Amit Singh

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Education

UPES, Dehradun — Aug 2023 – Till Date
B.Tech in Computer Science and Engineering — *CGPA: 8.61 / 10*

Technical Skills

Programming Languages: Python, C++, Go
Frameworks & Libraries: Node.js, React.js, TensorFlow, Keras, OpenCV, MediaPipe, NumPy, Pandas
Databases: SQL Server, MongoDB, Prisma, Vector Databases
AI & ML: Machine Learning, Deep Learning, BiLSTM, Attention Mechanism, RAG
Systems & Networking: TCP/IP Sockets, Event-Driven I/O, Data Serialization
Tools & Platforms: Git, GitHub, REST APIs, Postman, libp2p

Internships

AI/ML Intern — Jun 2026 – Jul 2026
IBM — *Duration: 8 Weeks*

- Built unsupervised fraud-detection models (Isolation Forest, deep Autoencoder) on a 284K-transaction credit card dataset with a 0.17% fraud rate, flagging anomalies via reconstruction error and isolation path length.
- Designed a Hybrid Fraud Risk Scoring framework combining normalized Isolation Forest and Autoencoder scores into a unified 0–100 score, improving Precision nearly 5$\times$ (2.97% $\rightarrow$ 14.64%) over the standalone Autoencoder while retaining 83.7% Recall (F1: 0.057 $\rightarrow$ 0.249).
- Engineered a leakage-free preprocessing pipeline (stratified splits, SMOTE, feature scaling) and built an explainability module for analyst-facing risk breakdowns, benchmarking against a Logistic Regression baseline.

Projects

Redis (Built from Scratch) | *C++, TCP Sockets, Event-Driven I/O*

- Implemented a Redis-like in-memory key-value server from scratch in **C++**, following the "Build Your Own Redis" methodology, handling raw **TCP socket programming** and a custom binary **request-response protocol**.
- Designed a single-threaded, non-blocking **event loop** using `poll()` to concurrently handle multiple client connections and serve core `GET`/`SET`/`DEL` operations without per-connection threads.
- Built a custom **binary serialization** scheme to encode and decode structured request/response data over the wire, replacing plain-text parsing with a length-prefixed protocol.
- Implemented a **timer and timeout** system to track per-connection idle time and enforce read/write deadlines within the event loop.
- Added **TTL-based key expiration** using a min-heap to efficiently track and evict expired keys without scanning the full keyspace.

ReliefLink | *Go, libp2p, mDNS, PubSub, React.js* — GitHub

- Built an offline-first, peer-to-peer emergency communication backend in Go using the **libp2p** framework, enabling device-to-device messaging over local networks without internet or central servers.
- Implemented **Multicast DNS (mDNS)** for zero-configuration peer discovery on LAN, enabling automatic node detection using a shared discovery string across rescue teams and civilians.
- Designed a **PubSub-based chat room** system allowing multiple peers to join named rooms and exchange messages over direct P2P connections, with configurable CLI flags for port, room, and identity.
- Exposed a local **HTTP API** (`-enable-http`) to bridge the Go backend with a React frontend, with persistent message logging (`logs.txt`) for offline backup and recovery during intermittent connectivity.

SanketSpeak | *Python, TensorFlow, Keras, OpenCV, MediaPipe, pyttsx3* — GitHub

- Developed a vision-based assistive system to translate dynamic Indian Sign Language (ISL) gestures into speech in real-time.
- Designed a CNN-BiLSTM model with an attention mechanism to capture spatial and temporal features from video sequences.
- Implemented a preprocessing pipeline to extract and standardize keyframe sequences for model input.
- Achieved **95% validation accuracy** on the INCLUDE-50 dataset using optimized feature extraction techniques.

Certifications & Training

Advanced Learning Algorithms — Apr 2025
DeepLearning.AI & Stanford University – Coursera — *Verify*

Supervised Machine Learning: Regression and Classification — Feb 2025
DeepLearning.AI & Stanford University – Coursera — *Verify*