Sajib Acharjee Dip

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RESEARCH INTERESTS

Computational Biology, Deep Learning, Machine Learning, Graph Learning

EDUCATION

- **Bangladesh University of Engineering and Technology** — Dhaka, Bangladesh
  Bachelor of Computer Science and Engineering; CGPA: 3.84/4.00 (Marks: 86.56%) — *Feb 2017 - May 2022*

RESEARCH EXPERIENCE

Undergraduate Thesis, CSE, BUET
Working with Dr. M Sohel Rahman(BUET) and Dr. Md. Abul Hassan Samee(Baylor College of Medicine) — *Dhaka, Bangladesh*

- **Predicting histone modification using deep learning approach**: — April 2021 - November 2021
  - We propose a deep learning based model consisting of custom convolutional neural network which can predict histone modification accurately on genome wide data with a reasonable functional implication score.

- **Capturing long range nucleotide interaction in sequence-to-methylation modeling**: — August 2021 - Current
  - We propose a hybrid model consisting of convolutional netwrok and recurrent neural network which can predict methylation status better than existing models on genome wide methylation data and identify the sequence motifs.
  - We also show that the model can predict accurately for sequence with less nucleotides than our baseline method. The work is still in progress.

Xulab, Carnegie Mellon University
Research Intern - Working in Dr. Min Xu's lab(Carnegie Mellon University) — *Pittsburgh, USA*

- **Analysis of Cryo-ET Data using different approaches**: — April 2021 - December 2021
  - Analysed Cryo-Electron tomogram data of SARs-Cov2 and influenza viruses.
  - Performed segmentation and saliency detection of tomogram using PUB-SalNet and feature decomposition.
  - Used IMOD to generate tomograms.

- **Review paper on feature detection of Cryo-ET data**: — June 2022 - Current
  - Writing of chapter "Feature detection" of book "Cryogenic electron tomography: a journey from sample preparation to data mining."
  - Analysing structural recovery using Cryo-Electron tomography
  - Comparing different methods for subtomogram alignment and averaging in feature detection perspective.

Fatima Fellowship
Research Fellow - Working with Dr. Panagiotis Mandros(Harvard University) — *USA*

- **Embedding gene regulatory networks to investigate complex diseases**: — May 2022 - Current
  - Analysing condition-specific heterogenous gene regulatory networks on the GTEx and TCGA projects.
  - Investigating multilayer differential embeddings of regulatory networks.

WORK EXPERIENCE

- **Machine learning Engineer(Remote)** — May 2022 - Current
  IQVIA — *NC, USA*
  - Developing machine learning based solutions(numpy, PyTorch, TensorFlow) for pharmaceutical clients using tasks e.g. regression, recommendation, time series analysis, ranking and toolkits Xgboost, SVD and Neural Factorization Machine.
  - Building end-to-end ML pipeline using kubeflow and other tools for clients and business people.

- **Junior Software Engineer Intern** — Feb 2022 - May 2022
  Dynamic Solution Innovators — *Dhaka, Bangladesh*
  - Developed end-to-end pipeline for testing using cypress.

- **Software Development Intern** — Feb 2021 - March 2021
  ESRD-Lab BUET — *Dhaka, Bangladesh*
  - Developed a full-stack real-life e-health prescription generation and hospital management platform.
  - Developed backend using Spring boot and used MongoDB for database.For front-end used react, bootstrap, css to consume RESTful API.

Notable Projects

- **A comparative analysis of Bangla newspaper classification using different RNN and BERT models.**: Categorize different news sample taken from prothom Alo kaggle using different models including LSTM, multilingual BERT, XLMRoberta (April 2022) *[Code]*
- **Image Segmentation on 3D brain MRI images to segment Brain tumor**: Pre-processed MRI data, implemented loss function for image segmentation and applied a pretrained U-net model to segment tumor regions on the 3D MRI images. (Nov 2020)
- **Shikhon (A mobile app developed using React native and Node js)**: Developed an e-learning platform where students can prepare themselves for undergrad admission test in Bangladesh. (June 2022 - Dec 2022) *[Code]*
- **Ghost Buster using Hidden Markov Model**: A ghost catching game in a grid using previous observations and continuous probability updation of the moving ghost developed using Java.(Dec 2020)*[Code]*

Honors and Awards

- **Fatima Fellowship** (May 2022): I was selected in the top 10% of 700 applicants from all over the world to work as a research intern at Harvard University.
- **Dean's list Award** (2018,2019,2022)
- **University Merit Award** (2019)
- **Inter-University Cyber Drill organized by Bangladesh e-GOV CIRT.** (2021): Secured 2nd position in computer security competition(CTF).
- **Hackathon arranged by BRACU** (2020): Secured 3rd position building an web app to reduce social network harassment and bullying.
- **CTF competition arranged by IEEE BUET** (2021): Was in top 7 in CTF competition.
- **Engineering Olympiad arranged by BUET** (2021): Secured 10th position among competitor from all Engineering background.
- **Board Merit Scholarship by Government of Bangladesh** (2014,2016): Secured 18th & 35th in Secondary and Higher Secondary School Certificate exam among students all over Board along with talentpool scholarship.

Technical Skills

- **Languages**: Python, C/C++, Shell, JavaScript, Java, PHP, Latex, SQL(Postgre), Assembly(Intel 8086), HTML, CSS
- **Frameworks**: BERT, RoBERTa, OpenGL, Node, Express, React, React Native, Spring boot
- **Libraries**: Tensorflow, Keras, Pytorch, NLTK, Pandas, Numpy, Scikit-Learn
- **Tools**: Kubeflow(Previously Airflow), Docker, git, JIRA, Matlab, XCode
- **Operative Systems**: Windows, Linux, Mac
- **Databases**: NoSQL, PostgreSQL, MySQL

Leisure

- **Hobbies**: Reading, Travelling, Playing harmonica
- **Languages**: Bangla, English, Hindi