



# SAYAK BRAHMACHARI

## SOFTWARE ENGINEER

### / ALL ABOUT ME

I hold the position of a senior full-stack developer and am a self-taught programmer with a strong eye for innovative design and an innate desire to learn to do more.

### / COMPETENCIES

- ★★★★★ Python
- ★★★★★ Javascript
- ★★★★★ App Development (React Native)
- ★★★★★ Web Development (Node/React/Next.JS)
- ★★★★★ Linux
- ★★★★★ Git
- ★★★★★ CI/CD
- ★★★★★ Network Administration
- ★★★★★ UI/UX Designing
- ★★★★★ Docker
- ★★★★☆ Automation/Scripting
- ★★★★☆ Internet of Things, Embedded Systems
- ★★★☆☆ C, C++, Embedded-C
- ★★☆☆☆ Java



### / CONTACT DETAILS

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### / EDUCATION HISTORY

>> **Kalinga Institute of Industrial Technology, Bhubaneswar**  
 BTech. in Electronics and Instrumentation Engineering  
 Class of 2022

Member of multiple student societies for being passionate about robotics, music production, photography, and motion graphics.

>> **Sri Sri Academy, Kolkata**

ISC | Class of 2018

Obtained a perfect score (100%) in ISC Computer Science. Represented the school in multiple competitions such as The Frank Anthony Memorial All-India Inter-School Debate organized by the CICSE School Board. Was a Gold Medalist in the English Olympiad and had an International Rank of 90 in the Cyber Olympiad, both organized by SOF.

>> **St. Joseph's School (North Point), Darjeeling**

ICSE | Class of 2016

Attended a Robotics workshop at Kennedy Space Center, NASA (The National Aeronautics and Space Administration of USA). Represented the school in multiple debate and elocution competitions. Was awarded trophies for outstanding performance in English and Science ASSET Olympiads. Was a school topper for 3 consecutive years and was awarded the Rector's Meritorious Award.

### / PATENTS

>> **An Unmanned Aerial Vehicle based method and system for Patrolling over Search and Rescue Area**

Filed Sep 23, 2020 Patent Number 202031041280

The system discloses an Unmanned Aerial Vehicles (UAVs) equipped with a radio communication module (SDR) to emulate a cellular base station and has a persistent connection to a ground control unit which directs and navigates said UAVs. The radio communication equipment acts as an IMSI catcher, resulting in nearby cellular devices to latch onto it as cellular devices poll all base stations in the vicinity. The cellular handset provides the base station with basic identification information such as the IMEI and IMSI numbers, which the UAV can retransmit to the base station along with its coordinates and the signal level of connected handsets. The ground control unit then uses true-range multilateration techniques, using the data (signal strength of handset and coordinates of UAV) from multiple UAVs, thus enabling the operator to pinpoint the position of individual handsets.



## / WORK EXPERIENCE

### >> Senior Software Engineer

November 2022 - Present | Entiovi Technologies Pvt. Ltd.

#### 1. Logistics Planning and Operations Management Dashboard Software:

Developed and maintained web applications using ReactJS for the front-end and NodeJS for the back-end, collaborating with a team to design and implement features for a Logistics Planning and Operations Management Dashboard software tailored for a large trucking company in North America. The applications integrated real-time data feeds and APIs to enhance the dashboard's functionality, providing the client with up-to-date shipment information, routes, and operational metrics, and allowing them to plan day-to-day operations in advance. Spearheaded the re-design of a new module within the Logistics Dashboard to give full control to an operator for route planning and resource allocation, resulting in an improvement in operational efficiency.

#### 2. Live-Selling E-commerce Application/Website:

Contributed to the implementation of various features in the front-end of a live-selling e-commerce platform for a leading US-based company and worked closely with the design team to ensure a seamless and visually appealing user experience. Utilized React to create dynamic, responsive, and modular user interfaces and UI components, enhancing the overall performance and usability of the platform, and collaborated with the backend team to integrate front-end components with server-side logic, ensuring data consistency and efficient communication between the front-end and back-end.

#### 3. Recruitment Involvement:

In addition to my responsibilities as a Senior Software Engineer, I actively participated in the recruitment process for both junior and senior engineering positions by conducting technical interviews. This involvement in the hiring process showcases my ability to assess and identify qualified candidates based on their technical skills and overall fit for senior roles. I designed and presented coding challenges and problem-solving scenarios to assess candidates' ability to think critically and apply their technical knowledge in practical situations and assessed candidates' communication skills, including their ability to articulate technical concepts, discuss their approach to problem-solving, and collaborate effectively within a team.

