Sanjay Acharjee

Linkedin: https://www.linkedin.com/in/sanjayacharjee/ Email: sanjay.acharjee@uta.edu
Github: github.com/acharjee07 Personal Website: https://acharjee07.github.io/

Education

- **The University of Texas at Arlington** Arlington,TX
  Ph.D. in Civil Engineering, CGPA: 4.00 / 4.00 *Jan 2024 – Present*
  - **Relevant Coursework:**

    Completed: Machine Learning (CSE 6363), Temporary Structures (CE 5320), Computer Vision (CSE 6367), Data Analysis Modeling Techniques (CSE 5301), Artificial Intelligence I (CSE 5360), Risk Management (CE 5350), Construction Methods Field Ops (CE 5344).

    In Progress (Fall 2025): Neural Networks (CSE 5368), Robotics (CSE 5364).

- **Bangladesh University of Engineering and Technology** Dhaka, Bangladesh
  B.Sc. in Civil Engineering, CGPA: 3.44 / 4.00 *Graduated May 2023*

Experience

- **University of Texas at Arlington** Arlington, TX
  Graduate Research Assistant *January 2024 - Present*
  - **Generative AI**: Working on multiple projects leveraging generative AI, including LLM agents and multimodal LLMs, to automate construction management tasks, analyze hazardous scenarios, and implement preventive measures.
  - **3D Thermal Profiling for Energy Efficiency**: Developing a novel method to create high-resolution 3D thermal profiles by fusing low-resolution thermal data with high-resolution visible imagery from drones. Utilizing open-source structure-from-motion (SfM) pipelines to precisely identify and map thermal anomalies, thereby enhancing energy efficiency assessments for buildings.
- **University of Texas at Arlington** Arlington, TX
  Graduate Teaching Assistant *Spring 2024 - Fall 2025*
  - **Course**: CE 5343: **Advanced Building Information Modeling**
  - **Guest Lectures**: Delivered three specialized lectures on emerging technologies: one on **'Introduction to Dynamo'** for computational design and a two-part series on **'Reality Capture'**.
  - **Technical Instruction**: Conducted hands-on training sessions for reality capture, teaching students to operate the Trimble X9 3D laser scanner for point cloud data collection and process the data using Trimble RealWorks for integration into Autodesk Revit.
- **AIEdgeInside - Tokyo, Japan** Remote
  Machine Learning Engineer (Full-time) *June 2023 - December 2023*
  - **Computer Vision**: Developed computer vision models for OCR tasks, including handwritten table documents. Worked with models like TRocr to identify relevant cells within tables, extract key information, and automate the extraction process.
  - **Generative AI**: Developed generative models for image synthesis, focusing on virtual try-on applications to create realistic apparel fitting simulations.
- **Muin Research Group — University of Southern California** Remote
  Undergraduate Research Intern (Part-time) *May 2022 - February 2023*
  - **Web Scraping**: Scraped Social Media Data using snscrape
  - **Emotion Detection by NLP**: Utilized a BERT architecture to detect emotions from social media data
  - **Earthquake Resiliency Estimation**: Analyzed Emotional Response of the Community to Earthquakes by analyzing social media data and currently working on a method to incorporate community psychological impacts of earthquakes in the resilience model

Projects

- **Bengali Automatic Speech Recognition (Speech Recognition, Natural Language Processing)**: Trained Facebook's Wav2Vec2 on Bengali Common Voice Speech Dataset for Automatic Speech Recognition dataset and got state-of-the-art accuracy of Levenshtein distance 1.47 on the public test set. The model is open-sourced on hugging face at this link.

  Training Notebook, Inference Notebook
  Tech: Python, HuggingFace, Pytorch, Tensorflow (September '22)
  Impact: Can help Businesses, Education and People with disabilities, such as those who have difficulty using a keyboard or mouse

- **Human Pose Estimation From Infrared Images (Computer Vision, Domain Adaptation, Semi-Supervised Learning)**: Developed and trained a customized Deep Learning based pose estimation architecture on Infrared Images and achieved state-of-the-art accuracy, on a different and complex domain through Domain Adaptation and Semi-Supervised approaches. It is around a 6% improvement from the current state-of-the-art architecture. It was a part of the IEEE Video and Image Processing Cup 2021 Project Link
  Tech: Python, PytorchLightning, Weights Biases, & OpenCV. (September '21)
  Impact: Can be used for remote patient monitoring without invading the patient's privacy.

