Krishnapriya Vishnubhotla

vkpriya@cs.toronto.edu • https://priya22.github.io/ • NLP | ML

I graduated in June 2024 with a PhD in Computer Science from the University of Toronto, where I was part of the Computational Linguistics group, supervised by Graeme Hirst and Frank Rudzicz. My PhD projects focused on modeling variation in language use as a function of speaker identity, a research area that falls in the intersection of natural language processing, sociolinguistics, and psycholinguistics. I am interested in leveraging large text datasets to better understand how facets of individual identity and communicative goals affect the ways in which information is conveyed via language, and how this knowledge can help us build more reliable and helpful AI agents.

Education

- **University of Toronto** — **Toronto, Canada**
  PhD in Computer Science, Computational Linguistics Group, GPA: 3.97/4.0 — *2019–2024*
- **University of Toronto** — **Toronto, Canada**
  Master of Science in Computer Science, Thesis option, GPA: 4.0/4.0 — *2017–2019*
- **National Institute of Technology Karnataka-Surathkal** — **Mangalore, India**
  B.Tech Computer Science and Engineering , CGPA 8.93/10 — *2013–2017*

Experience

- **National Research Council (NRC) Canada** — **Research Intern**
  Emotion Dynamics | *Mental Health* | *Social Media* — *June 2023 – Jan 2024*
  Formulated metrics to characterize emotional expression and variation among different demographic groups using social media utterances, and their connection to various mental health conditions.
- **AI4Good Lab** — **Teaching Assistant**
  Deep Learning | *Natural Language Processing* — *April 2022 – June 2022*
  The AI4Good Lab is a 7-week introductory machine learning program for under-represented groups in the field. As a TA, I designed and ran daily tutorial sessions on ML theory, programming, and mentored teams on an applied NLP project on style transfer.
- **Georgian Partners** — **Research Intern**
  Representation Learning | *Clustering* — *May 2020 – Dec 2020*
  Worked on developing unsupervised models of text embeddings and clustering for internal company applications.
- **Samsung AI Research Center** — **Research Intern**
  Multi-modal Representation Learning | *Video-caption alignment* — *May 2019 – Sep 2019*
  Worked on multi-modal representation learning and semi-supervised methods of text and video alignment. I was a part of the winning submission for the Samsung Retail Robot Challenge, for which we built an interactive clip retrieval system for customer support videos.
- **Myntra Designs Inc.** — **Software Engineering Intern**
  Customer Chatbot | *Ruby on Rails* — *May 2016 – July 2016*
  Worked on backend and frontend development of web interfaces for customer service chatbots.
- **Indian Institute of Technology Bombay** — **Summer Research Intern**
  Game Theory | *Operations Research* — *May 2015 – July 2015*
  Worked on characterizing Nash equilibrium of quasi-zero-sum games.

Research Themes

- **Comparing Character Portrayal in Human and Machine Story Generations**
  LLMs | *Story Generation* | *Bias*
  Created the GPT-WritingPrompts dataset, which pairs short stories written by Reddit users in response to prompts with comparable generations from GPT-3.5. Quantified and compared biases in character portrayal when grouped

by the narrative voice and the gender of the main protagonist of the story. Identified narrative aspects where human storytelling process differ from that of GPT-3.5.

- **Characterizing Emotional Expression and Variation in Social Media Utterances**
  Social Media | *Emotion arcs* | *Mental Health*

  Developed computational measures of Emotional Dynamics and Emotion Granularity from textual utterances, metrics used in the affective sciences as markers of physical and emotional well-being. Demonstrated their effectiveness as markers of mental health for multiple Mental Health Conditions. Work done in collaboration with members of the Affective Science Lab, University of North Carolina Chapel Hill.

- **Quotation Attribution and Character Voice in Literary Texts**
  Literary NLP | *Writing style* | *Emotion arcs* | *Bias*

  Created the Project Dialogism Novel Corpus (PDNC), a large dataset of characters and their quotations in full-length literary novels. Designed and evaluated neural models that can accurately attribute quotations to their speakers. Modelled effects of speaker and author identity on stylistic and emotional features of utterances.

- **A Dataset of Semantic Textual Relatedness**
  Semantic relatedness | *Sentence representations*

  Created a dataset of English sentence pairs annotated for semantic relatedness using Best–Worst Scaling. Explored the contribution of various linguistic features to semantic relatedness, and evaluated state-of-the-art sentence representation models on the dataset. In collaboration with multiple researchers, expanded this to a SemEval-2024 shared task on multilingual Semantic Textual Relatedness.

- **Disentangling Content and Style in Texts**
  Semantic similarity | *Writing style* | *Sentence representations*

  Evaluated autoencoder variants that learn disentangled representations of content and style on a highly-structured Natural Language Generation dataset. Our findings highlight the data requirements, effectiveness, and limitations of current learning methods.

