

# Shovon Sharma

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## Technical Skills

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**Languages:** C/C++, Python, Go, Bash, Javascript, Solidity

**Databases:** MySQL, Oracle SQL, SQLite, PostgreSQL, ChromaDB

**Frameworks/Technologies:** PyTorch, JAX/Flax, Blockchain, FastAPI, Unislosh AI, Hugging-Face

**Tools/Platforms:** Git, Docker, Linux

## Projects

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### Course Finder : An AI-Powered Course Recommendation System

Built a course recommendation system using Sentence Transformers for semantic embeddings and ChromaDB for efficient vector storage, integrated with a FastAPI backend and Streamlit UI. Designed a multi-factor ranking algorithm (similarity, rating, popularity, difficulty) to deliver personalized results, containerized with Docker.

### Stable Diffusion from Scratch

Implemented a *Denoising Diffusion Probabilistic Model (DDPM)* using *PyTorch*, including *Forward Diffusion*, *Attention-enhanced U-Net* for reverse-denoising, and a *Variational Autoencoder (VAE)* for latent space compression. Optimized training with a two-stage approach, reducing memory usage and ensuring stable convergence.

### DMoEBERT for Natural Language Inference (Thesis)

Designed a scalable *sparse-mixture of experts encoder-only model* for NLI. Trained 23M and 45M parameter variants from scratch under resource constraints, achieving 84% precision on SNLI and outperforming *BERT-base (110M, LoRA PEFT)* in efficiency, with  $13.5 \times$  fewer FLOPs and  $5.3 \times$  less memory.

### Sharma's Drive – Decentralized File Sharing & Storage Platform

Built a *blockchain-based* decentralized platform for file (audio, image, video, zip) sharing using *Solidity Smart Contracts*, *Node.js* backend, and *React* frontend, ensuring secure, tamper-proof uploads and retrievals.

### Chomp Chase – AI Maze Race Game

Developed a dynamic maze-solving game in *Python*, generating random mazes via *DFS with backtracking*. Designed an AI opponent using the *A\* pathfinding algorithm* to race the player for food targets.

### Sharma's Cache System – Redis Clone (Ongoing)

Developing a lightweight, in-memory key-value store in *Go*, implementing core Redis features including in-memory persistence, eviction policies, and pub-sub.

## Education

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### B.Sc. in Computer Science and Engineering

2020 – 2025

Khulna University of Engineering & Technology (KUET)

### Higher Secondary Certificate (HSC)

2017 – 2019

Govt. M.M City College, Khulna

Board Merit Position: 23

## Technical Writing

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- Contributor on Medium, writing blogs on Linux, Data Structure, Blockchain, and AI. Notable Articles :

- *The No-Nonsense Guide to Attention, LinearAttention, GPU Memory & FlashAttention : Math to Code* 
- *Understanding Vision Transformers from First Principles : Theory and Code* 
- *The Math Behind Stable Diffusion* 
- *Let's take a sql adventure : From theory to LeetCode* 
- *Let's Explore Go: From Hello World to Data Structures and Algorithms* 
- *Let me teach u Bash : From 'hello world' to User Management* 