FATIMA JAHARA

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FatimaJahara Fatima Jahara

ABOUT ME

I am actively seeking summer internship opportunities focused on multimodal and multilingual NLP, complex reasoning and alignment in LLMs, and advancing trustworthy and safe AI. I am a 1st-year PhD candidate researching alignment and reasoning in multimodal and multilingual large language models. My interest lies in knowledge representation and commonsense reasoning, especially within multilingual and multimodal contexts (encompassing vision, language, and acoustics). I am deeply invested in pushing the boundaries of natural language understanding and generation, focusing on creating models that are not only advanced but also fair, robust, and explainable. My passion also extends to the fusion of Computer Vision, HCI, and NLP to transcend traditional interfaces, enhance societal communication, and deepen our understanding of cognitive processes.

EDUCATION

Rutgers, the State University of New Jersey, NJ, US *September 2024 - Present*
Ph.D. in Computer Science
Advisor: Dr. Sharon Levy
Research Focus: *NLP, Responsible AI, LLM Reasoning*

Chittagong University of Engineering and Technology, Bangladesh *February 2016 - June 2021*
B.Sc. in Computer Science and Engineering
Advisor: Dr. Mohammed Moshiul Hoque
Thesis: *Classification of Bangla News Articles by using Multilayer Perception (MLP)*
GPA: 3.79 (with Honors) / 4.00, **Merit Position:** 5^{th} among 120

RESEARCH EXPERIENCE

Fatima Al-Fihri Predoctoral Fellowship *April 2023 - April 2024*
Predoctoral Fellow
- Worked under the supervision of Michael Saxon and Dr. William Wang, UC Santa Barbara NLP Group on multimodal evaluation in text-to-image models. Developed T2IScoreScore (TS2) a new benchmark using semantic error graphs to objectively test how well VLM metrics rank images by their errors. [link]

CUET NLP Lab, CUET, Bangladesh *June 2019 - June 2021*
Undergraduate Student Researcher
- Developed datasets tailored for low-resource languages: (1) a comprehensive dataset for fine-grained news categorization consisting of four primary categories and 26 fine-grained categories and (2) a Bangla emotion dataset (BEmoD).
- Performed a comparative analysis of 16 different POS tagging methodologies (8 stochastic and 8 transformative) using two tagsets (30-tag and 11-tag) based on execution time and accuracy for Bangla.
- Implemented a transformer-based weighted ensemble framework for fine-grained categorization of Bangla news data.

PUBLICATIONS

Published (All published papers can be found here)
Conference Papers
- M. Saxon*, **F. Jahara***, M. Khoshnoodi*, Y. Lu, A. Sharma, W.Y. Wang, "*Who Evaluates the Evaluations? Objectively Scoring Text-to-Image Prompt Coherence Metrics with T2IScoreScore (TS2)*, Thirty-Eighth Annual Conference on Neural Information Processing Systems (NeurIPS), 2024." [Github Repo][Dataset]
- **F. Jahara** O. Sharif, and M. M. Hoque, "*Automatic Categorization of News Articles and Headlines using Multi-layer Perceptron*," International Conference on Intelligent Computing & Optimization. Springer, 2021.
- **F. Jahara**, A. Barua, M. A. Iqbal, A. Das, O. Sharif, M. M. Hoque, and I. H. Sarker, " *Towards pos tagging methods for Bengali language: A comparative analysis*," in International Conference on Intelligent Computing & Optimization. Springer, 2020, pp. 1111–1123.
- D. Talukder and **F. Jahara**, "*Real-Time Bangla Sign Language Detection with Sentence and Speech Generation*," 2020 23rd International Conference on Computer and Information Technology (ICCIT), 2020.
- D. Talukder, **F. Jahara**, S. Barua and M. M. Haque, " *OkkhorNama: BdSL Image Dataset For Real-Time Object Detection Algorithms*," 2021 IEEE Region 10 Symposium (TENSYMP), 2021.

In preparation (to be submitted)
Journal Paper

- **F. Jahara**, O. Sharif, and M. M. Hoque, "Benchmark Dataset and Framework on Fine-Grained Classification of Bangla News Articles using Ensemble of Transformers."

PROFESSIONAL AND ACADEMIC EXPERIENCE

Rutgers, the State University of New Jersey, New Brunswick, NJ, US *September 2024 - Present*
Graduate Teaching Assistant

- Lead recitation sessions on data science concepts, including data wrangling, visualization, and statistical analysis.
- Design and grade quizzes, assignments, and exams.
- Collaborate with the professor to develop course materials and improve curriculum based on student feedback and performance.
- Provide one-on-one support during weekly office hours.

Workera, Palo Alto, CA, US *February 2021 - August 2024*
Senior Assessment Developer *January 2023 - Present*

- Served as the Primary SME developing assessments in Generative AI, Diffusion Models, and LLMs.
- Integrated LLMs into the assessment development pipeline to automate assessment development.
- Implemented an adaptive time allocation model for the Workera GOAT™ (Generative Ontology & Authoring Tool).

Assessment Developer *February 2021 - January 2023*

- Co-chaired a Role Delineation Study to align domains with evolving industry roles.
- Developed adaptive tests (skills ontology, test questions, and performance level descriptors) and associated learning plans tailored to measure proficiency in NLP, Computer Vision, ASR, TensorFlow, and PyTorch.
- Participated in score calibration and learning pathway standardization for Computer Adaptive Tests.

