniel Scalena, Gabriele Sarti, Malvina Nissim, Elisabetta Fersini
Extended abstract at the Sixth BlackboxNLP Workshop (EMNLP 2023)

MIND at SemEval-2023 Task 11: From Uncertain Predictions to Subjective Disagreement
Giulia Rizzi, Alessandro Astorino, **Daniel Scalena**, Paolo Rosso, Elisabetta Fersini
Proceedings of the 17th International Workshop on Semantic Evaluation (SemEval-2023)

Projects, Courseworks and Research works

Let the Models Respond: Interpreting the Detoxification process of LMs *Spring 2023*
Research project *Journal*

- Reached enhancement and detoxification of Generative Language Models;
- Aim not to limit model generation with toxic prompts but to foster counter-narrative.
- LMs interpretability techniques for detoxification process evaluation after fine-tuning and/or RLHF;

Reward LM *Spring 2023*
Open source Python library *GitHub*

- Python toolkit library enabling Fine-Tuning and Reinforcement Learning from *AI* Feedback (RLAIF) of Generative Large Language Models;
- Deeply integrated with HuggingFace and Accelerate frameworks;
- A structured methodology for measuring model toxicity is provided, allowing measurement with datasets recognised in the scientific literature.

From Uncertain Predictions to Subjective Disagreement *Spring 2023*
Research project & pubblication *ACL Anthology*

- Participation of the research lab MIND from UniMiB in the SemEval 2023 task related to Learning With Disagreements (Le-Wi-Di);
- Study the identification of the level annotator's agreement/disagreement;
- Explored the correlation between disagreement and uncertainty that a model, based on several linguistic characteristics, could have on the prediction of a given gold label.

-> Other projects and Open Source contributions *are available on my personal GitHub profile*

Language Skills

Italian	Native Language
English	Badge Bbetween Foreign Languages – English C1
French	B1

Activities

2024 LREC conference, Turin	Reviewer
2023 EMNLP conference, Singapore	Student Volunteer
2023 European Researchers Night	GroNLP collaborator, building demo tools on LMs Interpretability