Soham Khisa

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RESEARCH INTEREST

Deep Learning, Cyber-Physical Systems, Computer Vision, Natural Language Processing

PUBLICATION AND PREPRINT

- Aunabil Chakma*, Aditya Chakma*, **Soham Khisa***, Chumui Tripura*, Masum Hasan, and Rifat Shahriyar, "ChakmaNMT: A Low-resource Machine Translation On Chakma Language". [**EMNLP2024** @Workshop on Asian Translations] [Preprint]
- **Soham Khisa**, Avijoy Chakma, "Enhancing Performance in Addressing Data Distribution Heterogeneity for Human Activity Recognition" [*under double-blind review* @**PerCom2025**]

RESEARCH PROJECT

- Low-resource Machine Translation On Chakma Language Oct 2021 - Sept 2024
  - Core contributor in training **BanlgaT5** with back-translation
  - Achieved BLEU of **12.37** & **3.18** in CCP-BN & BN-CCP on the test-set (**higher from typical low-resource works**)
  - Collabs: A. Chakma (U of Arizona), A. Chakma, C. Tripura, Prof. R. Shahriyar (BUET), and M. Hasan (U of Rochester)

- Addressing Data Distribution Heterogeneity in Human Activity Nov 2023 - Sept 2024
  Recognition via Wearable Devices
  - Outperforms baselines by **3-15**% across different data distribution heterogeneities.
  - Proposes a novel approach that combines probabilistic mapping with self-supervised learning.
  - Collab: Prof. A. Chakma (Bowie State University)

- A New Approach to Address the Novel Class Discovery Problem Jan 2024 - Present
  - Collabs: A. Dewan (BUET), Prof. A. Chakma (Bowie State University)

- Knowledge Graph-Based Categorization of Newspaper Articles Apri 2022 - May 2023
  in a Newspaper Corpus
  - Collab: I. B. Mahmod (BUET)

PROFESSIONAL EXPERIENCE

Research Assistant (Remote) Sept 2023 - Present
Bowie State University, MD, USA (Remote)
I'm currently working with Dr. Avijoy Chakma at Bowie State University, focusing on machine learning for ubiquitous computing. I also explore applied machine learning and AI fields, including computer vision and LLMs. My responsibilities include:

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

EDUCATION

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

  Thesis: Knowledge Graph-Based Categorization of Newspaper Articles in a Newspaper Corpus [PDF]
  Advisor: Dr. Muhammad Masroor Ali

Undergraduate Lab Projects (Selected)

- **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.

Achievements and Awards

- Technical **Scholarship** by Bangladesh Government (2018-2023) for **outstanding results** in Higher Secondary School.

- Chittagong Hill Tracts Development Board **scholarship** in 2021 (**Top 0.1**% of Chittagong Hill tracts, Bangladesh)

- Rangamati Hill District Council Scholarship in 2020 (**Top 0.5%** of Rangmati District, Bangladesh)

- Finalist - MIST Inter-university ICT Innovation Fest, 2021

- Finalist - HackNSU season 3, 2021

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)

Certification

- **Workshop on AI in Public Health** at CHRF, supported by the Gates Foundation. [Certificate]   June 1, 2024

- **Deep Learning Specialization** by DeepLearning.AI on Coursera [Certificate]   Oct 30, 2020

- **Machine Learning Foundations: A Case Study Approach** by the University of Washington on Coursera [Certificate]   May 29, 2020

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**

REFERENCE

- Dr. Avijoy Chakma (Research Advisor)
- Dr. Muhammad Masroor Ali (Undergrad Thesis Advisor)