

Juan Duque

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- EDUCATION**
- Princeton University**, Princeton, NJ August 2020 - May 2022
Master of Science in Engineering, Computer Science GPA: 3.85
Advisors: Karthik Narasimhan, Elad Hazan
Relevant Coursework: Control Theory, Theory of Deep Learning, Probability Theory, Systems and Machine Learning, Graduate Algorithms
- Georgia Institute of Technology**, Atlanta, GA August 2014 - December 2018
Bachelor of Science, Computer Science Rank: 1/6409, GPA: 4.00
Advisors: Charles Isbell, Michael Loss
Relevant Coursework: Number Theory, Advanced Linear Algebra, Machine Learning Theory, Combinatorics, Natural Language Processing, Multivariable Calculus
- HONORS**
- Cornell, Maryland, Max Planck Pre-Doctoral Research School (CMMRS) 2021
Graduate Studentship (Princeton University) 2020
Colfuturo Scholarship (Colfuturo) 2020
Highest Honors (Georgia Institute of Technology) 2018
- PREPRINTS**
1. **Juan Duque**, John Li. Deep Exploration Bonuses for Episodic MDPs, 2021. Summary of work done available [here](#).
 2. John Li, **Juan Duque**. LP Rounding for Register Allocation Via Single Bit Supervision, 2020. Summary of work done available [here](#).
 3. **Juan Duque**, Michael Loss, Charles Isbell. Discovering Goals in Hierarchical Reinforcement Learning, 2018. Summary of work done available [here](#).
- RESEARCH EXPERIENCE**
- Princeton Artificial Intelligence**, Princeton University Princeton, NJ
Advisors: Karthik Narasimhan, Elad Hazan August 2020 - Present
- Currently studying the effects of Inverse Dynamics in creating state representations for Atari games that allow for out of domain generalization.
 - Developed exploration strategies in Reinforcement Learning that leverage simple heuristics (e.g. depth) to converge faster to more optimal solutions.
 - Mathematically proved that our algorithm satisfies the existing regret bounds of UCB Q-Learning Hoeffding.
- Institute for Robotics and Intelligent Machines**, Georgia Tech Atlanta, GA
Advisors: Charles Isbell, Michael Loss. August 2017 - December 2018
- Designed and implemented a hierarchical RL algorithm based on Kulkarni et al. "*Hierarchical Deep Reinforcement Learning: Integrating Temporal Abstraction and Intrinsic Motivation*" and compared it to my own implementation of DQN.
 - Used spectral graph partitioning to select goals programmatically in hierarchical agents and compared it to other clustering methods.
 - Improved the performance of the h-DQN algorithm and removed the necessity for human-selected goals in the pipeline.
- Uniandes Aerospace Program**, Universidad de los Andes Bogota, Colombia
Advisor: Johann Osma. August 2015 - May 2016
- Implemented Hamming error correction codes in C++ to ensure the correctness of incoming radio signals generated by the university's rockets.
- Institute for Robotics and Intelligent Machines**, Georgia Tech Atlanta, GA
Advisor: Henrik Christensen. January 2015 - May 2015
- Developed a Computer Vision algorithm to identify signs (e.g. traffic signs) and extract their text using tesseract OCR for applications in autonomous vehicles.

**INDUSTRY
EXPERIENCE**

Machine Learning Engineering Intern, LinkedIn Sunnyvale, CA
AI foundations, Mentors: Zhoutong Fu, Michael Kazi May 2021 - August 2021

- Pre-trained a multi-task BERT model with LinkedIn data used as an encoder for downstream natural language understanding applications.
- Implemented dynamic masking for online training of BERT and contributed to the data collection pipeline for large language models.

Software Engineer, Microsoft Redmond, WA
msn.com, Mentor: Rong Fang April 2019 - July 2020

- Created and optimized a machine learning title generation service of Microsoft News for articles, slide shows, and videos based on their content.
- Developed, monitored, and maintained cloud micro-services in Azure to process, enhance, and ingest news documents.

Data Science Intern, Microsoft Redmond, WA
msn.com, Mentor: Ying Qiao May 2018 - July 2018

- Designed and built a recommendation system for news articles based on users' reading history, using neural networks in Pytorch.
- Analyzed the feasibility of my system and built a Rest API and a client to deploy a live traffic experiment on msn.com.

Software Engineering Intern, Google San Francisco, CA
Google Cloud, Mentor: Ali Ayyash May 2017 - August 2017

- Designed, implemented, and tested an API that improves the latency of moving projects and folders concurrently within Google's cloud resource hierarchy that I then presented to my teammates.

**TEACHING
EXPERIENCE**

Introduction to Machine Learning, Princeton University Princeton, NJ
Graduate Student Preceptor Fall 2021 - Spring 2022

- Led weekly lectures of 20 students about introductory Machine Learning and its mathematical foundations.
- Held office hours, graded assignments and designed weekly quizzes.

Introduction to Programming Systems, Princeton University Princeton, NJ
Graduate Student Preceptor Fall 2020 - Spring 2021

- Led biweekly lectures of 10 students about introductory Computer Science and Systems Design in C and Assembly language.
- Held office hours, graded assignments and designed exam questions.

Office of Minorities Education, Georgia Tech Atlanta, GA
Undergraduate Tutor Fall 2017 - Spring 2018

- Taught personalized tutoring sessions in Introductory Computer Science, Algorithms, Linear Algebra and Machine Learning to minorities students.

**COMPUTER
SKILLS**

Languages: Python, Java, C, C++, Bash, Assembly, SQL, Wolfram, L^AT_EX.
ML Libraries: Pytorch, Tensorflow, SciPy, Numpy, scikit-learn, OpenCV, Matplotlib.
Developer Tools: Git, Docker, Azure, Google Cloud, Vim, Visual Studio.
Operating Systems: Unix, Linux, Mac OSX, Windows, Android.

INTERESTS

Chess, soccer, weight lifting, swimming.