

Work Experience

- **Predoctoral Resident | Intel Intelligent Systems Lab** January 2021 – Present
 - Advised by Vladlen Koltun.
 - Working on analyzing and controlling large pretrained language models.
- **Machine Learning Research Scientist | Scale AI** April 2020 – December 2020
 - Research Tech Lead & ML Lead on Scale Document.
 - Mentored junior researchers to be a part of their first ML paper submission to a major conference.
 - Built multi-task optical character recognition & document intelligence models, beating Google, Amazon, and other vendors, which landed a \$500k corporate models as a service (MaaS) contract and started our MaaS product offering.
 - Wrote document understanding survey paper which was accepted to the MLRSA workshop at NeurIPS 2020.
 - Developed algorithms to condition transformer language models to generate unseen sentences, paper under review.
 - Created a natural adversarial objects dataset to improve robustness of object detection systems, paper under review.
- **Research Scientist | AI Foundation** July 2019 – January 2020
 - Built a sample- and memory-efficient multi-task fake speech detection system and published at AAAI20.
 - Created a large, diverse fake speech dataset to improve internal fake speech detection systems.
 - Developed an audio-driven facial animation model, which made AI rendered puppets more realistic.
 - Evaluated the efficacy of different sentence representation methods for question-answer retrieval in dialog.

Education

- **Courant Institute of Mathematical Sciences | New York University** Sept 2017 – May 2019
 - **M.S. Computer Science** (Deep Learning & NLP) GPA: 3.8/4.0
 - **Research Advisors:** Kyunghyun Cho and Sam Bowman
 - **Graduate Courses:** Deep Learning, Deep Generative Models, Deep Learning for NLP
- **Northwestern University** Sept 2013 – June 2017
 - **B.A./M.S. Statistics/Computer Science;** Stat GPA: 4.0/4.0; MS GPA: 4.0/4.0
 - **Research Advisor:** Doug Downey
 - **Graduate Courses:** Deep Learning, Machine Learning Foundations, Probabilistic Graphical Models, Data Mining, Adv Topics in ML, Statistical Pattern Recognition, Computational Learning Theory, Adv Topics in Bayesian Stats

Publications (with embedded links)

1. Gehrmann, Sebastian, ... **Subramani, Nishant**, ... Jiawei Zhou. "The GEM Benchmark: Natural Language Generation, its Evaluation and Metrics" **arXiv**
2. **Subramani, Nishant** and Nivedita Suresh. "Discovering Useful Sentence Representations from Large Pretrained Language Models" **Under Review at NAACL 2021**
3. Lau, Felix, Rosanne Liu, **Nishant Subramani**, Alexandra Harrison, Aerin Kim, and Elliot Branson. "Natural Adversarial Objects" **Under Review at CVPR 2021**
4. **Subramani, Nishant**, Alexandre Matton, Malcolm Greaves, and Adrian Lam. "A Survey of Deep Learning Approaches for OCR and Document Understanding" **MLRSA Workshop at NeurIPS 2020**
5. **Subramani, Nishant** and Delip Rao. "Learning Efficient Representations for Fake Speech Detection" **AAAI 2020**
6. **Subramani, Nishant**, Samuel R. Bowman, and Kyunghyun Cho. "Can Unconditional Language Models Recover Arbitrary Sentences?" **NeurIPS 2019**
7. **Subramani, Nishant**. "Pag2admg: An Algorithm for the Complete Causal Enumeration of a Markov Equivalence Class" **ICML 2018 CausalML Workshop**.
8. **Subramani, Nishant**, and Doug Downey. "PAG2ADMG: A Novel Methodology to Enumerate Causal Graph Structures" **AAAI 2017 Student Abstract**
9. **Subramani, Nishant**. "Identifying the Best Predictors of Unmet Health Care Needs in Children with DBD." *Northwestern Undergraduate Research Journal* (2015).