Publications

Working Papers

- Huang, X.Y., Vishnubhotla, K. and Rudzicz, F., 2024. The GPT-WritingPrompts Dataset: A Comparative Analysis of Character Portrayal in Short Stories. arXiv preprint arXiv:2406.16767. *Under review*
- Vishnubhotla, K., Teodorescu, D., Feldman, M.J., Lindquist, K.A. and Mohammad, S.M., 2024. Emotion Granularity from Text: An Aggregate-Level Indicator of Mental Health. arXiv preprint arXiv:2403.02281. *Under review*

Refereed Publications

- Vishnubhotla, K., Hammond, A., Hirst, G., and Mohammad, S.M., 2024. The Emotion Dynamics of Literary Novels. In *Findings of the Association for Computational Linguistics (ACL 2024)*
- Ousidhoum, N., Muhammad, S.H., Abdalla, M., et al., 2024. SemRel2024: A Collection of Semantic Textual Relatedness Datasets for 14 Languages. In *Findings of the Association for Computational Linguistics (ACL 2024)*.
- Vishnubhotla, K., Rudzicz, F., Hirst, G., and Hammond, A., 2023. Improving Quotation Attribution in Literary Novels. In *Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics (Volume 2: Short Papers) (ACL 2023)*
- Abdalla M., Vishnubhotla, K. and Mohammad, S.M., 2023. What Makes Sentences Semantically Related: A Textual Relatedness Dataset and Empirical Study. In *Proceedings of the 17th Conference of the European Chapter of the Association for Computational Linguistics (EMNLP 2023)*
- Vishnubhotla, K., Hammond, A. and Hirst, G., 2022. The Project Dialogism Novel Corpus: A Dataset for Quotation Attribution in Literary Texts. In *Proceedings of the 13th Language Resources and Evaluation Conference (LREC 2022)*
- Vishnubhotla, K. and Mohammad, S.M., 2022. Tweet Emotion Dynamics: Emotion Word Usage in Tweets from US and Canada. In *Proceedings of the 13th Language Resources and Evaluation Conference (LREC 2022)*
- Vishnubhotla, K., Hirst, G. and Rudzicz, F., 2021. An Evaluation of Disentangled Representation Learning for Texts. In *Findings of the Association for Computational Linguistics (ACL 2021)*

- Vishnubhotla, K., Hammond, A. and Hirst, G., 2019. Are Fictional Voices Distinguishable? Classifying Character Voices in Modern Drama. In *Proceedings of the 3rd Joint SIGHUM Workshop on Computational Linguistics for Cultural Heritage, Social Sciences, Humanities and Literature (LaTeCH-CLfL 2019)*
- Budhkar, A., Vishnubhotla, K., Hossain, S. and Rudzicz, F., 2019. Generative Adversarial Networks for Text Using Word2vec Intermediaries. In *Proceedings of the 4th Workshop on Representation Learning for NLP (RepL4NLP-2019)*

Technical skills

- **Deep Learning Frameworks:** PyTorch, TensorFlow
- **ML/NLP Libraries:** HuggingFace, spaCy, NLTK, Pandas, NumPy, Scikit-learn
- **Programming Languages:** Python, R, Javascript, C, C++, Java

Teaching Experience

- **Co-Instructor:** Introductory Computation and Data Science for the Life and Physical Sciences, *(Winter 2024)*
- **Lead TA:** Introductory Computation and Data Science for the Social Sciences, Life and Physical Sciences, and Literature, *(Winter 2023, Fall 2023)*
- **Teaching Assistant:** Natural Language Computing, Introduction To Computer Programming, Introduction to Computer Science, Programming on the Web. *(2017 to 2022, various semesters.)*

Academic Service

- Research Mentorship: Xi Yu Huang, May-December 2023.
- I have served as a reviewer for:
  - ACL Rolling Review: 2024, 2023, 2022
  - *ACL Conferences (ACL, NAACL, EMNLP): 2022, 2021, 2020, 2019, 2018
- Volunteer mentor for the Graduate Application Assistance Program, 2021.
- Triager for the DCS Admissions Program, 2021 and 2020.
- Maintained the official webpage of the Computational Linguistics group, University of Toronto, from 2018-2020.

Awards

- Vector Research Grant, Vector Institute, Toronto *(2019–2024)*
- SGS and DCS Conference Grants, University of Toronto *(2021, 2023)*
- Ministry of Human Resources and Development India Undergraduate Scholarship *(2013–2017)*

Relevant Courses

(Advanced) Computational Linguistics ○ Natural Language Computing ○ Introduction to Machine Learning ○ Learning Discrete Latent Structure ○ Algorithms for Private Data Analysis ○ Topics in Computational Social Science ○ Computational Models of Semantic Change