Vijay Viswanathan

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Contact Information

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Research Statement

I do research on making AI models more reliable at specialized tasks. My research primarily investigates the use of synthetic data to achieve this goal.

Education

Carnegie Mellon University, School of Computer Science, Pittsburgh, PA 2022–2027 (expected)

- Ph.D in Language and Information Technologies GPA: 3.92/4.30
- *Advisors*: Sherry Tongshuang Wu and Graham Neubig

Carnegie Mellon University, School of Computer Science, Pittsburgh, PA 2020–2022 (expected)

- M.S. in Intelligent Information Systems GPA: 4.05/4.30
- *Advisors*: Prof. Graham Neubig and Dr. Pengfei Liu
- *Relevant Courses*: Algorithms for NLP, Probabilistic Graphical Models, Question Answering, Convex Optimization, Search Engines

Carnegie Mellon University, Mellon College of Science, Pittsburgh, PA 2012–2016

- B.S. in Mathematics, with minors in Computer Science and Language Technologies
- *Undegradute Research Advisor*: Prof. Eric Nyberg
- *Relevant Courses*: Real Analysis I and II, Intro to Theoretical Computer Science, Algebraic Structures, Basic Logic, Probability

Fellowships and Awards

- Oustanding Demo Paper, ACL 2022 (top 3 papers out of 75 system demo papers presented)
- NEC Student Research Fellow, 2022-2023
- Co-PI, Microsoft “Accelerate Foundation Models Research” Grant, 2023 (*$20,000, from Microsoft Research*)
- Johnson & Johnson Undergraduate Research Award (presented at CMU's “Meeting of the Minds”), 2015
- Thiel “20 Under 20” Fellowship Finalist, 2012

Publications

1. Jaixin Ge, Xueying Jia, **Vijay Viswanathan**, Hongyin Luo, Graham Neubig, Graham Neubig. 2024. “ Training Task Experts through Retrieval Based Distillation”. In *arXiv:2407.12874*.
2. Ian Wu, Sravan Jayanthi, **Vijay Viswanathan**, Simon Rosenberg, Sina Pakazad, Tongshuang Wu, Graham Neubig. 2024. “Synthetic Multimodal Question Generation”. In *Findings of the Association for Computational Linguistics: EMNLP 2024 (EMNLP Findings 2024)* (to appear).
3. Chenyang Zhao, Xueying Jia, **Vijay Viswanathan**, Tongshuang Wu, Graham Neubig. 2024. “Large Language Models Enable Few-Shot Clustering”. In *1st Conference on Language Modeling (COLM) 2024*.
4. Saumya Gandhi*, Ritu Gala*, **Vijay Viswanathan**, Tongshuang Wu, Graham Neubig. 2024. “Better Synthetic Data by Retrieving and Transforming Existing Datasets”. In *Findings of the Association for Computational Linguistics: ACL 2024 (ACL Findings 2024)*.
5. **Vijay Viswanathan**, Kiril Gashteovski, Carolin Lawrence, Tongshuang Wu, Graham Neubig. 2024. “Large Language Models Enable Few-Shot Clustering”. In *Transactions of the Association for Computational Linguistics (TACL)*.
6. **Vijay Viswanathan***, Chenyang Zhao*, Amanda Bertsch, Tongshuang Wu, Graham Neubig. 2023. “Prompt2Model: Generating Deployable Models from Natural Language Instructions”. In *Conference on Empirical Methods in Natural Language Processing Demo Track (EMNLP Demo Track 2023)*.

7. **Vijay Viswanathan**, Luyu Gao, Tongshuang Wu, Pengfei Liu, Graham Neubig. 2023. "DataFinder: Scientific Dataset Recommendation from Natural Language Descriptions". In *Annual Conference of the Association for Computational Linguistics (ACL 2023).*

8. Aryeh Tiktinsky*, **Vijay Viswanathan***, Danna Niezni, Dana Meron Azagury, Yosi Shamay, Hillel Taub-Tabib, Tom Hope, Yoav Goldberg. 2021. "An N-ary Relation Extraction Dataset for Drug Combinations". In *Proceedings of the 2022 Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL 2022).* **Oral**.

