

# Muntasir Wahed

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## Research Interests

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

## Education

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### 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

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- 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

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- Muntasir Wahed**, Kiet A. Nguyen, Adheesh Sunil Juvekar, Xinzhuo Li, Xiaona Zhou, Vedant Shah, Tianjiao Yu, Pinar Yanardag, Ismini Lourentzou. *PRIMA: Multi-Image Vision-Language Models for Reasoning Segmentation*, arXiv:2412.15209, 2024.
- Kiet A. Nguyen, Adheesh Sunil Juvekar, Tianjiao Yu, **Muntasir Wahed**, Ismini Lourentzou. *CALICO: Multi-Image Pixel-Grounded Object Comparison by Parts with Large Language Models*, arXiv:2412.19331, 2024.
- Muntasir Wahed**, Xiaona Zhou, Tianjiao Yu, Ismini Lourentzou. *Fine-Grained Alignment for Cross-Modal Recipe Retrieval*, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV), 2024.
- 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.
- Nur Ahmed, **Muntasir Wahed**, Neil Thompson. Growing Influence of Industry in AI Research. *Science (Policy Forum)*, 2023.
- 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*, Proceedings of the 30th ACM International Conference on Information and Knowledge Management (CIKM), 2021.

## Experience (Academic & Industry)

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### University of Illinois Urbana-Champaign

Graduate Research Assistant

August 2024 - Present

- Working on grounded multi-image comparison and grounded parts, attributes and affordance detection using VLMs

### 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

- Developed a dashboard for BRAC, providing various interactive visualization support to foster policy-making
- Implemented the Unique ID generation process, which enabled BRAC to uniquely identify its more than 100 million beneficiaries, facilitating the proper use of big data in policy-making
- Analyzed the usability of satellite data as an economic proxy to identify regional inequality using **geospatial data analysis**

## Enosis Solutions

Software Engineer

April 2019 - October 2019

- Developed and maintained features using Spring framework (Java), AngularJS and MySQL database, leveraging skills in **Issue Tracking** (JIRA), **Unit Testing** (Mockito), **Debugging** (DevTools) and Agile development process

## Academic Service

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- Served as a reviewer for CVPR '25, ECCV '24, WACV '24 and EMNLP '22
- Served as a program committee member for 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

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- **Ph.D.:** Advanced Natural Language Processing, Conversational AI, LLM Post-Pretraining
- **M.S.:** Advanced Machine Learning, Advanced Natural Language Processing, 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

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- 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

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### Competitive Programming

- **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