Pavan Kumar Bannuru

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Profile :

- **Enterprising professional with 10+ years of industry experience, including 6+ years in Data Science, Analytics, and Project Management, specializing in Generative AI and Machine Learning.**
- **Expert in Generative AI, with hands-on experience in Retrieval-Augmented Generation (RAG), Hybrid Search, Reranking, Multi-Agent Systems, and LangGraph, developing scalable AI-driven solutions.**
- **Proficient in implementing and optimizing Machine Learning algorithms (Linear/Logistic Regression, SVM, Decision Trees, KNN, Neural Networks) and advanced statistical techniques for real-time decision-making systems.**
- **Currently leading a Generative AI project, integrating data from diverse sources into OpenSearch and developing a hybrid search and reranking system for an LLM-powered chatbot to enhance retrieval and response quality.**
- **Experienced in business operations, strategic planning, and process optimization, leveraging AI to improve efficiency and reduce losses.**
- **Skilled in translating business use cases into well-defined problem statements, identifying key data sets for predictive modeling, and delivering impactful AI solutions.**
- **Strong communicator with effective stakeholder management skills, engaging with all business levels to drive data-driven decision-making.**
- **Rich experience in project management, focusing on conceptualizing, developing, and deploying AI-powered solutions for enterprise applications.**

Skills

- **Generative AI: RAGs (Retrieval-Augmented Generation), Hybrid search, Reranking with cross-encoder, Lang Graph, Multi-agent systems, Prompt engineering.**
- **Machine Learning: Classification, Regression, SVM, K-means, PCA, Decision Trees, Random Forest, Bagging & Boosting, Recommendation Systems.**
- **Deep Learning: ANN, CNN, TensorFlow, Neural Networks, Computer Vision (VGG, Inception, ResNet, Faster RCNN, YOLO, GANs).**
- **Natural Language Processing (NLP): Transformers, BERT.**
- **Statistics: Probability, Descriptive Statistics, Hypothesis Testing, Exploratory Data Analysis.**
- **Programming: Python, SQL.**

Professional Experience

Capgemini

Role: Senior Consultant (Data Scientist)
Duration: February 7, 2024 - Present
Project: Search as a Service

- **Leading the development of Retrieval-Augmented Generation (RAG) systems** from scratch to enhance search capabilities and content retrieval.
- Architecting **hybrid search solutions**, integrating **reranking techniques** to improve response accuracy in **LLM-powered** applications.
- **Collaborating with cross-functional teams** to integrate AI-driven solutions into existing business workflows.
- Conducting research and experimentation on **multi-agent systems, prompt engineering, and knowledge retrieval** to optimize system performance.

Calcutta Electric Supply Corporation Limited

Role: Executive (Data Scientist)
Duration: March 2019 - Present

- Engaged with **business teams to identify data science opportunities**, developing AI/ML models to enhance decision-making.
- **Developed machine learning solutions** to improve operational efficiency and predict failure incidents in power distribution systems.
- Designed **recommendation systems** to optimize compliance with government norms and regulations.
- Led **data validation and quality assurance processes**, ensuring high accuracy and reliability of analytics-driven insights.

Jindal India Thermal Power Limited

Role: Engineer (Analyst)
Duration: March 2015 - March 2019

- Conducted **root cause analysis** of system failures and **optimized plant operations** using data-driven insights.
- Analysed **heat balance, generation efficiency, and equipment life expectancy** to improve plant performance.
- Assisted in **annual overhaul planning** and managed defect tracking for preventive maintenance.

Projects

Capgemini: Generative AI Implementation (Ongoing)

Tools: OpenSearch, Python, Cross Encoder, LLM
Objective: Develop a Retrieval-Augmented Generation (RAG) system for HP, enhancing content retrieval and generation.
Key Contributions:

- **Integrated multi-source data into OpenSearch, leveraging both Python-generated and native embeddings for efficient retrieval.**
- **Developed a hybrid search and reranking system using a cross-encoder model, significantly improving result relevance.**
- **Built an LLM-powered chatbot that utilizes reranked search outputs to deliver accurate, context-aware responses.**

CESC Limited: Industrial PPE Detection

- **Tools**: YOLOv8, OpenCV
- **Objective**: Detect and alert on personnel without proper PPE to prevent accidents.
- **Contribution**: Developed a detection model using YOLOv8 that identifies non-compliance and sends alerts to authorities.

CESC Limited: Soot Blowing Optimization

- **Tools**: GradientBoostClassifier
- **Objective**: Optimize boiler efficiency by scheduling periodic soot cleaning.
- **Contribution**: Created a predictive model to manage soot blowing, improving efficiency and reducing operational costs.

CESC Limited: Opacity Emission Control

- **Tools**: GradientBoostRegressor
- **Objective**: Control emissions to comply with government regulations.
- **Contribution**: Developed a recommendation system to predict and manage opacity levels, ensuring regulatory compliance.

Education

Post-Graduation in thermal power Technology **-70%** 2015

Jindal institute of Power technology, Raigarh, India.

Mechanical Engineering **-74%** 2014

Krishna Chaitanya Institute of Technology and sciences (JNTUK), India.

12th - 86% 2010

Board of Intermediate Education, Kurnool, India.