Brain Station 23, Dhaka, Bangladesh *August 2019 - August 2019*
Trainee Software Developer

- Developed a "University Enrollment Log System" to facilitate student-course assignments utilizing Django, Ajax, D3.js, HTML, CSS, and JavaScript.

ADDITIONAL EXPERIENCE

DeepLearning.ai *December 2020 - October 2023*
Alpha Tester

- Assisted in designing functional requirements for the Practical Data Science Specialization courses.
- Created and executed test cases for courses, identifying potential coding workbook errors pre-release.

SELECTIVE PROJECTS

- **OkkhorNama:** A fully annotated image dataset with 12,000 for Bangla Sign Language, targeting real-time object detection and localization using YOLOv5 and translating sign language from visual inputs (images and video streams) and generating coherent words and sentences (both text and speech), contributing to multimodal communication for individuals with sensory and communication impairments.
- **FoodFond:** Implemented a recommendation engine for restaurants leveraging latent factor collaborative filtering grounded on ratings, reviews, and personalized preferences. Utilized Python, Django Rest Framework for backend development, and HTML5, CSS3, and JavaScript for frontend design and interactivity.
- **Bahon:** A specialized vehicle dataset tailored for Bangladesh to facilitate real-time vehicle detection with a decreased response time using state-of-the-art object detection architectures while laying the groundwork for automating traffic surveillance processes in Bangladesh. (ongoing)
- **Max Solve Time Automation:** An adaptive time allocation system to automate and customize time allocation for test questions based on several criteria (difficulty, domain, cognitive level, etc.) for the Workera GOAT™ (Generative Ontology & Authoring Tool).
- **Item Translation:** A project to automate the translation of test questions from a source language based on different criteria (technicality, audience, etc.) for the Workera GOAT™ (Generative Ontology & Authoring Tool).

SELECTIVE HONORS AND ACHIEVEMENTS

Predoctoral Fellowship, Fatima Al-Fihri Predoctoral Fellowship *2023*
Global Engineering Education Award, 6^{th} Industrial Engineering and Operations Management Conference *2023*
Dean's Award, Chittagong University of Engineering and Technology (CUET) *2021*
Undergraduate Merit Scholarship, Chittagong University of Engineering and Technology (CUET) *2019*
National Girls' Programming Contest, Bangladesh ICT Division - 2^{nd} *Runners up* *2017*

LEADERSHIP AND PROFESSIONAL ACTIVITIES

International Conference on Machine Learning (ICML) - *Volunteer* *2022*
Coursera - *Beta Tester, Mentor* *April 2021 - April 2022*
Workera - *Community Leader* *February 2021 - May 2021*
CUET Computer Club, Bangladesh - *Project Mentor* *March 2020 - December 2020*
IEEE CUET Women In Engineering, Bangladesh - *Vice Chair* *November 2019 - November 2020*
IEEE, Bangladesh - *Student Member, Professional Member* *June 2019 - Present*
National High School Programming Contest - *Volunteer* *2017*

SELECTIVE TRAINING AND WORKSHOPS

Qubit by Qubit 2020-2021 Introduction to Quantum Computing- *IBM Quantum and The Coding School*
Training on Machine learning and AI with Python- *ICT Ministry and Hi-Tech Park Authority of Bangladesh*
Computational Linguistics & Bangla Language Processing- *IEEE Bangladesh Section*
Ethical Hacking and Blockchain Technology- *IEEE Bangladesh Section*

SKILLS

Languages: Python, MySQL, SQLite, C, C++, Java, HTML5, CSS3, JavaScript, Ajax
Frameworks & Libraries: TensorFlow, Keras, PyTorch, Scikit-learn, NumPy, Pandas, Matplotlib, Seaborn, Django Rest Framework, Amazon Web Services, Rasa

CONFERENCE PRESENTATIONS

- "*Automatic Categorization of News Articles and Headlines using Multi-layer Perceptron*," Presenter, International Conference on Intelligent Computing & Optimization, 2021.
- " *Towards pos tagging methods for Bengali language: A comparative analysis*," Presenter, International Conference on Intelligent Computing & Optimization.
- "*Real-Time Bangla Sign Language Detection with Sentence and Speech Generation*," Presenter, 23rd International Conference on Computer and Information Technology (ICCIT), 2020.
- " *OkkhorNama: BdSL Image Dataset For Real-Time Object Detection Algorithms*," Presenter, 2021 IEEE Region 10 Symposium (TENSYMP), 2021.
- " *Bangla Sign Language Recognition System*," Presenter, AI for Bangla 1.0, 2021.

SELECTIVE ONLINE COURSES

Finetuning Large Language Models - *Deeplearning.ai*
ChatGPT Prompt Engineering for Developers - *Deeplearning.ai*
Deep Learning Specialization - *Coursera*
DeepLearning.AI TensorFlow Developer Specialization - *Coursera*
Natural Language Processing with Classification and Vector Spaces - *Coursera*
Analyze Datasets and Train ML Models using AutoML - *Coursera*
DeepLearning.AI TensorFlow Developer Specialization - *Deeplearning.ai*
Data Analyst in Python - *Dataquest.io*

REFERENCES

Sharon Levy, Assistant Professor, Dept. of Computer Science, Rutgers, the State University of New Jersey (s.levy@rutgers.edu)
Dr. Mohammed Moshiul Hoque, Professor, Dept. of CSE, CUET (moshiul_240@cuet.ac.bd)
Dr. Scott Frohn, Senior Manager of Assessment and Psychometrics, Workera (scott@workera.ai)
Michael Saxon, Ph.D. student, Computer Science (NLP Lab), UC Santa Barbara (saxon@ucsb.edu)