

Hirok Roy Rahul

Dhaka, Bangladesh | work.hrr25@gmail.com | linkedin.com/in/hirokrr | github.com/hirokr | hirokrr.vercel.app

PROFESSIONAL SUMMARY

Final-year Computer Science and Engineering student and Junior Software Engineer with experience building production web interfaces, full-stack applications, machine learning systems, and real-time computer vision software. Proficient in Python, TypeScript, React, Next.js, Node.js, REST APIs, PostgreSQL, and Docker. Experienced in collaborative product development, asynchronous processing, AI service integration, and reproducible research workflows.

TECHNICAL SKILLS

Languages: Python, TypeScript, JavaScript, C, C++, Java, SQL, Bash

Frontend: React, Next.js, React Native, Expo, Tailwind CSS, Three.js

Backend and Data: Node.js, Express, FastAPI, REST APIs, WebSocket, PostgreSQL, MySQL, MongoDB, Prisma, Supabase, Redis, Qdrant, PostGIS

AI and Computer Vision: PyTorch, TensorFlow, OpenCV, Hugging Face Transformers, LangChain, LangGraph, pandas, NumPy

Tools and Platforms: Git, GitHub, Docker, BullMQ, Celery, AWS S3, Azure, Google Cloud Storage, Vercel, Figma

PROFESSIONAL EXPERIENCE

FourbTech

Frontend Developer

April 2025 – October 2025

Hybrid, Dhaka, Bangladesh

- Develop and maintain client-facing interfaces with React, Next.js, and TypeScript in a production startup environment while completing undergraduate studies.
- Build reusable UI components, integrate REST APIs, and translate product and design feedback into maintainable application features.
- Collaborate through sprint planning and code review to deliver tested changes across product workflows.

Nebulae-Soft

Web Developer Intern

Nov 2024 – Apr 2025

Remote

- Developed and maintained web pages and features using Node.js and WordPress for client projects in a remote internship environment.
- Built and customized WordPress themes and plugins to meet client requirements, ensuring responsive and cross-browser compatible layouts.
- Collaborated with the development team to debug issues and deliver functional updates within project timelines.

Biose Research Center

Machine Learning Research Assistant

Jan 2024 – Nov 2025

Dhaka, Bangladesh

- Contribute to biomedical AI and computer vision research through literature review, experiment planning, data pipeline development, and reproducible model evaluation.
- Investigate multimodal deepfake detection and efficient vision-language model inference using PyTorch, pretrained encoders, attention analysis, and benchmark datasets.
- Maintain version-controlled research code and document experimental configurations, evaluation metrics, and implementation decisions.

BRACU DUBURI AUV Team

Machine Vision Engineer

Dec 2023 – Dec 2025

Dhaka, Bangladesh

- Develop real-time computer vision software for Bangladesh's first autonomous underwater vehicle and its participation in the international RoboSub competition.
- Implement and optimize Python and OpenCV pipelines for underwater object detection, gate recognition, and navigation under embedded hardware constraints.
- Integrate vision modules with an Arduino-based platform and debug software-hardware interactions in real-time control workflows.

SOFTWARE PROJECTS

Feynman AI | TypeScript, Node.js, WebSocket, PostgreSQL, Redis, Qdrant, Docker

2026

GitHub | Live Demo

- Built an AI study coach that ingests text, URLs, and uploaded learning materials, then supports real-time spoken explanation sessions grounded in retrieved source context.
- Designed a Retrieval-Augmented Generation (RAG) pipeline using Qdrant vector search, embedding-based document retrieval, contextual reranking, and source-grounded response generation for personalized learning sessions.

- Implemented asynchronous parsing and embedding workflows, WebSocket transcript events, LLM-generated probing questions, mastery reports, and session analytics. Finalist at Infinity AI BuildFest and Outskill AI Builders Hackathon.

ThesisForge | Next.js, FastAPI, PostgreSQL, Redis/RQ, Docker2026

GitHub | Live Demo

- Built a multi-agent thesis quality-control platform with seven specialized review agents, asynchronous analysis runs, collaboration logs, prioritized fixes, quality scores, citation notes, and defense questions.
- Implemented PDF, DOCX, BibTeX, TXT, and CSV ingestion in a monorepo deployed with Vercel and Render, including a one-click demonstration workflow.

ExplainFake (Thesis) | Python, PyTorch, Hugging Face, Transformers, Deep Learning2026

GitHub

- Researched multimodal deepfake detection and fine-tuned transformer-based Large Language Models (LLMs) for explainable deepfake analysis and classification tasks.
- Designed training, evaluation, and inference pipelines, performed dataset preprocessing and hyperparameter optimization, and analyzed model interpretability and performance trade-offs.

Tryora | Next.js, TypeScript, BullMQ, Prisma, Claid AI, Tripo3D2026

GitHub | Live Demo

- Developed an AI-powered virtual try-on e-commerce platform with BullMQ queues for long-running image enhancement and 3D model generation jobs.
- Integrated external AI and media APIs and designed the application data layer with Prisma and clear frontend-backend API boundaries.

EDUCATION

BRAC UniversityExpected Feb 2027

BSc in Computer Science and EngineeringDhaka, Bangladesh

- Coursework: Data Structures and Algorithms, Databases, Operating Systems, Computer Networks, Software Engineering, System Design and Analysis, Machine Learning, and Computer Vision.

RESEARCH EXPERIENCE

ExplainFake – Undergraduate Thesis | PyTorch, OpenCV, Hugging Face Transformers, multimodal learning, explainable AI2026 – Present

GitHub

- Designing a multimodal deepfake detection framework that combines pretrained visual and audio encoders through cross-attention, with attention analysis incorporated into the explainability strategy.
- Fine-tuning transformer-based Large Language Models (LLMs) to generate human-interpretable explanations for deepfake predictions, improving transparency and trustworthiness of model outputs.
- Conducting within-dataset and cross-dataset evaluation using FakeAVCeleb and AV-Deepfake1M while investigating multimodal detection, model generalization, and explainable AI techniques.

InstructPrune | PyTorch, Hugging Face Transformers, spaCy, LLaVA-1.5-7B2026 – Present

GitHub

- Developing a training-free adaptive visual-token pruning framework that estimates instruction complexity and dynamically adjusts pruning ratios to reduce redundant vision-language model computation.
- Building evaluation workflows for VQAv2, MMStar, and SEED-Bench to measure accuracy, latency, GPU memory consumption, token reduction, and estimated attention-computation savings.

CERTIFICATIONS AND ACHIEVEMENTS

System Design Fundamentals	Coursera View credential
Explainable AI	Coursera View credential
Natural Language Processing with Classification and Vector Spaces	Coursera View credential
Machine Learning Specialization	Coursera View credential
Deep Learning Specialization	Coursera View credential
Mathematics for Machine Learning and Data Science Specialization	Coursera View credential
PyTorch Ultimate 2024	Coursera View credential

ACHIEVEMENTS

Infinity AI BuildFest 2026 – **Finalist**
Outskill AI Builders Hackathon 2026 – **Finalist**

Research Profiles: ORCID 0009-0009-3782-5632 | ResearchGate