Soham Khisa

 Github | Linkedin | Email | Google Scholar | +880-1890311264

EDUCATION

– **Bangladesh University of Engineering and Technology (BUET)**   2018 - 2023
  BSc in Computer Science and Engineering

– **Dhaka Residential Model College**   2017
  Higher Secondary School Certificate (HSC)

– **Dhaka Residential Model College**   2015
  Secondary School Certificate (SSC)

PROFESSIONAL EXPERIENCE

Remote Research Assistant   September 2023 - Present

Currently working with Dr. Avijoy Chakma, Assistant Professor at Bowie State University. My research primarily focuses on developing and applying machine learning algorithms for IoT and Cyber-Physical Systems, with an emphasis on sensor-based time series data analysis, and system performance optimization. Alongside this, my role also involves exploring various fields of applied machine learning and artificial intelligence, including computer vision and large language models (LLMs). My responsibilities are:

- Conducting literature reviews
- Processing and analyzing data
- Implementing research ideas
- Assisting with research experiments
- Attending research meetings and discussions
- Contributing to research publications

RESEARCH INTEREST

Cyber-Physical Systems, Computer Vision, Natural Language Processing

RESEARCH EXPERIENCE

- **UNDERGRADUATE THESIS**

  Knowledge Graph-Based Categorization of Newspaper Articles in a Newspaper Corpus
  Supervised by: Dr. Muhammad Masroor Ali
  I completed my undergraduate research in Knowledge Graph under Dr. Muhammad Masroor Ali, Professor, Dept. of CSE, BUET. In this work, I measured the semantic relationship between the texts in the articles and the topics with the help of a knowledge graph. [PDF]

- **RESEARCH PROJECTS**

  – **Enhancing Performance in Addressing Data Distribution Heterogeneity for Human Activity Recognition**
    Authors: Soham Khisa, Avijoy Chakma
    We utilized a transfer learning solution to tackle this problem. My contribution involved implementing the overall approach, conducting the experiments, and comparing our approach against existing baselines.

Submitted to PerCom 2025 [A* conference] [**under double-blind review**]

- **ChakmaNMT: A Low-resource Machine Translation On Chakma Language**
  Authors: Aunabil Chakma, Aditya Chakma, Soham Khisa, Chumui Tripura, Masum Hasan, Rifat Shahriyar
  We developed a dataset for Chakma-Bangla translation to address the lack of digital resources for the endangered Chakma language. This effort aims to promote its preservation and digital growth for future generations. My specific contribution to this project involved implementing and conducting experiments to evaluate the performance of different NMT models trained on the dataset.
  Note: To be submitted to ACL 2025
  https://arxiv.org/abs/2410.10219

- **A New Approach to Address the Novel Class Discovery Problem**
  [**Work in Progress**]
  The novel class discovery problem in computer vision involves identifying and classifying previously unseen object categories without prior labeled examples. To address this challenge, we are developing a new approach aimed at enhancing overall performance and improving the model's ability to generalize to new categories effectively.
  Advisor: Dr. Avijoy Chakma

UNGRADUDATE LAB PROJECTS

- **CNN From Scratch**
  Deep Learning Project
  - **Libraries:** opencv, matplotlib, tqdm, pandas, pickle, scipy
  - **Architecture:** Convolutional Neural Network (LeNet)
  - **Description** The objective was to develop CNN-LeNet architecture from scratch (Using a very limited number of libraries). The codes can be found in this GitHub repository.

- **Retinal Disease Classification**
  Deep Learning Project
  - **Frameworks & Libraries:** numpy, matplotlib, pandas, PyTorch
  - **Architecture:** Restricted Boltzmann Machine, Convolutional Neural Network (AlexNet)
  - **Description:** The project's objective is to use retinal images to recognize and classify various retinal illnesses, including age-related macular degeneration and diabetic retinopathy. Codes and further details about this project can be found in this repository.

- **Auc-dais**
  Software Development Project
  - **Frameworks & DBMS:** Spring Boot, React, Bootstrap, PostgresSQL
  - **Description:** This project is an online auction platform system that allows users to list items for auction, and bidders can browse and select the items they wish to bid on. The front end of the project can be found on this GitHub repository. The back end is this repository. A video demonstration of this project is available here.

- **Cricbuzz**
  Database Project
  - **Frameworks & DBMS:** JavaFX, Oracle Database

- **Description:** This is a Java based desktop application inspired by cricbuzz. This application is usable for updating live cricket scores. Click here to see the source code of our project. Demonstration of this project is available here.

- **Scientific-Calculator**
  Microprocessors, Microcontrollers, and Embedded Systems
  - **Tools & Technologies:** C, Atmel Studio, Proteus, ATmega32, Arduino
  - **Description:** As the name suggests the project is on creating a scientific calculator on proteus and writing a program on Atmel Studio to do the necessary calculations. The project is available in Github. The video demonstration can be found here.

- **C-subset Compiler**
  Compiler Design
  - **Tools & Technology:** C, Flex, Bison
  - **Operations:** arithmetic operations, functions, recursion, print, comment, loops, variables
  - **Description:** This project is on the development of a compiler that is a subset of the C programming language. The project is available in Github.

SKILLS

- **Programming Languages:** Python, Java, C, C++, C#, Assembly
- **Machine Learning Frameworks/Libraries:** PyTorch, TensorFlow, NumPy, scikit-learn, Pandas, Keras
- **Database Management:** SQL (Oracle, Postgres, MySQL, SQLite)
- **Software Development:** Django, Spring Boot, React, JavaFX, Bootstrap
- **Version Control:** Git, GitHub
- **Operating Systems:** Linux, Windows, Mac
- **Scripting:** LaTeX, HTML, Shell Script(Linux)

ACHIEVEMENTS

- **Hackathons**
  - MIST Inter-university ICT Innovation Fest, 2021   Finalist
  - HackNSU season 3, 2021   Finalist

- **Scolarships**
  - Technical Complimentary Scholarship for regular engineering students, Bangladesh Government, 2018-2023
  - Chittagong Hill Tracts Development Board scholarship, 2021
  - Rangamati Hill District Council scholarship, 2020

- **Certification**
  - **Workshop on AI in Public Health** at CHRF, supported by the Gates Foundation.
    * Completion date: June 1, 2024
    * Certificate
  - **Deep Learning Specialization** by DeepLearning.AI on Coursera.
    * Completion date: October 30, 2020
    * Certificate

- **Machine Learning Foundations: A Case Study Approach** by the University of Washington on Coursera.
  - Completion date: May 29, 2020
  - Certificate
- **Database Management Essentials** by the University of Colorado System on Coursera.
  - Completion date: June 24, 2020
  - Certificate

Co-curricular Activities

- Active Member of DRMC Science Club   2015 - 2017
- Member of Entrepreneurship Development Club, BUET   2018 - 2019

- **Speedcubing Contests**
  - 3×3 Rubik's cube competition, Dhaka Spring Open 2018, **Semifinalist**
  - Rubik's cube competition, DRMC 9th National Science Carnival-2016, **2nd position**
  - Rubik's cube competition, Holy Cross 13th Inter College Science Festival 2015, **2nd position**
  - Rubik's cube competition, SAGC Science Festival 2015, **3rd position**