Abid Hussain

Bioinformatics Student

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Islamabad, Pakistan

Summary

I am a dedicated and motivated 6th-semester undergraduate Bioinformatics student with a strong foundation in biology, programming, and mathematics. I am currently enhancing my skills in AI/ML, web development, and data analysis to apply computational approaches in medical diagnostics, drug discovery, genomics, and biological research. I am seeking opportunities to contribute to data-driven research and professional environments.

Technical Skills

Machine Learning: CNNs, Logistic Regression, Random Forest, Ensemble Methods, XGBoost, Scikit-learn, PyTorch, SHAP, CTGAN

Data Analysis: Pandas, NumPy, Exploratory Data Analysis (EDA), Statistical Analysis, Data Visualization, Heatmaps

Bioinformatics & Computational Biology: BLAST, Galaxy, BWA-MEM, BCFtools, FastQC, Clustal Omega, MEGA, Phylogenetics, Variant Calling, Nextflow, Dotmatcher, NCBI, UniProt, Ensembl, GenBank, OpenSim, Jalview

Big Data & Parallel Computing: Hadoop, Spark, MapReduce

Web / App Development: Python, Streamlit, Flutter, HTML, CSS

Research & Development Tools: Git, GitHub, Linux, Jupyter Notebook, Google Colab, Hugging Face, LaTeX, Zotero, Microsoft Excel

Work Experience

BIOMISA Lab — Islamabad, Pakistan
Research Intern — 06/2025 – 08/2025

- Developed a machine learning framework for thalassemia classification using complete blood count (CBC) data
- Designed a preprocessing pipeline with feature engineering and CTGAN to handle class imbalance
- Optimized XGBoost models using cross-validation and SHAP-based interpretability analysis
- Built and deployed a Streamlit web application for interactive predictions and visualization on Hugging Face
- Contributed to research documentation for a potential publication

Academic Projects

Brain Tumor Detection Using Deep Neural Networks (PyTorch) — 11/2025 – 12/2025

- Designed and implemented an end-to-end deep learning pipeline to classify brain tumors from MRI scans into four categories (Glioma, Meningioma, Pituitary, No Tumor)
- Performed MRI preprocessing including resizing, normalization, and tensor conversion using PyTorch transforms
- Built a fully connected deep neural network using ReLU activations and trained it for 100 epochs with CrossEntropyLoss and Adam optimizer on GPU
- Evaluated performance using accuracy, precision, recall, F1-score, confusion matrix, and ROC-AUC

Variant Calling and Mutation Analysis (Galaxy and Python) — 11/2025 – 12/2025

- Designed a reproducible variant calling workflow using the Galaxy platform

- Processed human FASTQ data from NCBI SRA and aligned reads to the HBB reference genome using FastQC and BWA-MEM
- Identified SNPs and small indels using BCFtools with high-confidence filtering
- Conducted comparative variant analysis in Python and generated summary tables and visualizations

Protein Evolution Analysis 12/2024 – 01/2025

- Compared cytochrome protein sequences across five species
- Performed multiple sequence alignment using Clustal Omega and constructed a phylogenetic tree

OpenSim Biomechanical Analysis 04/2025 – 05/2025

- Recorded motion data using OpenCap and analyzed it in OpenSim
- Performed inverse kinematics for joint movement analysis
- Studied knee extension and muscle activation patterns

RTOS Implementation on RISC-V using Zephyr 11/2025 – 12/2025

- Deployed a Zephyr RTOS environment on a QEMU-emulated RISC-V platform
- Implemented a producer–consumer IPC system using kernel threads and message queues
- Applied multitasking, preemptive scheduling, synchronization, and deterministic memory management
- Built the project using Zephyr SDK, west build system, CMake, and RISC-V GCC toolchain
- Validated execution via QEMU console output and maintained the project on GitHub

Education

National University of Sciences and Technology (NUST) Islamabad, Pakistan
Bachelor of Science in Bioinformatics 09/2023 – Present

Federal Board of Intermediate and Secondary Education (FBISE) Islamabad, Pakistan
Intermediate (Pre-Medical) 09/2019 – 08/2021

Relevant Courses Studied

Cell Biology, Evolutionary Biology, General Genetics, Introduction to Bioinformatics and Computational Biology, Introduction to Big Data in Biology, Fundamentals of Computer Programming, Database Systems, Object-Oriented Programming, Data Structures and Algorithms, Design and Analysis of Algorithms, Software Engineering, Artificial Intelligence, Computer Organization and Assembly Language, Operating Systems

Interests

Medical diagnostics research, drug and biomarker discovery, multi-omics data analysis