SAYAK BRAHMACHARI

Senior Software Engineer | Full-Stack & Embedded

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EXPERIENCE

Quant Analyst
Algo One AI Pvt. Ltd.

📅 Feb 2024 – Present   📍 Remote/India

- Engineered backend systems for a B2C financial analysis platform, handling **data ingestion**, **web scraping**, and **parsing** pipelines based on **Django** and **AWS Lambda**.
- Backtested options trading strategies using historical market data, validated and fixed financial calculation logic with test cases and documentation.
- Developed market movement analysis software for cryptocurrencies, implementing intuitive dashboard UIs in **ReactJS**.
- **Tech Stack:** Python3, ReactJS, PostgreSQL, Django, AWS.

Senior Software Engineer
Entiovi Technologies Pvt. Ltd.

📅 Nov 2022 – Jan 2024   📍 India

- Managed **recruitment processes**; designed coding challenges and conducted technical interviews for junior/senior candidates.
- Spearheaded the redesign of a logistics planning dashboard for a trucking company, optimizing resource allocation and integrating real-time data feeds for live shipment metrics and route tracking.
- Developed a dynamic and modular front-end for a leading B2C Live-Selling E-commerce platform.
- **Tech Stack:** ReactJS, NodeJS, VueJS, PostgreSQL, APIs.

Research Analyst & Software Developer
Algo One AI Pvt. Ltd.

📅 Sept 2021 – Oct 2022   📍 India

- Automated **options trading strategies** to minimize latency and reduce manual intervention.
- Enhanced **backtesting frameworks** incorporating advanced statistical analysis for strategy assessment.
- Developed an **NLP pipeline** to extract market sentiment and executive communication trends from earnings call transcripts.
- **Tech Stack:** Python3, NLP, Data Science, Qt.

SELECTED PROJECTS

struixLang & struixCC
Compiler Design Project

- Implemented a stack-based virtual machine with **62 documented instructions**, dynamic typing, custom word definitions, control structures, string operations, file I/O, and networking primitives.
- Added language features including **homoiconicity**, metaprogramming support, predefined primitives, and a modular interpreter architecture.

TECHNICAL SKILLS

Languages: Python, C/C++, Embedded C, JavaScript/TypeScript, SQL

Backend: Django, Node.js, REST APIs, PostgreSQL

Frontend: React, React Native, Next.js, Vue.js

DevOps & Infra: Docker, AWS (Lambda), CI/CD, Linux

Embedded & Systems: Microcontrollers, Robotics, SDR, Assembly, SLAM

Data & ML: Pandas, NumPy, SciPy, NLP

EDUCATION

B.Tech in Electronics and Instrumentation
Kalinga Institute of Industrial Technology

📅 Class of 2022

Focus: Robotics and UAV Design, Electronics, Cybersecurity.

ISC (Computer Science)
Sri Sri Academy, Kolkata

📅 Class of 2018

Scored 100% in Computer Science.

PUBLICATIONS

📕 **Intl. Symposium for Crisis Forecasting (2022) | University of the Federal Armed Forces, Munich, Germany**

Presented a paper on "Forecasting Terrorist attacks through Artificial Intelligence". **Field:** ML on OSINT.

📕 **Intl. Colloquium on Modern Technologies (2021) | Aristotle University of Thessaloniki, Greece**

Presented paper on "COVID-19: The Catalyst of Cybercrime Among Children". **Field:** Cybercrime, Statistical Analysis.

PATENTS

UAV-based System for Search & Rescue
Patent No. IN 202031041280

📅 Filed Sep 2020

- Designed a UAV-based SDR system that emulates emergency base stations to locate missing persons' mobile devices via multilateration, for use in disaster search & rescue.

- Built **struixCC**, an AST-based compiler translating a subset of C (expressions, control flow, functions, arrays, local scopes, bitwise ops) into struixLang bytecode.
- **Tech Stack:** Python3, Compiler Design.

LIDAR-based Vehicle with SLAM
University Major Project

- Engineered autonomously navigating terrestrial bots using **Sensor Fusion**, **SLAM algorithms**, and **Computer Vision** for path planning (optimized A*).
- **Tech Stack:** Python3, Embedded C, Robotics, SLAM, OpenCV.

Wi-Fi Ducky
Hardware Security Project

- Designed a wireless HID emulation device for **authorized security testing** in controlled environments, featuring remote and scheduled payload execution via WiFi and a custom PCB.
- **Tech Stack:** Embedded C, Microcontrollers, USB HID Protocol, PCB Design.

 Full portfolio and source code available on GitHub.

- Developed airborne SDR modules and ground control software for true-range multilateration and device localization.
- **Keywords:** UAV, SDR, Emergency Base Stations, Signal Processing, Multilateration.

OTHER PROJECTS

pwnagotchi
- Contributed to core plugins and fixes for an AI-driven wireless research platform used for **authorized WiFi security analysis** and educational experimentation.
- **Stack:** Python, ML, Embedded Systems.

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react-native-codeditor
- Identified and fixed issues for a React Native component for editable code blocks with syntax highlighting.
- **Stack:** React Native.

ShellBot - Personal Project
- Built a cross-platform remote shell framework for **lab-based post-exploitation simulation** and distributed task execution in controlled research setups.
- **Stack:** Python, Sockets, Cybersecurity.

...and many others on GitHub.