S M Taslim Uddin Raju

West Haven, CT, USA smturaju@uwaterloo.ca +1 (203) 410-1912
raju32742.github.io smturaju raju32742

Career Summary

Machine Learning Engineer with 5+ years of experience in **AI for healthcare, medical imaging, and computer vision.** Specialized in **non-invasive health monitoring, signal processing, multimodal learning, and digital pathology**, with **20+ publications** in leading venues. Proven track record of delivering real-world **ML/DL** solutions and leading interdisciplinary research projects.

Education

University of Waterloo – MASc. in Electrical and Computer Engineering (ECE) – Research | GPA: - 85% Sep 2023 – Apr 2025

- **Thesis:** Advanced AI for Histopathological Whole Slide Image Classification and Captioning

Khulna University of Engineering & Technology – **MSc**. and **BSc**. in CS| GPA: - **4.00/4.00 and 3.85/4.00** Apr 2015 – Dec 2022

- **Thesis:** Hemoglobin and Glucose Levels Estimation Techniques Using PPG Characteristic Features of Smartphone Videos

Research and Teaching Experience

University of Waterloo – ***Graduate Research Assistantship, Pattern Analysis and Machine Intelligence Lab*** Sep 2023 – Apr 2025

- Conducted advanced research in digital pathology, AI for histopathological image analysis, and multimodal learning
- Developed novel architectures combining Graph Neural Networks, Vision Transformers, and LLMs for clinical applications

University of Waterloo – ***Teaching Assistant, Department of Electrical and Computer Engineering*** Jan 2024 – Apr 2025

- Courses: Introduction to Computer Structures and Real-Time, Programming for Performance, and Digital Computers
- Contributed to course delivery by leading labs, grading assignments and exams, and offering academic support through office hours

Khulna University of Engineering & Technology – ***Lecturer, Department of Computer Science and Engineering*** Dec 2020 – Aug 2023

- Courses: CSE 1101 – Structure Programming, CSE 2113 – Computer Architecture, and CSE 4112 – Machine Learning
- Taught undergraduate courses, supervised student projects, and mentored students through academic and technical guidance to support their learning and development.

Eastern University – ***Lecturer, Department of Computer Science and Engineering*** Mar 2019 – Dec 2020

- Courses: 6131205 – Structure Programming, 07142213 – Computer Architecture and 05413109 – Numerical Methods
- Delivered undergraduate lectures, designed course materials and assessments, and guided students through academic support

Selected Projects

GNN-ViTCap: GNN-Enhanced Microscopic WSI Classification and LLMs Based Captioning Sep 2024 – Apr 2025

- Designed integrated framework combining GNNs and LLMs for WSI classification and pathology captioning.
- Achieved high accuracy with **BLEU-4 = 81.1% and METEOR = 56.7%,** with **BioMedGPT** in image captioning

LLM-Q&A: Automated Medical Q & A Systems Using Fine-Tuned Large Language Models May 2024 – Sep 2024

- Implemented an automated medical Q&A system by fine-tuning **LLM** models such as **GPT-2, Llama2, Bloom, and T5**
- Evaluated using **BLEU** and **ROUGE** metrics, with **T5** showing superior performance in generating accurate medical answers

TransUAAE-CapGen: Caption Generation from Histopathological Whole Slide Images Sep 2023 – Apr 2024

- Developed a hybrid **UNet-based Adversarial Autoencoder** and **transformer** to generate captions for histopathological images.
- Achieved high accuracy **with BLEU-4 = 86.8% and ROUGE = 89.3%,** outperforming traditional **LSTM-based** models.

Non-Invasive Blood Component Levels Estimation Using Smartphone Fingertip Video Jan 2020 – Feb 2023

- Introduced a non-invasive method for monitoring **Glucose and Hemoglobin** levels using **Smartphone** video and NIR LED device.
- Generated **PPG signal,** extracted the PPG features and fed the features to **DNN-based** models to estimate blood component levels.

Service and Outreach

Leadership & Co-curricular Activities

- Mentor, Graduate Mentorship Program, University of Waterloo – Guided new graduate students via mentorship initiative [PDF]
- Mentor, System Development Project, KUET – Supervised students in developing smartphone-based solutions [2021] [PDF]
- Supervisor, Capstone Project, KUET – Guided 4th-year students in deep learning for biomedical data analysis [2023] [PDF]
- Student Coordinator, Department of CSE, KUET, leading campus tours, and coordinating student volunteers

Voluntary Experiences

- Collaboration work with one blood organization project, Petersburg, Florida 33716, USA [2020-2021] [PDF]
- Collaboration research with King Saud University, Saudi Arabia [PDF]
- Instructor for introductory workshop on C Programming in SGPIC (Special Group Interested in Programming Contest) [2016- 2017]

Fellowship, Honors & Awards

2023 – 2025	Graduate Research Students (GRS) from University of Waterloo [Funding: $42000 USD] [PDF]
2023	Scholar Award, IEEE International Conference on Systems, Man and Cybernetics (IEEE SMC) [Funding: $500 USD]
2023	Scholar Award, PyCon US Poster Presentation, Salt Lake City, Utah USA [Funding: $2000 (USD)]
2023	Vice Chancellor Awards for top researcher, EEE faculty, KUET [Funding: $500 (USD)] [PDF]
2015 – 2018	Dean's Awards, outstanding academic performance, KUET [Avg CGPA of each year: 3.90, 3.94, 3.93/4.00] [PDF]