Samia Islam

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Field of Interest

Dynamical Systems, Non-Linear Dynamics, Single-Cell Analysis, Deep Learning

Academic Credentials

- **Doctor of Philosophy in Computer Science and Engineering** GPA: 3.90/4.00
  Michigan State University *Fall 2023-Present*
  Advisor: Dr. Sudin Bhattacharya, Associate Professor,
  Departments of Biomedical Engineering and Pharmacology & Toxicology

- **Bachelor of Science in Computer Science and Engineering** CGPA: 3.96/4.00 (4th in class of 110)
  Islamic University of Technology, Gazipur, Bangladesh *January 2019 - May 2023*
  Advisor: Dr. Hasanul Kabir, Professor, Department of CSE
  Co-advisor: Md Bakhtiar Hasan, Assistant Professor, CSE

- **Higher Secondary Certificate** GPA: 5.00/5.00
  Sirajganj Govt. College, Sirajganj, Bangladesh *July 2016 - October 2018*

Research

- **Modeling Single Cell Dynamics from Gene Expressions** *August 2024 - Present*
  PhD Research
  - The goal is to derive the differential equations that define the cell trajectory from single-cell gene expressions
  - Currently working on Sparse Identification of Non-Linear Dynamics algorithm to fit in the single cell data

- **Enhancing Workplace Accessibility with Computer Vision** *Fall 2023 - Summer 2024*
  PhD Research
  - An in-depth exploration of computer vision applications in assistive environments
  - Proposed a deep learning approach for the application of assistive sewing technology

- **Complementarity of ConvNet, MLP mixer and Vision Transformers** *October 2022-Present*
  Collaborative Project
  - Contribution in creating an empirical understanding of whether the three types of models tend to learn complementary feature representations
  - Correlation analysis between similarity/differences between different groups of models
  - Constructed a comprehensive GitHub repository of ConvNet, MLP mixer and Vision transformers trained on Cifar-10 and Cifar-100

- **Multiple Object Tracking with Transformer based Architecture** *November 2021 - May 2023*
  Undergraduate Thesis
  - Worked on the combination of Swin Transformer with Joint Detection and Embedding (JDE)
  - Proposed a noble approach to track multiple objects in video with lower inference time with multi-scale attention

Publications

- **Multiple Object Tracking in Recent Times: A Literature Review** *December 2022*
  Review Paper
  - Contains the summaries of more than **100 papers** that were published in the last three years.
  - Popular approaches of object tracking, benchmarks, and future directions are well discussed.
  - Huge number of real-life applications are included

- Link: https://arxiv.org/abs/2209.04796

- **Wrinkle Detection and Cloth Flattening through Deep Learning and Image Analysis as Assistive Technologies for Sewing** *March 2024*
  Conference Paper
  - Accepted in The PErvasive Technologies Related to Assistive Environments (PETRA) 2024
  - Developed a deep learning-based method for detecting wrinkles in fabric
  - Designed an algorithm to determine the optimal point on fabric to pull for wrinkle removal based on detected wrinkles
  - Link: https://dl.acm.org/doi/abs/10.1145/3652037.3652067

Work Experience

- **Graduate Teaching Assistant** *Fall 2024*
  Department of Computer Science and Engineering at Michigan State University
  - Course: CSE 231 (Introduction to Programming I)
  - Conducted labs, help rooms and creating projects

- **Graduate Research Assistant** *Spring 2024-Summer 2024*
  Department of Computer Science and Engineering at Michigan State University
  - Developed a system integrated with a robot that can flatten a wrinkled cloth while sewing

- **Graduate Teaching Assistant** *Fall 2023*
  Department of Computer Science and Engineering at Michigan State University
  - Course: CSE 260 (Discrete Structures in Computer Science)
  - Conducted student monitoring, office hours, and grading

Skills Summary

- **Languages**: Python, C, C++, SQL, Java, JavaScript, Dart
- **Tools**: Visual Studio Code, PyCharm, Google Colaboratory, Android Studio, Blender, GitHub, LaTeX
- **Libraries**: Scanpy, PyTorch, Tensorflow, OpenCV, NumPy, Scikit-learn
- **Framework**: React, Express, PostgreSQL, Flutter