- **Gradient-Based Optimization Algorithm for Intelligent Reflecting Surfaces (Digital Signal Processing, 6G Technology)**: As a part of the IEEE Signal Processing Cup 2021, developed a gradient-based algorithm for an intelligent reflecting surface to direct wireless signals from a transmitter toward a receiver. Intelligent Reflecting Surface is a promising technology for 6G. Project Link
  Tech: Python, Numpy, CVXPY, (May '21)
  Impact: Can be used for real-time optimization of Intelligent Reflecting Surfaces which can be used to improve the energy efficiency of wireless communication systems in 6G technology.

Honors and Awards

- 2024 Graduate Dean's STEM Research Assistantship (The University of Texas at Arlington) - May, 2024
- Champion of IEEE Video and Image Processing Cup 2021 - September, 2021
- First runner-up in Dl Sprint Bengali Automatic Speech Recognition Competition - September 2022
- Second runner-up in IEEE Video and Image Processing Cup 2022 - September, 2022
- Finalist in Robi Datathon 2.0 out of 358 teams (Among top 10) - June 2022

Certifications

- Remote Pilot (sUAS) — Certificate No.: 5027795 — Federal Aviation Administration
- Introduction to Machine Learning in Production — Credential: Credential — July 2021
- Tensorflow Developer Specialization by DeepLearning.AI — Credential: Credential — July 2020
- AI for Medical Diagnosis by DeepLearning.AI — Credential: Credential — September 2020
- Build Basic Generative Adversarial Networks by DeepLearning.AI — Credential: Credential — December 2020
- Deep Learning Specialization by DeepLearning.AI — Credential: Credential — June 2020

Conference Proceedings

- **Acharjee, S.**, Khan Ratul, A., Patiño, D., Sakib, M.N. (2025). **Data-Driven Safety: Leveraging Historical Accident Data and Generative AI for Generating Workplace Hazard Visualizations.**
  ASCE International Conference on Computing in Civil Engineering (i3CE 2025)
- **Acharjee, S.**, Khan Ratul, A., Aryal, A., Sakib, M.N. (2025). **SfM Meets Thermal: Reconstructing 3D Thermal Profiles of Buildings Using Multimodal Drone Data.**
  ASCE International Conference on Computing in Civil Engineering (i3CE 2025)
- Khan Ratul, A., **Acharjee, S.**, Park, S., Sakib, M.N. (2025). **From Sketch to BIM: A Framework for Automating the Conversion of Hand-Drawn Plans into 3D Models Using MLLMs and 3D Modeling Software.**
  ASCE International Conference on Computing in Civil Engineering (i3CE 2025)
- Khan Ratul, A., **Acharjee, S.**, Liang, C.J., Sakib, M.N. (2025). **Human-Robot Interaction in AEC Industry: A Review of Augmented and Mixed Reality Applications.**
  ASCE International Conference on Computing in Civil Engineering (i3CE 2025)

Publications (Peer-Reviewed Journal Articles)

- Nahin, S.K., **Acharjee, S.**, Saha, S., Das, A., Hossain, S., Haque, M.A. (2024). **Human sleeping pose estimation from IR images for in-bed patient monitoring using image processing and deep learning techniques.**
  Heliyon (Elsevier) (IF: 4.0, Q1)
  DOI: 10.1016/j.heliyon.2024.e36823
- **Acharjee, S.**, Khan Ratul, A., Patiño, D., Sakib, M.N. **Scene Graph–Guided Generation and Evaluation of Visual Hazard Scenarios for Industrial Safety AI.**
  In Preparation for Automation in Construction (Elsevier)
- **Acharjee, S.**, Khan Ratul, A., Sakib, M.N. **Strengthening AEC Task Automations Through Generative AI: A Systematic Review.**
  In Preparation for Automation in Construction (Elsevier)

Reference

Dr. Md Nazmus Sakib
Assistant Professor,
Department Of Civil Engineering,
The University of Texas at Arlington
Email: mdnazmus.sakib@uta.edu

Dr. Diego Patiño
Assistant Professor,
Department Of Computer Science and Engineering,
The University of Texas at Arlington
Email: diego.patino@uta.edu