Sadman Sakib

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EDUCATION

B. Sc., Computer Science and Engineering *Feb 2017 – Apr 2022 (expected)*
Bangladesh University of Engineering & Technology (BUET)

Thesis: Deep Learning, Bioinformatics
Current GPA: 3.86/4.00 (7/8 terms). Rank: 14th among 120 students.
Major GPA: 3.94/4.00
Final two years GPA: 3.98/4.00 (3/4 terms)

RESEARCH INTEREST

- Wireless Networks
- Mobile and Ubiquitous Computing
- Internet of Things
- Artificial Intelligence

RESEARCH EXPERIENCE

Transparent Third-party Authentication and Application Mobility in Federated Edge Computing
Feb 2020 – Oct 2021

Supervisor: Dr. Ying-Dar Lin (NYCU), Dr. Md. Shohrab Hossain (BUET)
Keywords: Cellular Networks (4G/5G), Edge Computing, Security, Mobility. Resources: [PDF] [Slides]

- We design transparent proxy-based architecture and protocols for authentication and application state transfer for roaming users in federated edge networks.
- We optimize our design by prefetching data and reusing token stored in UE.
- We attain 73.6%-84.6% reduction in service interruption latency compared to cloud-based services.

IoT-VR: IoT Simulation Platform for Cost-free Deployment and Monitoring of IoT Networks
Jan 2020 – Present

Supervisor: Dr. Matthew Caesar (UIUC), Md. Iftekharul Islam Sakib (BUET)
Keywords: Internet of Things, Simulation, Wireless Networks. Resources: [Website] [Slides]

- We design and develop discrete-event simulation to simulate IoT devices (e.g. Arduino) and sensors.
- We design and develop simulation of wireless networks to connect IoT components.
- We develop a virtual world where users can deploy and monitor IoT networks. Our software is presently being used in the UIUC CS 437 Internet of Things course.

Predicting Sequence Features of DNA Bendability and Chromosome Conformation with Deep Learning
Mar 2021 – Present

Supervisor: Dr. Md Abul Hassan Samee (BCM), Dr. M. Sohel Rahman (BUET)
Keywords: Deep Learning, Bioinformatics, Model Interpretation. Resources: [Poster] [Slides]

- We find important sequence patterns that contribute to DNA and chromatin conformation
- We use multinomial CNN to obtain sequence motifs.
- We use Global Importance Analysis methods to interpret the CNN model and rank sequence motifs.

PRESENTATION

[1] **A deep learning model reveals sequence signatures associated with DNA bendability and links bendability-altering mutations with aberrant chromosomal conformation**
Authors: Samin Rahman Khan, Sadman Sakib, M. Sohel Rahman, Md. Abul Hassan Samee
In *Conference on Genome Informatics, Cold Spring Harbor Laboratory*, 2021. Resources: [Poster]

PUBLICATION

[1] **Provisioning Fog Services to 3GPP Subscribers: Authentication and Application Mobility**
Authors: Asad Ali, Tushin Mallick, Sadman Sakib, Md. Shohrab Hossain, and Ying-Dar Lin
In IEEE International Conference on Communications 2022 (To appear). arXiv: 2112.02476

MANUSCRIPT

[1] **Federated 3GPP Mobile Edge Computing Systems: A Transparent Proxy for 3rd-Party Authentication with Application Mobility Support** (Under-review)
Authors: Asad Ali, Samin Rahman Khan, Sadman Sakib, Md. Shohrab Hossain and Ying-Dar Lin
Submitted to IEEE Access. arXiv: 2112.08590

NOTABLE PROJECTS

Radar: Detecting and Tracing Objects | Microcontrollers, Sensors, Android, Wi-Fi Module
A small-scale radar is created with microcontrollers and sonar sensors. The microcontrollers are connected with a smartphone using Wi-Fi module to visualize data in a smartphone application. [Demo]

Bengali Handwritten Digit Recognizer | Keras, OpenCV
A CNN model is trained to classify Bengali handwritten digits as part of a competition. Images are unblurred, sharpened and transformed spatially for better prediction. The model achieves 91.4% accuracy. [Repository]

Implementation of AI Algorithms | Java, Algorithms
AI algorithms, such as local search, maintaining arc consistency and hidden markov model, are implemented to solve interesting problems in the Artificial Intelligence course. [Repository]

RELEVANT COURSEWORK

• Data Communication • Computer Networks • Microprocessors, Microcontrollers and Embedded Systems
• Artificial Intelligence • Machine Learning (Coursera) • Deep Learning Specialization (Coursera)

TECHNICAL SKILLS

Languages: C, C++, Python, Java, R, Unix shell scripts, LaTeX, MATLAB, Arduino, Javascript, HTML, CSS, SQL
Frameworks: Linux networking, OpenAirInterface, Tensorflow, Keras, Docker, Kafka, MongoDB, PostgreSQL
Platforms: Network Simulator 3, ThingsBoard, Proteus, Wireshark, Google Cloud Platform, AWS

COMMUNITY ENGAGEMENT

Participant, ACM SIGPLAN International Conference on Functional Programming 2021
Participant, International Conference on Research in Computational Molecular Biology 2021

HONORS & AWARDS

Dean's List Scholarship, BUET	2018-21
University Merit Scholarship, BUET	2017-21
Winner, National Undergraduate Mathematics Olympiad	2018
Honorable Mention, Notre Dame College	2016
National Winner, Bangladesh Mathematical Olympiad	2014-16

EXTRA-CURRICULAR ACTIVITIES

Contestant, CSE Hackathon, 2019
Academic Team Member, Bangladesh Mathematical Olympiad, 2018-19
President, Notre Dame Chess Club, 2015-16