AVIJIT MITRA

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EDUCATION

PhD in Computer Science Sep 2019 - Present
University of Massachusetts Amherst (UMass Amherst), MA, USA

Master of Science in Computer Science Feb 2024
University of Massachusetts Amherst (UMass Amherst), MA, USA

Master of Science in Electrical and Electronic Engineering Jan 2021
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

Bachelor of Science in Electrical and Electronic Engineering Feb 2017
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

WORK EXPERIENCE

Graduate Research Assistant, BioNLP Lab, UMass Amherst, MA, USA Jan 2020 - Present

- Advisor: Professor Hong Yu
- Area of Study: Natural Language Processing, Epidemiology

Applied Scientist Intern, Machine Learning Accelerate, Amazon.com Inc., San Diego, USA June 2024 - Aug 2024

- Team: MLA SPS
- Developed hallucination localization systems in LLM responses.

Applied Scientist Intern, Alexa AI, Amazon.com Inc., WA, USA May 2023 - Sept 2023

- Team: Apex Science
- Developed a pipeline for generating multimodal content from long-form text

Applied Scientist Intern, Alexa AI, Amazon.com Inc., WA, USA May 2022 - Sept 2022

- Team: Context Carryover (CC)
- Developed synthetic utterance similarity detection dataset and assessed its feasibility

Applied Scientist Intern, Alexa AI, Amazon.com Inc., WA, USA Jun 2021 - Aug 2021

- Team: Context Carryover (CC)
- Developed tasks to minimize model hallucination for constrained contextual query rewriting (CQR)

Machine Learning Researcher, Semion Ltd., Dhaka, Bangladesh Mar 2017 - Feb 2019

- Provided Deep Learning solutions to clients
- Designed and developed necessary software infrastructures

Intern, Semion Ltd., Dhaka, Bangladesh Aug 2016 - Dec 2016

SELECTED PUBLICATIONS

1. C. Leon, M.L. Sung, J. I. Reisman, W. Liu, R.D. Kerns, K.S. Gordon, **A. Mitra**, S. Kwon, H. Yu, W.C. Becker, W. Li. "Occurrence of opioid related neurocognitive symptoms associated with long-term opioid therapy", The Clinical Journal of Pain , 2024
2. M.L. Sung, C. Leon, J.I. Reisman, K.S. Gordon, R.D. Kerns, W. Li, W. Liu, **A. Mitra**, H. Yu, W.C. Becker. "Disparities in receipt of medications for opioid use disorder before and during the COVID-19 pandemic in the U.S. Veterans Health Administration", Substance Use & Addiction Journal, 2024
3. **A. Mitra**, N. Gupta, C. Naik, A. Sethy, K. Bice, Z. Raeesy. "Generating contextual images for long-form text", LREC-COLING, 2024
4. P. Vashisht, A. Lodha, M. Maddipatla, Z. Yao, **A. Mitra**, Z. Yang, J. Wang, S. Kwon, H. Yu. "UMass-BioNLP at MEDIQA-M3G 2024: DermPrompt–A Systematic Exploration of Prompt Engineering with GPT-4V for Dermatological Diagnosis", 6th Clinical Natural Language Processing Workshop, ACL, 2024
5. Z. Yang, **A. Mitra**, S. Kwon, H. Yu. "ClinicalMamba: A Generative Clinical Language Model on Longitudinal Clinical Notes", 6th Clinical Natural Language Processing Workshop, ACL, 2024
6. Z. Yang, **A. Mitra**, W. Liu, D. Berlowitz, H.Yu. "TransformEHR: Transformer-based encoder-decoder generative model to enhance prediction of disease outcomes using electronic health records", Nature Communications, 2023
7. J. Wang, Z. Yao, **A. Mitra**, S. Osebe, Z. Yang, H. Yu. "UMASS_BioNLP at MEDIQA-Chat 2023: Can LLMs generate high-quality synthetic note-oriented doctor-patient conversations?", 5th Clinical Natural Language Processing Workshop, ACL, 2023