Tech stack: ReactJS, NodeJS, VueJS, PostgreSQL.

### >> Research Analyst and Software Developer

September 2021 - October 2022 | Algo One AI Pvt. Ltd.

#### 1. Options Trading Automation:

- Automated the execution of options trading strategies, reducing manual intervention and minimizing latency in trade execution.
- Integrated real-time market data feeds and leveraged APIs to ensure the latest market information was considered in strategy execution.

#### 2. Backtesting Framework Enhancement:

- Enhanced the backtesting framework to incorporate advanced statistical analysis, allowing for a more comprehensive assessment of strategy performance.
- Conducted scenario analysis to identify potential areas of improvement and optimize trading algorithms for varying market conditions.

#### 3. NLP-Based Insights from Earnings Calls:

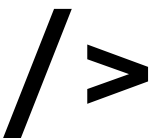
- Developed a scalable and efficient NLP pipeline for processing large volumes of earnings call transcripts.
- Extracted key insights, such as market sentiment, analyst sentiment, and trends in executive communication, providing a quantitative basis for decision-making.

Tech stack: Python3, AWS, NLP, Data Science, Qt, Cloud Computing.

### >> Freelance App/Web Developer

June 2020 - September 2020

I worked as a freelance e-commerce website developer in 2020, where I designed and implemented multiple responsive progressive web apps with a cart-based shopping system and support for handling online payments.





## / OPEN - SOURCE CONTRIBUTIONS

### >> **pwnagotchi - AI-powered wireless packet capture device for cracking WPA encryption**

Pwnagotchi is an A2C-based AI device powered by bettercap and running on a Raspberry Pi Zero-W that learns from its surrounding WiFi environment in order to maximize the crackable WPA key material it captures (either through passive sniffing or by performing deauthentication and association attacks). This material is collected on disk as PCAP files containing any handshake supported by hashcat, including full and half WPA handshakes and PMKIDs.

Tech stack: Machine learning, Python3, Embedded Computing, Networking and Wireless Technologies, Cybersecurity

### >> **Directus v8 - Real-time API and no-code App dashboard for managing SQL database content**

Directus is a free and open-source headless content management system (CMS) framework for managing custom SQL-based databases. It consists of a web app and an API that allows developers to connect data to a variety of clients, such as websites, native apps, kiosks, and IoT devices.

Tech stack: PHP, SQL, VueJS, Javascript

### >> **Wi-Fi Ducky - A wireless HID emulation BadUSB device with keyboard and mouse support**

A wireless USB exploitation BadUSB device capable of emulating the keyboard and mouse of a PC and executing commands wirelessly via WiFi, giving an attacker full unrestricted access to a device while remaining invisible to most anti-malware solutions.

Tech stack: Electronics, Microcontroller Programming, Embedded Systems, USB HID Protocol, Cybersecurity

### >> **Jexactyl - An advanced game hosting management panel and billing system**

Jexactyl is an open-source game server hosting and management panel. It allows you to configure and deploy game servers, and run games in isolated Docker containers and has an integrated billing system that supports Stripe and PayPal. It also includes a ticket system in order to provide support to customers.

Tech stack: PHP, Go, Typescript, Docker Containerization and Orchestration

### >> **GPRM - GitHub Profile ReadMe Maker**

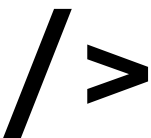
GPRM is a NextJS website that can be used to design and customize a markdown file that can be used for the ReadMe section of a GitHub user's profile.

Tech stack: Javascript, NextJS, ReactJS, Firebase, TailwindCSS

### >> **react-native-codeditor**

react-native-codeditor is a React Native component that supports displaying editable code blocks in an application and can be used to implement a text input field with support for syntax-highlighting and many other necessary features and has a rich programming interface to allow further extension.

Tech stack: NodeJS, Javascript, React Native, App Development





## / PERSONAL PROJECTS

### >> **LiDAR-based Vehicle with Autonomous Navigation, SLAM & Obstacle Avoidance (University Major Project)**

July 2021 - November 2021

Developed an autonomous navigation solution using computer vision and artificial intelligence to navigate from one location to another using Sensor Fusion, Localization, Path Planning, and Computer Vision knowledge. The navigation was implemented using a modified version of the A-star algorithm like segmented calculation, incremental cost back-off, minimum improvement repropagation, backtrack cost favoring, and backtrack detection and pausing.

Tech stack: Machine-Learning, Python3, Embedded Systems, Robotics, SLAM Algorithms.