9. Yang Xiao, Jinlan Fu, Weizhe Yuan, **Vijay Viswanathan**, Zhoumianze Liu, Yixin Liu, Graham Neubig, Pengfei Liu. 2022. "'DataLab: A Platform for Data Analysis and Intervention". In *Proceedings of the 60th Annual Meeting of the Association for Computational Linguistics, System Demonstrations Track (ACL Demo Track 2022).* ***Outstanding Demo Paper***.

10. **Vijay Viswanathan**, Graham Neubig, Pengfei Liu. 2021. "CitationIE: Leveraging the Citation Graph for Scientific Information Extraction". In *Proceedings of the 59th Annual Meeting of the Association for Computational Linguistics and the 11th International Joint Conference on Natural Language Processing (Volume 1: Long Papers) (ACL-IJCNLP 2021).* **Oral**.

11. Siddhant Arora*, Alissa Ostapenko*, **Vijay Viswanathan***, Siddharth Dalmia*, Florian Metze, Shinji Watanabe, Alan W Black. 2021. "Rethinking End-to-End Evaluation of Decomposable Tasks: A Case Study on Spoken Language Understanding". In *22nd Annual Conference of the International Speech Communication Association (Interspeech 2021).*

** authors contributed equally*

Press Coverage

- **2023**
  - ”The push to make big AI small” — Axios
  - ”CMU & Tsinghua U's Prompt2Model Generates Deployable Models Following Natural Language Instructions” — SyncedReview / Jiqi Zhixin
  - ”Researchers from CMU and Tsinghua University Propose Prompt2Model: A General Purpose Method that Generates Deployable AI Models from Natural Language Instructions” — MarkTechPost

Mentored Students

- Jiaxin Ge (Peking Uni.) Dec 2023 - Now
  Co-advised with Graham Neubig and Hongyin Luo (MIT).

- Xueying Jia (CMU) Oct 2023 - Now
  Collaborating with Chenyang Zhao and co-advised with Graham Neubig and Tongshuang Wu. Published a paper (as co-first author) at COLM 2024.

- Ritu Gala (CMU) Aug 2023 - May 2024
  Collaborating with Saumya Gandhi and co-advised with Graham Neubig and Tongshuang Wu. Published their first paper (as co-first author) at ACL Findings 2024.

- Saumya Gandhi (CMU) Aug 2023 - May 2024
  Collaborating with Ritu Gala and co-advised with Graham Neubig and Tongshuang Wu. Published a paper as co-first author at ACL Findings 2024.

- Vanya Bannihatti Kumar (CMU) Aug 2023 - Now
  Co-advised with Graham Neubig and Tongshuang Wu.

- Chenyang Zhao (Tsinghua Uni.) Mar 2023 - Aug 2024
  Had first paper accepted to EMNLP Demo 2023 (co-led with Vijay Viswanathan), and had a second paper published as co-first author at COLM 2024. Co-advised with Graham Neubig and Tongshuang Wu.

- Yuanchen Bai (CMU) May 2022 - Oct 2023
  Had first paper accepted to a workshop at AACL in Nov 2023 (co-led with Raoyi Huang). Co-advised with Tzu-Sheng Kuo, and Tongshuang Wu.

- Raoyi Huang (CMU) May 2022 - Oct 2023
  Had first paper accepted to a workshop at AACL in Nov 2023 (co-led with Yuanchen Bai). Co-advised with Tzu-Sheng Kuo, and Tongshuang Wu.

