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 — Expected: Dec 2023
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, Amazon Alexa AI, WA, USA — May 2023 - Sept 2023

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

Applied Scientist Intern, Amazon Alexa AI, WA, USA — May 2022 - Sept 2022

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

Applied Scientist Intern, Amazon Alexa AI, 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 𝔤

1. 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

2. 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?", ACL 2023 Workshop CLinical NLP, 2023 ↗

3. **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 ↗

4. 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 ↗

5. 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 ↗

6. **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 ↗

7. H. Ahsan, E. Ohnuki, **A. Mitra**, H. Yu., "MIMIC-SBDH: A Dataset for Social and Behavioral Determinants of Health", Machine Learning for Healthcare, 2021 ↗

8. **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 ↗

9. **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 ↗

10. **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

449th **among 2172 teams (Top 21%), Human Protein Atlas Image Classification, Kaggle** ◪ — 2019
355th **among 3234 teams (Top 11%), TGS Salt Identification challenge, Kaggle** ◪ — 2018
Dean's List Award, for academic excellence, BUET, Bangladesh — 2013, 2017
2nd **Runner up**, Inter-University Project Show, BUET, Bangladesh — 2015
1st **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

- **Reviewer**
  - EMNLP
  - JMIR
  - JMIR Medical Informatics
  - JMIR AI
  - npj Mental Health Research
  - BMC Pulmonary Medicine
  - Frontiers in Bioengineering and Biotechnology
  - PLOS One