Nicolas Carrara, Ph.D.

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SUMMARY

- Machine Learning Research Scientist with a strong background in Deep Reinforcement Learning solving real-life problems, such as Dialogue Systems, Traffic Signal Control, and Autonomous Driving, by collaborating with 5 major industry players (including Google Brain, Microsoft Research, and Huawei).

- Software Engineering skills demonstrated by the creation of 4 large research frameworks and 5+ open-source projects. Strong abilities for system designs and scaling projects used by 20+ collaborators across multiple teams.

- Effective science communicator, giving talks at Amazon, Huawei, Ford Motors, and several international conferences. Published 5 papers, including at 3 high-impact conferences. Mentored 2 graduate students and led a 5-person team of Ph.D. and MS students. Taught 7 different courses on Computer Science and Machine Learning.

Projects: Micro Traffic Simulator, Gym-Pydial, Age-Of-Triggers, UAV-RL, Scholar-Parser, Aoe2 Map Generator.

Skills: Python (Pytorch, Tensorflow, RLlib, Gym, etc), Java, Javascript, LaTeX.

Publications: Ph.D. dissertation, NeurIPS, EWRL, UAI (workshop), SLSP, SemDial.

WORK EXPERIENCE

University of Toronto, Toronto, Canada.   March 2020 - Present
Postdoctoral fellow. D3M lab, Department of Mechanical and Industrial Engineering.

- Machine Learning advisor on 4 projects, transforming transportation solutions from rule-based to data-driven. Gave several talks on Reinforcement Learning.
- Designed a new Variational Autoencoder architecture that almost instantly optimizes traffic intersections reducing by 80% the amount of data needed, providing a fast deployment of new traffic-lights controllers with minimum costs.
- Lead software engineer on a Reinforcement Learning library, 20k+ lines of code, used across 3 teams at the UofT Intelligent Transportation Systems department. Designed the scalable architecture and coded 40% of the codebase.
- Reviewed 12+ papers for 4 international conferences (AAAI, IEEE L-CSS, ECML-PKDD, MLJ).

Orange labs, CRIStAL, and University of Lille, Lille, France.   September 2015 - December 2019
Ph.D. Candidate / Research Engineer. SequeL (INRIA), and NaDia (Orange) teams.

- Pushed the state of the art of Dialogue Systems and Safe Reinforcement Learning with 5 peer-reviewed publications, introducing solutions to control premature hang-ups of users with personal assistants.
- Scaled a personalized dialogue system to handle 100 times more users (10 to 1000+) using clustering methods and transfer learning.
- Implemented a dialogue simulator and its web application interface (Full-Stack) to collect 1000+ real users' dialogues.

INRIA, Nancy, France.   June 2013 - August 2015
Research Intern. 4 internships at Cortex, Kiwi, and Larsen teams.

- Conceived the Android version of a Java (Swing) research software for Dynamic Neural Fields. Optimized the backend to run on a tablet with limited resources.
- Introduced a planning algorithm to handle more than one optimization criterion, yielding optimal solutions for the whole Pareto front of discrete multi-criteria Markov Decision processes.
- Designed a Java library implementing Monte Carlo Markov Chains. The library has been used by the Kiwi team to conduct research on path prediction of users on the Web.

EDUCATION

Ph.D., Computer Science. University of Lille, France.	2019
Summer School (LxMLS), Natural Language Processing. Instituto Superior Técnico, Portugal.	2017
MS, Machine Learning. University of Lorraine, France.	2015
BS, Computer Science. University of Lorraine, France.	2013