Miguel Ángel Del Río Fernández

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Education

Massachusetts Institute of Technology Cambridge, MA
MEng Computer Science *GPA: 4.8/5.0* February 2020
Focus in *Artificial Intelligence / Machine Learning*
BS Computer Science *GPA: 4.5/5.0* June 2019

Relevant Coursework
Machine Learning for Healthcare, Computational Psycholinguistics, Statistics Computation and Applications, Graduate Machine Learning, Cognitive Robotics, User Interface Design

Skills

Programming Languages:	Python, R, Java, Matlab, Android Java, Swift, Perl, JavaScript, HTML, CSS, LaTeX
Frameworks:	Autograd, PyTorch, Keras, NLTK, Sci-kit Learn, networkx, Tensorflow, ROS, Django, JQuery
Spoken Languages:	Spanish, English

Work Experience

MIT Department of Brain and Cognitive Sciences Cambridge, MA
Research Assistant January 2019 | February 2020
Thesis Title Structure and Geometry in Sequence-Processing Neural Networks

IBM Durham, NC
Senior Cognitive Intern (Research) June 2018 | August 2018

- Worked on an Agile team of researchers and developers focusing on improving IBM's Discovery Service
- Invented a document re-ranking algorithm that utilizes user clicks as they interact with the Discovery System to improve search results and adapt to user preferences and novel queries.
- Improved IBM's algorithm by statistically significant increase on Accuracy, NDCG, Match, and Precision over the current system by >2%.
- Gave multiple presentations to people with mixed technical backgrounds weekly.
- Presented results at a poster session as part of IBM's intern finale

Atolla Cambridge, MA
Machine Learning Advisor April 2018 | May 2018

- Directly worked with CEO and CTO to develop an outline of data pipeline and machine learning model
- Working with other team members, recommended appropriate models as well as potential improvements to their technology.

Alert Logic Dallas, TX
Software Engineering Intern July 2016 | August 2016

- Shadowed Senior Engineers on their projects and weekly meetings assisting with simple programming tasks and bugs when needed.
- Developed a tool to automate scraping information from an online government database in order to facilitate transition from older vulnerability metrics (CVSS 2.0) to newer ones (CVSS 3.0).

Projects and Research

Causal Interpretations of Language Models *Python, Pytorch, NLTK* May 2019
Analyzed the behavior of LSTMs for next-word prediction on 'garden path stimuli'. Using linear models, found a set of units in the cell state that controlled the model's downstream predictions of words, making words of the *correct part-of-speech* more likely.

Colon Polyp Detection *Python, Keras, Tensorflow* May 2019
Used an open-sourced dataset to develop multiple models to detect where a polyp was within an image. In particular, I focused on a patch-based Convolutional Neural Network approach that determined whether a small part of an image contained a polyp.

Criminal Network Analysis *Python, sklearn, networkx* December 2018
Used kaggle dataset of Los Angeles cocaine trafficking and busts in the 1970s. I analyzed the types of crimes that arrested criminals had previously committed to understand how people progress in their criminal careers.

Neural ODE Implementation *Python, Autograd* December 2018
Final project for 6.867 class at MIT. In our work, we replicated the results from the Neural Ordinary Differential Equations paper involving modeling time-series using ordinary differential equations (ODEs). I worked on developing the RNN and ANN in autograd and worked in with the rest of the team on connecting the different components for the full model.

Dialect Identification *Python, PyTorch, Librosa* December 2018
A research project at MIT with the purpose of creating a model that will be able to take in raw audio signals and predict which of 5 Arabic dialects the signal originally came from. I worked on implementing a paper that shows how to detect different speakers from raw audio signals and adapting it to the task of identifying different dialects.

"MEDIA" *IBM Cloud, IBM Personality Insights API, Python* July 2018
An Information Retrieval/Deep Learning project focused on recommending different media based on it's content. I focused on generating the relevant feature vectors for each piece of media that we wanted to compare. Along those same lines, I ranked the vectors we had generated using a combination of k-Nearest Neighbors and cosine similarity to find relationships between the content.

Extracurriculars

Medlinks RD August 2017 | June 2018

- Worked as dorm leader, focusing on promoting healthier living and safer choices.
- Helped re-start a program to provide free food for students during finals.
- Led a team of 8 other Medlinks, organizing meetings, volunteer events, and trainings.

Peer Mentor August 2017 | June 2018

- Worked closely with MIT administration to develop a community of Upperclassmen and Administrative teams that provide support for new students.
- Worked with incoming Freshmen to welcome them to MIT and the dorm.
- Organized, set-up, and worked events to teach students important basic life skills such as: budgeting, cooking, MIT communities, safe-sex, and more.

Entry Chair August 2015 | December 2017

- Dorm representative for my living group.
- Interacted frequently with student government and university departments to make decisions that impacted not only my living group but the dorm as a whole.
- Worked with students to solve interpersonal conflicts and find solutions that resulted in improved relationships.

References

[1] Jonathan Mamou, Hang T. T. Le, Miguel del Rio, Cory Stephenson, Hanlin Tang, Yoon Young Kim, and SueYeon Chung. Emergence of separable manifolds in deep language representations. *ICML*, 2020. https://arxiv.org/abs/2006.01095.