Research Experience

- **Research Collaborator | Allen Institute for AI** October 2020 – Present
 - Working with Doug Downey and Daniel King on scientific concept generation models from scientific papers with the Semantic Scholar team.
- **NLP Researcher | Masakhane** May 2020 – Present
 - Co-organizing the AfricaNLP 2021 workshop. **Accepted at EAACL2021**
- **Research Assistant | New York University** September 2017 – May 2019
 - Advised by Kyunghyun Cho and Sam Bowman.
 - Developed a framework to analyze the sentence space of a recurrent neural language model.
 - Built a pipeline to investigate using a language model as a universal decoder for multitask natural language generation.
- **Deep Learning Research Intern | Salesforce Research** March 2017 – August 2017
 - Supervised by Richard Socher
 - Built a multitask NLP system trained end-to-end for a variety of NLP tasks.
 - Investigated impact of CoVe pretraining on state of the art abstractive summarization and question answering models.

- **Research Assistant | Northwestern University** July 2014 – March 2015; March 2016 – June 2017
 - Advised by Doug Downey.
 - Improved my *pag2adm* algorithm developed at ETH Zurich into a method that generates all Markov equivalent acyclic directed mixed graphs (not necessary just ancestral) from a PAG.
 - Developed various methodologies to identify deep net hyperparameter settings more efficiently using active learning and sampling.
 - Developed various ensembling methodologies to improve state-of-the-art language model performance on the Penn Tree Bank dataset.
 - Developed alternative dropout methodologies to increase variance of models from epoch to epoch to improve deep neural network performance on a variety of tasks.
 - Developed methods to input pre-existing analogical knowledge to improve word-embeddings in Google's word2vec models.
 - Developed methods to utilize importance sampling to help stochastic gradient descent convergence for neural sentence-level language modeling.
- **Research Assistant in Biomedical Informatics | Stanford University** Jun 2015 – Jan 2016
 - Supervised by Olivier Gevaert
 - Developed a Bayesian Network structure learning methodology to identify a genetic basis for Glioblastoma.
- **Research Assistant in Biomedical Informatics | Feinberg School of Medicine** Jan 2016 – March 2016
 - Supervised by Yuan Luo
 - Predicted ICU 30-day readmission rates from a multivariate panel of physiological measurements using Subgraph Augmented Non-Negative Matrix Factorization (SANMF).
- **Master's Semester Project Student in Systems Biology | ETH Zurich** Sept 2015 – Jan 2016
 - Supervised by Manfred Claassen
 - Developed a methodology (*The Boundary Searcher*) to efficiently calculate the r-convex hull of a point cloud in high dimensions.
- **Master's Semester Project Student in Statistics | ETH Zurich** Sept 2015 – Jan 2016
 - Supervised by Marloes Maathuis
 - Developed a novel methodology to transform a given partial ancestral graph (PAG) to the set of all ancestral acyclic directed mixed graphs that belong in the Markov equivalence class that the PAG encodes.

Teaching Experience

- **Teaching Assistant for Natural Language Understanding | NYU** Jan 2018 – May 2018
 - Graduate Course: DSGA-1012 - Natural Language Understanding.
 - Gave a lecture on deep learning fundamentals for NLU.
 - Developed homework assignments and ran the tutorial sessions of the course.
 - Helped advise research projects completed by students in the course that involved deep learning applied to language.
- **Teaching Assistant for Statistical Language Modeling | Northwestern** Jan 2017 – Mar 2017
 - Graduate Course: EECS 496 - Statistical Language Modeling focusing on Deep Learning.
 - Constructed seminar reading list; helped other students understand seminal deep NLP papers.
- **Teaching Assistant for Probabilistic Graphical Models | Northwestern** Sept 2016 – Dec 2016
 - Graduate Course: EECS 495 - Probabilistic Graphical Models.
 - Helped to design course materials and structure for this graduate course.
 - Developed and graded assignments; held office hours.
- **Teaching Assistant for Mathematical Foundations of CS | Northwestern** Sept 2016 – Dec 2016
 - Undergraduate Course: EECS 212 - Mathematical Foundations of Computer Science.
 - Helped to develop and grade assignments and exams; held office hours.
- **Teaching Assistant for Machine Learning | Northwestern** Feb 2016 – June 2016
 - Undergraduate/Graduate Course: EECS 349 - Machine Learning.
 - Devised methodology for and built a mechanical TA which uses the Vancouver crowd sourcing algorithm.
 - Helped to design tree search and decision tree assignments, graded assignments, and held office hours.
- **Co-Instructor for Computing Applications I & II | Northwestern** Sept 2014 – March 2015
 - Undergraduate Courses: ISP 101-1, 101-2 - Computing Applications I/II.
 - Co-taught course with three other teaching assistants.
 - Wrote exam questions and assignments covering python and R basics.

