Vignesh Kumar Rajavelu

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EDUCATION

PES University, Bangalore   **Expected May 2026**

Bachelor's in computer science and engineering

Courses: Machine learning, Cloud computing, Deep Learning, Generative AI, Compiler Design, Database Management Systems

SKILLS & ABILITIES

Languages: Python, C++, Java, TensorFlow, PyTorch, Scikit-learn, OpenCV, Pandas, NumPy, Matplotlib, SQL, React, Node.js, Pypspark, Kafka

Development & Tools: Git, Docker, Linux, FastAPI, Flask, AWS, Google Cloud, Firebase

Technologies: Image Processing, Big Data Analytics, Machine learning, Deep Learning, Large Language models, Web Development

WORK EXPERIENCE

SDSU Project: Structure Prediction for Complex Protein Systems (with **San Diego State University**)   **Jun 2025 – Present**

- Collaborating with Prof. Christopher Paolini on enhancing deep learning models for protein structure prediction in domains where AlphaFold struggles.
- Analyzing structural failure modes using SSNMR-aligned datasets and integrating physical constraints into model design.
- Contributing to a high-performance computing (HPC) pipeline combining deep learning, molecular dynamics simulations, and MPI-based distributed training.

Nokia Project: BTS Snapshot Analysis using Graylog (**Academic Collaboration with Nokia**)   **June 2025 – Present**

- Designing a telecom log analytics system using Graylog, Docker, and CentOS to monitor Base Transceiver Station (BTS) snapshots.
- Developing custom log ingestion and parsing pipelines to extract KPIs and identify anomalous network behavior.
- Exploring machine learning-based alerting for predictive maintenance and real-time fault classification in telecom infrastructure.

ACADEMIC PROJECTS

EmoStream: Concurrent Emoji Broadcast over Event-Driven Architecture   **Nov 2024**

- Designed and implemented a distributed real-time emoji event processing system using Apache Kafka, WebSockets, and Spark Streaming, enabling scalable event-driven architecture.
- Developed a multi-cluster data distribution pipeline with Kafka topics, publishers, and WebSocket servers, ensuring efficient real-time aggregation, processing, and client delivery.
- Integrated fault-tolerant mechanisms including Kafka persistence, WebSocket reconnection logic, and multi-subscriber redundancy, ensuring system reliability and high availability.

Criminal Database Management System   **Nov 2024**

- A full-stack Criminal Database Management System (**CDMS**) using React.js, SQL, and backend procedures to efficiently manage and track criminal records, investigations, and case details.
- Implemented database functionalities including stored procedures, triggers, and audit logging to ensure data integrity, security, and accurate tracking of modifications.
- Designed user roles and workflows for law enforcement officers, head officers, and users, enabling complaint registration, case assignment, and crime record management with authentication and role-based access.

Big Data Pipeline for Used Car Market Analysis   **May 2024**

- Designed a big data processing pipeline using Apache Spark & PySpark SQL for analyzing used car market trends.
- Performed data preprocessing, transformation, and EDA, optimizing **Spark** operations for efficient large-scale data analysis.
- Built a scalable data pipeline for structured data insights, enabling potential real-time or batch processing.

ACHIEVEMENTS/ CERTIFICATIONS

- **AWS Educate** – Getting Started with Compute
- **HackerRank** – Problem Solving (**Intermediate**) Certification
- Contributed to open-source projects under the **Google Developers Club**
- Skill-Forge (AIESEC) – Mastering the Business Spectrum.
- Led sponsorship outreach for **PES University Fest**, collaborating with multiple companies to secure **financial** sponsorships, significantly contributing to the event's success