Muntasir Wahed

mwahed2@illinois.edu | mwahed.com | immuntasir | immuntasir | @immuntasir

Research Interests

Multimodal Learning, Vision-Language Models, Conversational AI, Self-Supervision, ML Robustness, Information Retrieval

Education

University of Illinois Urbana-Champaign

Ph.D. in Computer Science *May 2026 (Expected)*

Advisor: Dr. Ismini Lourentzou

Virginia Tech

M.S. in Computer Science (Grade: **4.00/4.00**) *May 2023*

University of Dhaka

B.Sc. in Computer Science and Engineering (Grade: **3.66/4.00**) *January 2019*

Honors & Awards

2025 **Winning Team Co-Lead**, Amazon Nova AI Challenge

2023 **Finalist Team**, Amazon Alexa Prize TaskBot Challenge 2

2023 **VT Pratt Graduate Fellowship**, Department of Computer Science, Virginia Tech

2022 **VT Pratt Graduate Fellowship**, Department of Computer Science, Virginia Tech

2021 **SIGIR Student Travel Grant**, CIKM 2021

Selected Publications

1. **Muntasir Wahed**, Kiet Nguyen, Adheesh Juvekar, Xinzhuo Li, Xiaona Zhou, Vedant Shah, Tianjiao Yu, Pinar Yanardag, Ismini Lourentzou. *PRIMA: Multi-Image Vision-Language Models for Reasoning Segmentation*, Under Review, 2025.
2. **Muntasir Wahed**, Xiaona Zhou, Kiet A. Nguyen, Tianjiao Yu, Nirav Diwan, Gang Wang, Dilek Hakkani-Tür, and Ismini Lourentzou. *MOCHA: Are Code Language Models Robust Against Multi-Turn Malicious Coding Prompts?* **EMNLP**, 2025.
3. Kiet Nguyen, Adheesh Juvekar, Tianjiao Yu, **Muntasir Wahed**, Ismini Lourentzou. *CALICO: Multi-Image Pixel-Grounded Object Comparison by Parts with Large Language Models*, Conference on Computer Vision and Pattern Recognition (**CVPR**), 2025.
4. Jiawei Liu, Nirav Diwan, Zhe Wang, Haoyu Zhai, Xiaona Zhou, Kiet A. Nguyen, Tianjiao Yu, **Muntasir Wahed**, Yinlin Deng, Hadjer Benkraouda, Yuxiang Wei, Lingming Zhang, Ismini Lourentzou, Gang Wang. *PurpCode: Reasoning for Safer Code Generation.* Conference on Neural Information Processing Systems (**NeurIPS**), 2025.
5. **Muntasir Wahed**, Xiaona Zhou, Tianjiao Yu, Ismini Lourentzou. *Fine-Grained Alignment for Cross-Modal Recipe Retrieval*, Winter Conference on Applications of Computer Vision (**WACV**), 2024.
6. **Muntasir Wahed**, Daniel Gruhl, Ismini Lourentzou. *MArBLE: Hierarchical Multi-Armed Bandit for Human-in-the-Loop Lexicon Expansion*, 30th ACM International Conference on Information and Knowledge Management (**CIKM**), 2023.
7. **Muntasir Wahed**, Daniel Gruhl, Alfredo Alba, Anna Lisa Gentile, Petar Ristoski, Chad Deluca, Steve Welch, and Ismini Lourentzou. *SAUCE: Truncated Sparse Document Signature Bit-Vectors for Fast Web-Scale Corpus Expansion*,**CIKM**, 2021.

Patents

1. **Muntasir Wahed**, et al. "Human-ai collaborative prompt engineering." U.S. Patent. 18/602,868.
2. **Muntasir Wahed**, and Daniel Gruhl. "Hierarchical multi-armed bandit for lexicon expansion." U.S. Patent. 18/062,208.

Experience (Academic & Industry)

University of Illinois Urbana-Champaign

Graduate Teaching Assistant *August 2025 - Present*

- Teaching assistant for CS 446 - Machine Learning

Google DeepMind

Intern *May 2025 - August 2025*

- Worked at the Gemini App team. Evaluated reasoning and visual perception capabilities and developed new strategies to improve performance across diverse tasks (one paper submitted for internal review and one invention disclosure)

University of Illinois Urbana-Champaign

Graduate Research Assistant *August 2024 - May 2025*

- Worked on grounded multi-image comparison and grounded parts, attributes, and affordance detection using Vision Language Models (VLM) (one paper published at CVPR '25, another under review)
- Improved the robustness of code language models against security vulnerabilities and malicious coding prompts using data synthesis and supervised fine-tuning (SFT) strategies (one paper published at EMNLP '25, another under review)

IBM Research

Summer Research Intern *May - August 2022, 2023, 2024*

- Identified important components that improve the performance of human-in-the-loop **error pattern discovery** framework and developed a UI to facilitate error pattern discovery in LLM responses
- Developed an **entity set expansion** technique to build lexicons for natural language processing tasks by efficiently selecting among existing models based on continuous feedback from subject-matter experts (published at CIKM '23, patent granted)
- Designed and implemented models to identify **personally identifiable information (PII)** as part of the LLM training process
- Developed and deployed a UI that enables **efficient data annotation** and collaboration with external researchers