Research Experience

- **Cohere** May 2024–Sep 2024
  Intern of Technical Staff, with Pat Verga on the *Agents & RAG Team* Remote
  - Generated a large-scale synthetic dataset for training web navigation agents.
  - Leveraged weak supervision from a web search dataset to guide the data synthesis process.
- **Carnegie Mellon University, Language Technologies Institute** Aug 2022–*present*
  Doctoral Researcher with Profs. Sherry Tongshuang Wu and Graham Neubig Pittsburgh, PA
  - Studying applications of data generation for NLP as an NEC Student Research Fellow.
  - Designing new algorithms for semi-supervised clustering for diverse tasks such as open knowledge base canonicalization and document clustering.
- **Carnegie Mellon University, Language Technologies Institute** Aug 2020–May 2022
  Research Assistant for Prof. Graham Neubig and Dr. Pengfei Liu Pittsburgh, PA
  - Studied extracting critical structured information (e.g. methods and metrics) from full scientific texts, using the *SciREX* dataset
  - Proposed using the citation graph in a neural multi-task information extraction system, giving state-of-the-art results (oral presentation at the *ACL-IJCNLP 2021* conference)
  - Working on automatically recommending datasets to use for a given natural language system description (submitted to *ARR Dec '22*, currently in revision)
- **Allen Institute for Artificial Intelligence (AI2)** Summer 2021
  Research Intern at AI2 Israel, with Prof. Yoav Goldberg Remote
  - Worked on extracting a database of drug interactions from text in biomedical abstracts
  - Supported the construction of a novel annotated dataset for discovering drug interactions by implementing an efficient modeling framework, implementing new relation extraction metrics, and benchmarking state-of-the-art models for this new task (submitted to *ARR Nov '22*)
  - Developed novel task-specific pretraining scheme to leverage unlabeled data
- **Carnegie Mellon University, Language Technologies Institute** Jan 2015 - May 2016
  Research Assistant for Prof. Eric Nyberg Pittsburgh, PA
  - Created a query-to-question conversion system to convert a search engine query to its intent
  - Won $1000 Johnson & Johnson Award at CMU's undergraduate research symposium
  - Developed method for using an ensemble of adaptive sampling methods in active learning

Work Experience

- **Uber ATG** Apr 2019 - Aug 2020
  Software Engineer, Prediction team (under Dr. Micol Marchetti-Bowick) Pittsburgh, PA
  - Developed model enabling autonomous cars to jointly predict spatial paths and vehicle-vehicle interactions, considerably improving the comfort of autonomous driving in traffic
  - Owned system to measure the autonomous car's predictions of other vehicles via simulation
  - Built application to crowdsource labels for road interactions in dense traffic from onboard sensor logs
- **Scaled Inference** Mar 2017 - Mar 2019
  Inference Engineer, Statistical Modeling team Palo Alto, CA
  - Implemented algorithms for contextual, adaptive A/B optimization. Wrote first production version of our policy search algorithm and efficient Bayesian inference from scratch in Go
  - Responsible for debugging and improving statistical models and RL algorithms in production
- **Yik Yak** Jun 2016 - Dec 2016
  Software Engineer, Machine Intelligence Team (under Dr. Marsal Gavalda) Atlanta, GA
  - Designed and implemented the ranking component of a user recommendation system for Yik Yak's location-based social network
  - Trained deep models on large user-generated text and image data (from >100M messages)
  - Built user interface to crowdsource user relevance data to tune our ranking model
  - Deployed ranker to production via Docker and Kubernetes

Service

- Student Member, CMU LTI Diversity, Equity, and Inclusion (DEI) Committee, 2022-2023
- Reviewer, Controllable Generative Modeling in Language and Vision (CtrlGen) Workshop at NeurIPS, 2021
- Chair, Student Committee for CMU LTI Faculty Hiring, 2022
- Member, Student Committee for CMU LTI Faculty Hiring, 2021
- Teaching Assistant for "Multilingual Natural Language Processing" (11-737), Spring 2022

Standardized Test Scores

- GRE: 170/170 (Quantitative), 167/170 (Verbal), 5.5/6.0 (Writing) taken on 10/2/2021

References

Dr. **Graham Neubig**
Associate Professor at Carnegie Mellon University
E-mail: gneubig@andrew.cmu.edu

Dr. **Sherry Tongshuang Wu**
Assistant Professor at Carnegie Mellon University
E-mail: sherryw@cs.cmu.edu

Dr. **Yoav Goldberg**
Research Director at Allen Institute for Artificial Intelligence, Israel and Professor at Bar Ilan University
E-mail: yoavg@allenai.org

Dr. **Kiril Gashteovski**
Senior Research Scientist at NEC Laboratories Europe
E-mail: kiril.gashteovski@neclab.eu

Dr. **Micol Marchetti-Bowick**
Tech Lead Manager at Aurora Innovation
(formerly, Manager at Uber ATG)
E-mail: micol.mb@gmail.com