

# Soham Khisa

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## EDUCATION

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- **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

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### 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

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Cyber-Physical Systems, Computer Vision, Natural Language Processing

## RESEARCH EXPERIENCE

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### • 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.

- **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

## UNGRADUATE LAB PROJECTS

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- **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, PostgreSQL
- **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

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- **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:**  $\text{\LaTeX}$ , HTML, Shell Script(Linux)

## ACHIEVEMENTS

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- **Hackathons**

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

- **Scholarships**

- 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

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- 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, **2<sup>nd</sup> position**
  - Rubik's cube competition, Holy Cross 13th Inter College Science Festival 2015, **2<sup>nd</sup> position**
  - Rubik's cube competition, SAGC Science Festival 2015, **3<sup>rd</sup> position**