8. **A. Mitra**, R. Pradhan, R. D. Melamed, K. Chen, D. C. Hoaglin, K. L. Tucker, J. I. Reisman, Z. Yang, W. Liu, J. Tsai, H. Yu. "Associations Between Natural Language ProcessingEnriched Social Determinants of Health and Suicide Death Among US Veterans", JAMA Network Open, 2023 (nominated for VA Health Services Research & Development Best Paper Award 2023)
9. Z. Yang, S. Wang, B. P. S. Rawat, **A. Mitra**, H. Yu. "Knowledge Injected Prompt Based Fine-tuning for Multi-label Few-shot ICD Coding", EMNLP Findings, 2022
10. A. J. Rose, J. S. Lee, D. R. Berlowitz, W. Liu, **A. Mitra**, H. Yu. "Guideline-discordant dosing of direct-acting oral anticoagulants in the veterans health administration", BMC Health Services Research, 2021
11. **A. Mitra**, H. Ahsan, W. Li, W. Liu, R. D. Kerns, J. Tsai, W. Becker, D. A. Smelson, H. Yu. "Risk Factors Associated With Nonfatal Opioid Overdose Leading to Intensive Care Unit Admission: A Cross-sectional Study", JMIR Medical Informatics, 2021
12. H. Ahsan, E. Ohnuki, **A. Mitra**, H. Yu., "MIMIC-SBDH: A Dataset for Social and Behavioral Determinants of Health", Machine Learning for Healthcare, 2021
13. **A. Mitra**, B. P. S. Rawat, D. McManus, H. Yu. "Relation Classification for Bleeding Events from Electronic Health Records: Exploration of Deep Learning Systems", JMIR Medical Informatics, 2021
14. **A. Mitra**, B. P. S. Rawat, D. McManus, A. Kapoor, H. Yu. "Bleeding Entity Recognition in Electronic Health Records: A Comprehensive Analysis of End-to-End Systems", accepted at *AMIA Annual Symposium*, 2020
15. **A. Mitra**, K. Ashraf. "Sepsis Prediction and Vital Signs Ranking in Intensive Care Unit Patients", *arXiv preprint arXiv:1812.06686*, 2018

RELEVANT PROJECTS

- **Prompt-based learning for generative NER** across multiple domains (Python, PyTorch) 2023
- **Generative NER** with pointer mechanism and constrained decoding (Python, PyTorch) 2022
- **Joint named entity recognition and relation extraction** (Python, PyTorch) 2021
- **Transferability of the winning tickets** in CV and NLP (Python, PyTorch) 2020
- **Evaluation of triplet fingerprinting** attack for website fingerprinting (Python, Keras) 2020
- **Offensive language identification** across multiple social media platforms (Python, PyTorch) 2020
- **SemRad**, a teleradiology solution (Java, JavaFX, SQLite, MySQL) 2018
- **Faulty semiconductor wafer detection** from machine logs (Python, Tensorflow) 2018
- **Finding hotspots** in semiconductor wafer logs using LRP algorithm (C++, Python) 2018
- **Detection of Arrhythmia** based on discrete wavelet transform (DWT) features (Python, Keras) 2018
- **HealthGeek**, an Android app and **Differential Diagnoses**, an Amazon Alexa skill (Java, Node.js, Flask) 2017
- **Risk factors detection** for heart diseases in diabetic patients (Python, Theano) 2017

SKILLS

Programming Languages: Python, Java, MATLAB, R, C, C++
Machine Learning Frameworks: Pytorch, Tensorflow, Keras, Scikit-learn
Other Expertise: Weka, Arduino, LaTeX, Git, Microsoft Office

ACHIEVEMENTS

449^{th} among 2172 teams (Top 21%), Human Protein Atlas Image Classification, Kaggle 2019
355^{th} among 3234 teams (Top 11%), TGS Salt Identification challenge, Kaggle 2018
Dean's List Award, for academic excellence, BUET, Bangladesh 2013, 2017
2^{nd} Runner up, Inter-University Project Show, BUET, Bangladesh 2015
1^{st} Runner up, Inter School & College Science Festival, Rajuk College, Bangladesh 2010
National Level Scholarship, Bangladesh 2003,2006,2009,2011

TEACHING EXPERIENCE

Fall 2023	Guest Lecturer, COMP.5800: Topics in Computer Science, UMass Lowell
Fall 2020	Guest Lecturer, COMP.5800: Topics in Computer Science, UMass Lowell
Fall 2019	Teaching Assistant, COMPSCI 121: Introduction to Computing

SERVICES

- **Paper Reviewer**
  - EMNLP, JMIR, JMIR Medical Informatics, JMIR AI, npj Mental Health Research, BMC Pulmonary Medicine, Frontiers in Bioengineering and Biotechnology, PLOS One, AMIA annual symposium
- **MS Application Reviewer**, 2023, Manning College of Information and Computer Science, UMass Amherst
- **Mentor**
  - Mentored multiple MS and PhD students on different projects in NLP and multimodal learning