SARTHAK PATTNAIK

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EDUCATION

Boston University Sept 2022 – Dec 2023
Masters in Applied Data Analytics, GPA: 3.80/4.00 Boston, MA

WORK EXPERIENCE

HCL America Inc. June 2024 – April 2025
Senior AI/ML Engineer Remote

- **Multimodal RAG System Architect**: Designed and deployed an enterprise-scale RAG pipeline using FAISS, integrating OpenAI and Google Gemini models to automate business process documentation, resulting in 60% reduction in manual effort and $350K annual cost savings
- **Enterprise AI Application Development**: Led the E2E development of an automated business process chatbot using Rasa, integrating with enterprise systems (SharePoint, Minio, Teams) and microservices architecture with Docker and Kubernetes.
- **Healthcare AI Innovation**: Pioneered multimodal AI analysis techniques to extract insights from pharmacovigilance reports by leveraging GPT-4o and Gemini 1.5 Pro, enabling 45% faster report processing for 65+ pharmaceutical products.
- **Model Training & Fine-Tuning**: Curated golden prompts leveraging Chain-of-Thought prompting to generate structured summaries of key metrics for exposure estimation across 65 drugs reducing hallucinations and improving response accuracy.
- **ML-Ops Implementation**: Established CI/CD workflows for ML model deployment, reducing model deployment time from days to hours and ensuring 99.9% system availability.
- **Cross-functional Leadership**: Led a team of 5 engineers and collaborated with product managers and domain experts to align AI implementation with strategic business objectives.

Metropolitan College, Boston University Jan 2024 – May 2024
Visiting Scholar Boston, MA, USA

- **Supply Chain AI Research**: Applied advanced techniques such as SMOTE and ADASYN for class imbalance mitigation in supply chain datasets, enhancing predictive model performance with 70% higher accuracy than baseline approaches.
- Explored the role of AI in key supply chain areas such as demand forecasting, inventory optimization, warehouse automation, supplier management, and risk mitigation.
- Reviewed and synthesized state-of-the-art AI techniques including Genetic Algorithms, NLP, and Blockchain for improving supply chain resilience and operational efficiency.
- **Election Analytics Innovation**: Engineered a mixed-methods forecasting framework using ARIMA and Bi-LSTM models to analyze voter turnout trends across demographic groups, enabling predictive insights into electoral participation disparities.
- Implemented Bidirectional LSTM architectures with L2 regularization and dropout layers to capture complex sequential dependencies in turnout behavior, revealing forecasted declines in swing state engagement.

Metropolitan College, Boston University May 2023 – Dec 2023
Graduate Research Assistant Boston, MA, USA

- Performed audience extension on marketing data using linear interpolation and Sequential Backward Selection, cutting CPM costs by 75%.
- Identified drivers of startup success and resilience during economic crises using AdaBoost, Support Vector Machines (SVM), and Random Forest algorithms on a startup dataset.
- Superimposed a Pareto distribution model on Boston Property data, analyzing wealth acquisition trends across 1,000,000+ properties and 5000 investors over 20 years.

PUBLICATION

1. Pattnaik, S., Pinsky, E. (2023). α-Based Similarity Metric in Computational Advertizing: A New Approach to Audience Extension. In: Zlateva, T., Tuparov, G. (eds) Computer Science and Education in Computer Science. CSECS 2023. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, vol 514. Springer, Cham. https://doi.org/10.1007/978-3-031-44668-9_1

2. Pattnaik, S., Park, K., Pinsky, E. (2024). Startups and Market Meltdowns: Understanding Survival and Success Factors in Entrepreneurial Settings. In: Rajagopal, Goncalves, M., Zlatev, V. (eds) Entrepreneurship, Innovation, and Technology. Palgrave Studies of Entrepreneurship and Social Challenges in Developing Economies. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-65314-8_15

3. Pattnaik, S.; Liew, N.; Kures, A.O.; Pinsky, E.; Park, K. Catalyzing Supply Chain Evolution: A Comprehensive Examination of Artificial Intelligence Integration in Supply Chain Management. *Eng. Proc.* **2024**, *68*, 57. https://doi.org/10.3390/engproc2024068057

4. Pattnaik, S., Pinsky, E., Park, K. (2025). The Periodic Table: Chemical Properties and Mendeleev Meets Physical Properties and Machine Learning. In: Zlateva, T., Tuparov, G. (eds) Computer Science and Education in Computer Science. CSECS 2024. Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, vol 609. Springer, Cham. https://doi.org/10.1007/978-3-031-84312-9_7

5. Pattnaik, S.; Danole, P.; Mandiya, S.; Foroutan, A.; Mashhadiagha, G.; Khanghah, Y.S.; Isazadehfar, K.; Pinsky, E. Analyzing Patterns of Injury in Occupational Hand Trauma Focusing on Press Machines: A Registry-Based Study and Machine Learning Analysis. *Eng. Proc.* **2024**, *68*, 61. https://doi.org/10.3390/engproc2024068061