Virginia Tech

Graduate Research Assistant *May 2021 - May 2024*

- Designed and developed a **fine-grained alignment** approach along with a hyperbolic loss to capture hierarchical similarity among class categories to improve **cross-modal retrieval** models for structured texts (published at WACV '24)
- Experimented with state-of-the-art **contrastive learning** frameworks, and developed a method to improve the **robustness** of CL frameworks against **adversarial attacks**
- Implemented virtual-world **forest modeling** using trees generated with 3D L-systems to facilitate **sonar simulation**

Amazon Alexa Prize TaskBot Challenge 2

Finalist Team *January 2023 - September 2023*

- Designed and developed a **task-oriented conversational AI** that assists customers in searching and completing tasks, for example, recipe, DIY, etc, and answers relevant questions
- Implemented a human-in-the-loop hybrid **intent classification** module to gradually improve the ability to understand user queries, resulting in the successful classification of more than 90% of user utterances
- Implemented an **online dynamic caching** mechanism to drastically reduce the response time of the bot by 700ms
- Contributed to various subtasks related to the bot, including harmful text classification, instruction tuning, prompt engineering, and financial, medical, or legal document classification, etc
- Designed and conducted **user testing** to observe interactions and formulated actions to improve UX accordingly
- Co-led the writing of the technical report and was responsible for extracting and writing the analysis insights

Virginia Tech

Graduate Teaching Assistant

- CS5254 (January 2022 - May 2022): grading assignments in android app development
- CS2114 (January 2021 - May 2021): taught classes, graded assignments, and helped students in office hours

Tiger IT Bangladesh Limited

Software Engineer (ML) *June 2020 - December 2020*

- Conducted literature review and designed solutions using deep learning models in **Tensorflow** and **PyTorch** to solve image and signal processing problems including **face detection**, **video classification**, and analyzing **vital signs from video**
- Built prototypes using Fast API and android studio to enable testing and collecting feedback from users

Data & Design Lab

Research Assistant *April 2019 - June 2020*

Enosis Solutions
Software Engineer *April 2019 - October 2019*

Academic Service

- Served as a reviewer for CVPR '26, CVPR '25, ECCV '24, WACV '24 and EMNLP '22
- Served as a program committee member for AAAI '25, PETRA '23, '24 and IEEE Big Data '23, '24, '25
- Served as a judge for the VTHacks 2022 Hackathon
- Worked with the Computer Science Graduate Council to organize CS@VT Lightning Talks 2021 & 2022
- Volunteered at the CS@VT Graduate Recruiting Weekend 2022 & 2023
- Served as a panelist at the CS@VT Qualifier Q&A 2022
- Volunteered for various campus organizations, including Dhaka University Science Society and ACM Students Chapter
- Mentored undergraduate students, providing guidance on research methodologies, data analysis, and literature review
- Organized two reading groups on Deep Learning and Self-Supervised learning

Relevant Coursework

- **Ph.D.**: Advanced Natural Language Processing, Conversational AI, LLM Post-Pretraining
- **M.S.**: Advanced Machine Learning, Multimodal Vision, Data Challenges in Machine Learning, Statistics in Research I & II, Computational Social Science, Information Visualization
- **B.Sc.**: Machine Learning & Data Mining, Natural Language Processing, Artificial Intelligence

Skills

Programming Python, C/C++, Java, JavaScript, R
Web Django, Spring, AngularJS, HTML5, SASS
Libraries Gensim, NLTK, Scikit-Learn, NumPy, Matplotlib, Pandas, Scipy, Tensorflow, PyTorch
Misc. Linux, Git, REST API, LaTeX, Android Studio, QGIS

Extracurricular Activities

Programming

- Contributing to VLM integration in the **Google Tunix** LLM Post-Training library.
- **Team Participation**: ACM ICPC Dhaka Regionals 2017 (**5th**/148), SUST Inter University Programming Contest 2017 (**6th**/161), ACM ICPC Dhaka Regionals 2016 (**19th**/123), National Collegiate Programming Contest 2016 (**21st**/119)
- Worked as problem setter in National High School Programming Contest 2017, and HackerRank

Content Writing

- **Shoshikkha** - *Education Blog in Bengali*: Founded the project and developed the website in 2015, contributed to the website as an author and editor of technical articles and tutorials about programming languages, data structures, and algorithms
- Technical writing on **Medium**, featured in popular blogs, for example, **Towards Data Science**

Community Service

- Served as the President of the Association of Bangladeshi Students at Virginia Tech, leading a team of 6 executive members and more than 20 volunteers, organizing several community-building events for more than 150 Bangladeshi students
  - Initiated a mentoring program to assist new international students in adapting to life in a new country, including documentation and mentorship assignments
  - Designed a new award-winning (**Best Student Organization Program Award** @ Virginia Tech) program to celebrate International Mother Language Day, a platform for students from around the globe to celebrate diversity through cultural exhibition and performances
- Volunteered for CommunityAction, organizing various events focused on underserved communities
  - Raised funds to construct a library with more than 500 books for underprivileged students
  - Organized educational sessions for underprivileged students