Nathan Ng

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https://nng555.github.io

Research Interests

I'm currently interested in teaching models to *learn to learn*. More specifically, I'm interested in developing methods that can directly learn useful algorithms in the form of neural networks by leveraging strong pre-trained foundation models. I'm most excited about applying this approach to problems in robustness/generalization, uncertainty quantification, training data attribution, and causal inference.

Education

New York University — New York, NY
Postdoctoral Researcher — *Sept 2024 – Present*
Kyunghyun Cho

Massachusetts Institute of Technology — Cambridge, MA
Visiting Scholar — *Sept 2021 – June 2024*
Marzyeh Ghassemi

University of Toronto — Toronto, Ontario
Ph.D. Machine Learning — *Sept 2019 – June 2024*
Marzyeh Ghassemi

University of California San Diego — San Diego, California
BS Computer Science (Summa Cum Laude) — *Sep 2014 – Jun 2018*
Zachary Lipton and Julian McAuley

Professional Experience

Prescient Design — New York, NY
Research Intern (Kyunghyun Cho) — *Summer 2022*
Blind Biological Sequence Denoising with Self-Supervised Set Learning

Meta — New York, NY (Virtual)
Research Intern (Naman Goyal) — *Summer 2021*
Growing Switch Transformers for Multilinguality

Google — Mountain View, CA (Virtual)
Research Intern (Qi Guo) — *Summer 2020*
Improving Dialogue Breakdown Detection with Semi-Supervised Learning

Meta (Full Time) — Menlo Park, CA
Research Engineer (Michael Auli) — *Sep 2018 – Sep 2019*

Meta — Menlo Park, CA
Software Engineering Intern — *Summer 2016 / Summer 2017*

Qualcomm — San Diego, CA
Software Engineering Intern — *Summer 2015*

Refereed Publications

1. **N. Ng**, R. Grosse, and M. Ghassemi. "Measuring Stochastic Data Complexity with Boltzmann Influence Functions". In: *Proc. of ICML*. 2024.
2. **N. Ng**, J. W. Park, J. H. Lee, R. Kelly, S. Ra, and K. Cho. "Blind Biological Sequence Denoising with Self-Supervised Set Learning". In: *TMLR*. 2024.
3. K. O'Brien, **N. Ng**, I. Puri, J. Mendez, H. Palangi, Y. Kim, M. Ghassemi, and T. Hartvigsen. "Improving Black-box Robustness with In-Context Rewriting". In: *TMLR*. 2024.

4. **N. Ng**, N. Hulkund, K. Cho, and M. Ghassemi. "Predicting Out-of-Domain Generalization with Neighborhood Invariance". In: *TMLR*. 2023.

5. J. Bae, **N. Ng**, A. Lo, M. Ghassemi, and R. Grosse. "If Influence Functions are the Question, What is the Answer?" In: *Proc. of NeurIPS*. 2022.

6. **N. Ng**, K. Cho, and M. Ghassemi. "SSMBA: Self-Supervised Manifold Based Data Augmentation for Improving Out-of-Domain Robustness". In: *Proc. of EMNLP*. 2020.

7. T. Lau, **N. Ng**, J. Gingold, N. Desai, J. McAuley, and Z. C. Lipton. "Embryo staging with weakly-supervised region selection and dynamically-decoded predictions". In: *Proc. of Machine Learning for Healthcare*. 2019.

8. **N. Ng**, K. Yee, A. Baevski, M. Ott, M. Auli, and S. Edunov. "Facebook FAIR's WMT19 News Translation Task Submission". In: *Proc. of WMT*. 2019.

9. K. Yee, **N. Ng**, Y. Dauphin, and M. Auli. "Simple and Effective Noisy Channel Modeling for Neural Machine Translation". In: *Proc. of EMNLP*. 2019.

10. **N. Ng**, R. Gabriel, J. McAuley, C. Elkan, and Z. Lipton. "Predicting surgery duration with neural heteroscedastic regression". In: *Proc. of Machine Learning for Healthcare*. 2017.

Workshop Publications

1. **N. Ng**, N. Thangarajan, J. Pan, M. Ghassemi, and Q. Guo. "Improving Dialogue Breakdown Detection with Semi-Supervised Learning". In: *Proc. of Workshop on Human in the Loop Dialogue Systems at NeurIPS*. 2020. Oral.

2. M. Ott, S. Edunov, A. Baevski, A. Fan, S. Gross, **N. Ng**, D. Grangier, and M. Auli. "fairseq: A fast, extensible toolkit for sequence modeling". In: *Proc. of NAACL-HLT: Demonstrations*. 2019.

3. **N. Ng**, J. McAuley, Z. Lipton, and N. Desai. "Predicting Embryo Morphokinetics in Videos with Late Fusion Nets & Dynamic Decoders". In: *Proc. of ICLR Workshops*. 2018.

Professional Activities

Chief Organizer

Workshop on Robustness in Sequence Modeling at NeurIPS	*2022*

Reviewer

ICML	*2024*
NeurIPS	*2023*
ICLR	*2023*
NeurIPS	*2022*
Machine Learning for Healthcare	*2020*

Shared Tasks

1st in Dialogue Breakdown Detection Challenge English task	*2020*
1st in WMT News Translation English ↔ German task	*2019*
1st in WMT News Translation English ↔ Russian task	*2019*

Honors and Awards

- OpenAI Preparedness Challenge Winner *2024*
- Jacobs Scholarship, University of California San Diego *2014*
- Regents Scholarship, University of California San Diego *2014*

Selected Invited Talks

ML@B (UC Berkeley) *April 19, 2024*
Measuring Stochastic Data Complexity with Boltzmann Influence Functions

Datology AI *April 2, 2024*
Measuring Stochastic Data Complexity with Boltzmann Influence Functions

Wallace Group (Northeastern) *Mar 21, 2024*
Measuring Stochastic Data Complexity with Boltzmann Influence Functions

Reddy Group (MILA) *Sept 26, 2023*
Learning Robust Representations of Discrete Sequences

ML@B (UC Berkeley) *Jan 19, 2023*
If Influence Functions are the Question, What is the Answer?

Teaching

University of Toronto Teaching Assistant

CSC 2515: Introduction to Machine Learning (Graduate Level) *Fall 2020*
CSC 2541: Topics in Machine Learning: Machine Learning for Health *Winter 2020*
CSC 311: Introduction to Machine Learning *Fall 2019*

Meta Internal Lecturer

Special Topics in Deep Learning: NLP and Translation *Feb 2019, Sep 2019*

University of California, San Diego Teaching Assistant

CSE 101: Design and Analysis of Algorithms *Winter 2018*
CSE 158: Web Mining and Recommender Systems *Fall 2017*
CSE 21: Mathematics for Algorithms and Systems *Winter 2017*
CSE 11: Introduction to Object-Oriented Programming *Fall 2015*