### >> **Home Automation and Security System (University Minor Project)**

Feb 2021 - April 2021

Designed a home automation and security system for a smart home environment. The project involved the use of embedded systems, IoT, various sensors, and the Blynk cloud platform for the management and integration of the various components.

Tech stack: Internet of Things (IoT), Embedded Systems, Cloud Computing, Electronics.

### >> **IoT based Remote Controlled Terrestrial Robot**

November 2019 - April 2020

Precursor project to LiDAR-based Vehicle with Remote Navigation, Obstacle Avoidance, Feature Recognition, and Mapping. Used an Arduino, a custom-built Android app, and HC-05 Bluetooth serial module to build a terrestrial robot capable of being remotely controlled from a phone.

Tech stack: App Development (Android), Robotics, Embedded Systems, Electronics.

### >> **struixLang (A stack based Turing-Complete programming language)**

January 2017 - August 2020

A stack-based case-insensitive homoiconic Turing-complete toy programming language implemented in Python3. Several primitive subroutines (words) are pre-defined and mechanisms to define new user-defined words within struixLang itself are in place.

Tech stack: Python3, Algorithms, Data Structures, Compiler Design, Assembly Programming.

### >> **ShellBot (Cross platform reverse remote shell utility)**

January 2017 - August 2020

ShellBot is an advanced cross-platform Reverse Remote Shell Suite written in Python3. It relies on a client-server-controller model where a server can accept several clients at once, and relay a chosen client's shell to the controller. The program includes built-in functions to perform distributed brute-forcing/DoS attacks.

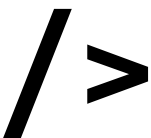
Tech stack: Python3, Networking, Cybersecurity, Operating Systems, Socket Programming.

### >> **eSpeak NG Bindings for Python3**

September 2016 - August 2020

An eSpeak NG TTS binding for Python3 with support for altering the pitch, speed, and accent. This library was a result of not finding a well-documented TTS library with the required features for Python3 for a related project.

Tech stack: Python3, Operating Systems, Natural Language Processing, Audio Processing.





## / PAPERS PUBLISHED

### >> Conference Paper for The International Symposium for Crisis Forecasting (2022)

Center for Crisis Early Warning | University of the Federal Armed Forces, Munich, Germany  
| Federal Ministry of Defense, Germany | Federal Foreign Office, Germany

Presented a research paper on "Forecasting Terrorist attacks through Artificial Intelligence: In search of a Predictive Panacea" on November 07, 2022, to members of the academia, as well as the security and military/intelligence community from around the world after being selected as the only panelist from Asia. The paper explored the usage of a machine-learning (ML) based approach to analyze Open Source Intelligence (OSINT) to determine patterns in a person's behavior and then compare it to baselines established by the person's past behavior or behavior exhibited by users in a similar demographic.

### >> Conference Paper for The International Colloquium on Modern Technologies, Political Philosophy, Social, Political and Economic Rights (2021)

The International Colloquium on Modern Technologies, Political Philosophy, Social, Political and Economic Rights | The Interdisciplinary Laboratory for Black Sea and Mediterranean Studies (ILBSEM) | Aristotle University of Thessaloniki, Greece

Presented a joint paper with Dr. Sumit Mukerji on "COVID-19: The Catalyst of Cybercrime Among Children And Youth In India And Bangladesh: A Comparative Study" on December 11, 2021, exploring the correlation between the rise of cybercrime in South Asia with more people being affected by the pandemic caused by the COVID-19 virus while going into further detail regarding the statistics around this correlation and providing hypotheses for its cause.

## / SEMINARS ATTENDED

### >> International Seminar on Clean Water and Sanitation (2017)

United Nations & UNICEF | WEBFUNA & UN Information Centre, New Delhi | Institute of Foreign Policy Studies, Calcutta University

Attended the International Seminar on Clean Water and Sanitation organized by West Bengal Federation of United Nation Association at Calcutta University.

## / NOTABLE MENTIONS

- > Completed Workshop on Ethical Hacking, Reverse Engineering & Python Programming organized by ISOEH (now known as ISOAH).
- > Attended The Kolkata Police Hackathon (2022) organized by IEM Labs.

## / COURSES

- > Ethical Hacking - IIT, Kharagpur
- > Docker for Developers and DevOps - Udemy
- > REST APIs with Flask and Python - Udemy

## / OTHER INTERESTS

- > Video Editing/Motion Graphics
- > Music Production
- > Photography
- > Script Writing/Film Direction

