Amar Mahato

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PROFILE

Backend-focused Software Developer with hands-on experience building distributed systems, event-driven architectures, and security tooling. Proficient in **TypeScript, Python, and Go** with practical experience in microservices, message queues (RabbitMQ), and API development (REST, WebSocket, gRPC). Designed and built backend systems spanning real-time data pipelines, RAG workflows, envelope encryption, and binary analysis tooling. Comfortable working across the stack but strongest in system design, database modeling (PostgreSQL, MongoDB), and backend services. Currently pursuing B.Tech in Computer Science at Dr. B.C. Roy Engineering College.

PROJECTS

Concize | *Node.js, RabbitMQ, Cerebras, Sarvam AI, Groq, Gemini, Qdrant, MongoDB*   [GitHub]

- Architected an **Event-Driven Microservice Backend** using independent RabbitMQ workers to completely decouple audio ingestion from AI workloads, safely handling simultaneous concurrency without pipeline bottlenecks.
- Engineered an advanced **Hybrid LLM-Based Chunking RAG Pipeline**; utilized Sarvam AI for bulk transcription and Cerebras (Llama 3.1) to synthesize semantically coherent, speaker-aware narratives for Qdrant vector embedding.
- Guaranteed absolute global timeline precision across distributed workers by implementing a custom x-audio-offset injection header, perfectly synchronizing concurrently overlapping WebRTC front-end audio chunks.
- Implemented **Defense-in-Depth LLM Security**: summary-anchored relevance filtering, strict prompt guardrails, exponential backoff with multi-key API rotation, and atomic MongoDB locking for strict sequential data consistency.

Wombat | *TypeScript, Next.js, Express, Go, Google KMS, Supabase, Prisma*   [GitHub]

- Led backend design and development as part of a 2-person team (frontend by co-developer); designed the overall system architecture, security model, API contracts, and authentication flows (JWT, RBAC, Zod validation).
- Built a **secrets management platform** enabling secure API credential injection and rotation without application redeployment, serving real-time usage analytics through RESTful APIs.
- Implemented **envelope encryption using Google Cloud KMS**, encrypting keys at the application layer before database storage via Prisma ORM, ensuring credentials are never stored in plaintext.
- Developing a **high-performance proxy service in Go** for granular API traffic interception, rate-limiting, and usage metering, with SDK wrappers for multi-provider integration (Gemini, MongoDB).

Headless Ghidra MCP | *Python, Java, Ghidra, MCP, Capstone, pefile*   [GitHub]

- Built a **cross-platform MCP server** enabling LLM clients to perform automated binary analysis, decompilation, call-graph traversal, and malware triage without Ghidra's GUI; fully functional and actively being extended with new analysis tools.
- Designed a **Python–Java bridge** with a custom Ghidra script that serializes functions, strings, imports, exports, and cross-references into cached JSON, enabling stateless analysis across sessions.
- Built **high-speed native inspection tools** using Capstone disassembly, PE/ELF parsing, and mmap-based regex search to complement Ghidra's deep analysis with sub-second triage on large binaries.
- Ongoing work focuses on expanding tool coverage, improving analysis depth and accuracy, and scaling capacity for larger and more complex binary files; includes a 60-test automated suite with full Windows/Linux compatibility.

TECHNICAL SKILLS

Languages: TypeScript, JavaScript, Python, Go, Java, SQL, HTML/CSS
Backend & APIs: Node.js, Express.js, FastAPI, RabbitMQ, gRPC, REST APIs, WebSockets, JWT, OAuth2
Frontend Development: React.js, Next.js, Tailwind CSS, Chrome Extension API, SSE
Database & Storage: PostgreSQL, MySQL, MongoDB, Redis, Supabase, Prisma ORM, NeonDB
AI & NLP: RAG Pipelines, LLM Tool Use (MCP/LangChain), Vector Search (Qdrant), Whisper V3, Gemini/Groq SDKs
DevOps & Security: Docker, AWS (EC2/S3), GitHub Actions (CI/CD), Render, Vercel, Nginx, Linux, Google KMS, Zod, Jest

Education

Dr. B. C. Roy Engineering College   Durgapur, West Bengal, India
Bachelor of Technology, Computer Science and Engineering
Beachwood School   Durgapur, West Bengal, India
Higher Secondary