Abdul Mohaimen Al Radi

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Summary

I'm a research assistant at the University of Dhaka's Department of Computer Science and Engineering, specializing in computer vision and deep learning. My primary interests include medical image analysis and restoration, focusing on improving X-rays and CT scans through segmentation and classification. Additionally, I have a growing interest in deepfake detection.

Education

University of Dhaka — Dhaka, Bangladesh
Bachelor of Computer Science and Engineering (CGPA 3.72 out of 4.0, top 10% of class) — *Class of 2024*

MC College — Sylhet, Bangladesh
Higher Secondary Education — *2016 - 2018*

Experience

University of Dhaka — Dhaka, Bangladesh
Research Assistant at The Cognitive Agents and Interaction Lab — *Spring 2023 - Present*

- **Computer Vision and Image Restoration** Working on combining traditional image restoration techniques (with added novelty to those techniques) and fast deep learning models to create fast inference image restoration pipelines. The work involves a deep look into image priors, Fourier domain and small data problems.

- **Cyber Security and Cryptography** I developed cryptographic schemes for Wireless Body Area Networks, gathering performance data on mobile devices, desktops, and Microcontrollers (STM32 arm-cortex processor). I integrated TCP/IP and wireless protocols to analyze safety against potential attacks.

- **Training for Large Language Model** Provided programming improvement completions for Large Language Models in different fields like Matlab, Javascript, Java, C++, Python, Algorithms, Sorting, etc. I critiqued 240 different completions by popular LLMs and provided an ideal completion for them as a part of a project to improve the LLM efficacy in programming.

- **Mentoring Undergraduate Thesis** Currently mentoring two groups of undergraduate thesis teams working on Deep Learning and Image Restoration. The mentoring involves co-supervising their projects and collaborating on parts of the project that align with my previous works.

Skills

- **Programming Skills:** C/C++, Java, JavaScript, ReactJS, NodeJS, Python, FastAPI, Kotlin, Dart, Matlab
- **ML/DL Libraries:** Pytorch, Keras, CUDA, Tensorflow, scikit-learn, opencv
- **Hardware Skills:** Micro-controllers/processors, Embedded Systems
- **Version Control:** Git, Github

Selected Publications

FULL LIST AVAILABLE AT **Google Scholar**

[1] Mosarrat Jahan, Fatema Tuz Zohra, Md. Kamal Parvez, Upama Kabir, **Abdul Mohaimen Al Radi**, Shaily Kabir **An end-to-end authentication mechanism for Wireless Body Area Networks.** *Smart Health By Elservier, impact factor(5.19) .*

[2] **Abdul Mohaimen Al Radi**, Prothito Shovon Majumder, Md. Mosaddek Khan **Domain-Independent Blind Image Deblurring with Fast Fourier Transform and ReLU Sparsity Prior** *(Under Review)*

Research Work

Image Restoration

- **Domain-Independent Blind Image Deblurring with Fast Fourier Transform and ReLU Sparsity Prior** Blind image deblurring is the process of extracting a sharp image and blur kernel from a blurry image. Typically, a blurry image is modeled as the convolution of a sharp image with a blur kernel. Hence, there are two unknowns to be discovered, making it an ill-posed problem. In this literature, a prominent approach to this problem was to use statistical assumptions about a specific domain of images (I.E texts, low-light, natural, etc) that deblurs well for those domains. However, there was no general statistical assumption that works well across all types of images. Our work provides a new statistical prior, (ReLU sparsity) that works competitively in all domains of images.

Cyber Security

- **An end-to-end authentication mechanism for Wireless Body Area Networks** A secure authentication mechanism is proposed for Wireless Body Area Networks (WBANs) to protect medical data and enable efficient analysis by healthcare professionals. It utilizes hashing and encryption within a network architecture involving a central hospital server, patient devices, body sensors, and medical professional mobile devices. Authentication protocols resist network attacks, with system performance evaluated using Network Simulator 3 for metrics like throughput, packet-loss ratio, and authentication time. CPU cycles and energy consumption data were collected using optimized algorithms for various device types.

Competitive Programming Career

- **National High School Programming Contest 2016** Regional position **3rd**, National Position **top 10%**
- **National High School Programming Contest 2017** Regional Position **4th**, National position **top 10%**
- **Leading University Intra University Programming Contest 2017** Invited as a high school student, position **Champion**
- **Battle of Brains 2019 Champion** in first year category and **fourth** in overall category
- **Code Samurai Hackathon 2022 Top 50** finalist from nation
- **AUST Inter-University Programming Contest 2022 Top 10%** position in team contest
- **International Collegiate Programming Contest Dhaka Regional Preliminary 2020 Top 8%** position in team contest
- **Problems from Codeforces, Uva, LightOJ, SPoj, AtCoder** Solved total **871** problems

Projects

- **Apellai, a subsonic client for music streaming app 2020** Apellai provides a fast and efficient mobile app solution for users with extensive music libraries and podcasts who prefer not to store them locally. Built on Kotlin, it enables streaming directly from a Subsonic server, offering features like filtering, searching, media controls, and server switching.. The GitHub repository link

- **Habitrix, a habit tracking app for healthy lifestyle 2021** Our habit tracking app lets users set and monitor habits like daily walking distance, visualizing progress across days, weeks, and months. It also features a smart to-do list that prioritizes tasks based on user-set parameters like deadline, importance, and enjoyment, all wrapped in a seamless mobile experience built with Flutter. The GitHub repository link

- **Deversorium, a new hostel management system with integrated meal system 2023** Our app offers tailored solutions for Bangladeshi hostels, with easy room booking, meal planning, and streamlined rent payments. Developed using ReactJS, NodeJS, ExpressJS, and MongoDB, it efficiently serves both hostel owners and tenants. The GitHub repository link

Reference List

- **Dr. Md. Mosaddek Khan** Associate Professor. Ph.D. at University of Southampton, United Kingdom, **Bachelors Thesis Supervisor**. mosaddek@du.ac.bd. Phone: +880 1768-408402.

- **Dr. Mosarrat Jahan** Associate Professor. Ph.D. at University of New South Wales, Sydney, **Adviser**. mosarratjahan@cse.du.ac.bd Phone: +880 1817-566316