Other Experience

- **Deep Learning Consultant | Talkspace** November 2017 – August 2018
 - Taught Talkspace's Data Science team about deep learning fundamentals and helped build domain-specific models.

Research Presentations

- ***A Survey of Deep Learning Approaches for OCR and Document Understanding.*** December 2020
NeurIPS MLRSA Workshop 2020, Virtual. Talk.

- *Can Unconditional Language Models Recover Arbitrary Sentences?* March 2020
SRI International, Menlo Park, CA. Talk.
- *Learning Efficient Representations for Fake Speech Detection.* February 2020
AAAI 2020, New York, USA. Poster.
- *Can Unconditional Language Models Recover Arbitrary Sentences?* December 2019
NeurIPS 2019, Vancouver, Canada. Poster.
- *PAG2ADMG.* ICML 2018, Stockholm, Sweden. Causal ML Workshop. Poster. July 2018
- *PAG2ADMG.* AAAI 2017, San Francisco, CA. Student Abstract Spotlight Talk. February 2017
- *PAG2ADMG.* AAAI 2017, San Francisco, CA. Student Abstract Poster. February 2017
- *Pag2Admg.* Undergraduate Research Expo, Northwestern University. Poster. June 2016
- *The Boundary Searcher.* EECS Poster Fair, Northwestern University. Poster. Apr 2016
- *Predicting Unmet Health Care Needs in Children with DBD.* June 2015
Undergraduate Research Expo, Northwestern University. Poster.
- *Predicting Unmet Health Care Needs in Children with DBD.* Mar 2015
EECS Poster Fair, Northwestern University. Poster.
- *How Evil are Turnovers?* June 2014
Undergraduate Research Expo, Northwestern University. Talk.
- *How Evil are Turnovers?* Apr 2014
Computational Statistics Conference, Northwestern University. Poster.

Professional Service

- Program Committee Member for GEM Workshop at **ACL 2021** 2021
- Workshop Organizer for AfricaNLP at **EACL 2021** 2021
- Conference Reviewer for ACL 2021
- Conference Reviewer for CVPR 2021
- Conference Reviewer for AAAI 2020, 2021
- Conference Reviewer for ICML 2020
- Conference Reviewer for EMNLP 2019
- Conference Reviewer for ICLR 2019, 2020
- Conference Reviewer for ICCV 2017
- Conference Reviewer for NeurIPS 2017, 2020

Awards & Honors

- Henry M. MacCracken Graduate Fellowship (5 year fully-funded PhD Fellowship) September 2017 - May 2019
- Charles A & Ruby E Howell Endowed Scholarship December 2014 - June 2017
- Academic Dean's List September 2014 - June 2016
- Inaugural ETH Zurich Exchange Program Acceptee (1/3 students) September 2015 - February 2016
- Intel Science Talent Search (ISTS) Outstanding Written Report Award March 2013
- National AP Scholar August 2012
- REHSS High School Research Internship Acceptee (1/30 students nationwide) June 2012 - August 2012
- National Merit Commended Scholar December 2011