Souvik Ghosh

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About me

I am Souvik Ghosh, a motivated and detail-oriented software developer and currently a CSE undergraduate at BUET. I am passionate about software development, machine learning, and problem-solving. I am eager to leverage my skills in developing high-quality software solutions and contributing effectively to dynamic development teams.

Education

BS **Bangladesh University of Engineering and Technology**, Computer Science — Feb 2020 – Ongoing

- CGPA: 3.83/4.0
- **Relevant Coursework:** Software Engineering, Information System Design, Machine Learning, Compilers, Operating Systems, Computer Networks, Database, DSA

Skills

Languages: Java, C, C++, Javascript, Python, SQL, Bash

Frameworks: React.js, Material UI, Tailwind CSS, Bootstrap UI, Node.js, Express.js, REST API, Postman, Postgres, PL/SQL

DevOps: Docker, Github Actions, CI/CD, AWS

Projects

Bits Unplugged | Interactive CS Learning Platform — Github YouTube Website

- Co-developed an innovative platform focused on enhancing problem-solving skills without coding, emphasizing strategy over syntax.
- Implemented features such as drag-and-drop interactive problem solving, real-time contests, personalized recommendations, and analytics dashboards.
- Provided a customizable canvas editor for problem setters to create new challenges and integrated topic-wise learning materials with example problems.
- Designed an analytics module to track problem ratings, user progress, and contest performance.
- Facilitated seamless collaboration with intuitive user interfaces built using ReactJS and Tailwind CSS.
- **Technologies:** Docker, GitHub Actions, Tailwind CSS, Sequelize, PostgreSQL, Supabase, ReactJS, NodeJS, ExpressJS, Render.com

Multimodal Breast Cancer Prognosis Prediction | Machine Learning Project — Github

- Designed a multimodal framework using mRNA expression, copy number alteration, and clinical data from the TCGA-BRCA dataset.
- Transitioned from MLP-based models to self-attention and cross-attention mechanisms for improved performance.
- Focused on contrastive learning techniques to handle feature embeddings without classification during training.

Ray Tracing with OpenGL | Computer Graphics Project — Github

- Rendered bitmap images using ray tracing and the Phong Illumination model, with an option to add texture from image files.

References available upon request.

- Supported rendering from any position of 3D geometric shapes like planes, spheres, triangles, pyramids, and cubes.
- **Language:** C++, **Library:** OpenGL

C Compiler | Compiler Project Github

- Incrementally developed a compiler for a subset of the C programming language.
- **Language:** C++, Flex, Bison

TECHWORLD | Database Management Project Github

- Developed a manageable software solution for tech product companies to process user orders and manage supplies from retailers.
- Implemented the project using EJS, JavaScript, CSS, C++, and SQL.

Football Club Manager | Java Project Github

- Created a platform for football clubs to manage player transactions and host an interactive auction marketplace.
- Utilized JavaFX, JFoenix, Socket Programming, and Scene Builder.

PacMan Desktop Game | C Programming and IGraphics Projectc Github

- Developed a desktop game using OpenGL.
- Utilized OpenGL 4.5, GLFW, GLEW, irrKlang, GLM, Soil2, Freetype.

Research Experience

Undergraduate Thesis, CSE, BUET *Manuscript Under Preparation*

Title: ResLysEmbed: A ResNet-Based Framework for Succinylated Lysine Residue Prediction Using Sequence and Language Model Embeddings

Supervisor: Dr. Mohammad Saifur Rahman

- Developed a novel deep learning architecture, ResLysEmbed, incorporating a Resnet branch for sequence data and an MLP branch for ProtT5 embeddings.
- Conducted SHAP-based interpretability analysis to identify crucial residues within a 33-length window around target sites.
- Achieved state-of-the-art performance in succinylation site prediction, surpassing existing benchmarks.

Deepfake Detection for IEEE SP Cup 2024 *Ongoing*

Supervisor: Dr. Mohammad Saifur Rahman

- Used training data from eight datasets in DeepFakeBench, focusing on hybrid model development for enhanced detection.
- Explored generative approaches, including **diffusion models, GANs, and VAEs,** to create synthetic datasets for training robust and generalized detection models.
- Evaluated advanced backbone architectures, such as **MaxViT, ConvNeXt, and EfficientNet**, with specialized loss functions like contrastive loss and focal loss for improved accuracy.

Awards & Achievements

Research Grant from RISE BUET

Received a research grant from BUET Research and Innovation Centre for Science and Engineering for an ongoing research project.

References available upon request.