Bernard Benson

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Summary

Data Scientist with 7+ years of experience driving impactful data solutions across diverse industries, including transportation, logistics, space science, and scientific research. Proven ability to develop and deploy advanced machine learning models for predictive analytics, natural language processing, and computer vision applications. Expertise in leveraging deep learning techniques, Retrieval Augmented Generation (RAG) architectures, and time series forecasting to solve complex business challenges and optimize data-driven strategies. Proficient in Python and SQL with a strong understanding of cloud frameworks like Azure and Google Cloud.

Technical Skills

- Programming Languages: Python, SQL, C++
- Machine Learning: Supervised & Unsupervised Learning, Feature Engineering, Model Evaluation & Optimization
- Deep Learning: Neural Networks (CNNs, RNNs, LSTMs, Transformers), TensorFlow, PyTorch, Keras
- Data Analysis & Visualization: Pandas, NumPy, Matplotlib, Seaborn, Plotly, Power BI
- NLP & Computer Vision: Text Preprocessing, Sentiment Analysis, BERT, OpenCV
- Cloud & DevOps: Azure, Google Cloud Platform (GCP)
- Software Development: Git, Agile, CI/CD Pipelines, Docker, REST APIs, ETL Pipelines, Unit and Integration testing, Technical Writing

Experience

Generative AI Solutions Architect, Megan Soft VA – Remote   December 2024 – Present

- Developed an evaluation framework for generative AI chatbots and RAG systems using DeepEval and Ragas.
- Established KPIs and testing procedures to optimize performance and user satisfaction.
- Designed multi-chatbot strategies for scenarios with chatbots having overlapping capabilities.
- Streamlined evaluation workflows by integrating automated performance metrics.
- Collaborated with cross-functional teams to align AI solutions with business goals.
- Designed and implemented recommender systems for pharmacy benefits management.

Data Scientist, Tom McLeod Software Corporation – Birmingham, AL   Aug 2021 – Nov 2024

- Led the development and deployment of machine learning models that predicted freight rates for over 1,100 customers, improving pricing accuracy and efficiency.
- Reduced customer support resolution times by designing and implementing Retrieval Augmented Generation (RAG) based natural language chatbots.
- Automated document classification processes by building and deploying LayoutLMV2-based machine learning models, increasing efficiency and accuracy.
- Spearheaded the research and analysis of AI applications within the transportation and logistics industry to identify opportunities for innovation and growth.
- Represented McLeod Software as a conference speaker at various industry events, sharing expertise and insights on AI in transportation and logistics.

Applied ML Researcher, Frontier Development Lab, Remote   June 2021 – Aug 2021

- Applied machine learning techniques to analyze and model the impact of solar drag on satellite orbits as part of a NASA-sponsored research project.
- Developed a sophisticated multi-variate time series model based on deep neural network ensembles to accurately predict space weather indices.
- Collaborated effectively within a high-performing research team, resulting in a team excellence award.

Graduate Teaching Assistant, University of Alabama in Huntsville, Huntsville AL   Aug 2016 – May 2021

- Managed and supervised lab sessions for CPE211L Introduction to Programming using C++.
- Managed and supervised the EE316 Electrical Circuits and Electrical Design Lab, ensuring a safe and productive learning environment for students while providing technical assistance and guidance.

RF Engineer, Nexgen Wireless/Global Telecom Associates, Milwaukee, WI   March 2013 – March 2016
- Analyzed drive test data and network logs to identify and resolve coverage gaps and interference issues, resulting in improved network performance and customer satisfaction.
- Utilized heatmaps and coverage plots to effectively visualize network performance data, facilitating data-driven decision-making and optimization efforts.

Projects

Freight Rate Predictor
- Collected and cleaned a large dataset of historical freight rates, performed exploratory data analysis to identify key features and trends influencing freight rates and engineered new features to improve model accuracy.
- Developed and trained a gradient-boosted model, optimizing hyperparameters to achieve the best predictive performance.
- Implemented conformal prediction methods to quantify the uncertainty of rate predictions, providing more reliable and actionable insights for pricing decisions.
- Deployed the trained model as a REST API endpoint on Azure Machine Learning, enabling real-time rate prediction and integration with other McLeod Software applications.

Customer Q&A Chatbot using Retreival Augmented Generation
- Implemented a Retrieval Augmented Generation (RAG) based customer chatbot using ChromaDB to efficiently search and retrieve relevant information from the knowledge base.
- Developed prompt templates and prompt engineering using GPT-4o from Azure OpenAI.
- Developed a user-friendly chatbot interface using Streamlit, enabling seamless interaction and natural language communication with customers.
- Deployed the chatbot using Azure DevOps, ensuring continuous integration and delivery for ongoing updates and improvements.
- Monitored chatbot performance and gathered user feedback to iteratively refine the model and knowledge base for enhanced accuracy and customer satisfaction.

Driver Sentiment Analysis and Text Classification
- Implemented a driver sentiment analysis and text classification system using transfer learning.
- Fine-tuned pre-trained NLP models to detect driver sentiment and classify text messages from drivers.
- Integrated the analysis into a Power-BI dashboard for analysis and derive insights into driver behavior.

Document Image Classifier
- Created a large labeled dataset of document images, including various document types such as invoices, bills of lading, contracts, and receipts.
- Utilized a LayoutLMV2 model, a deep learning architecture specifically designed for document image understanding, to extract relevant features from the images and classify them accurately.
- Fine-tuned the LayoutLMV2 model on the labeled dataset, optimizing hyperparameters to achieve high classification accuracy and generalization.
- Deployed the trained model as a REST API endpoint on Azure Machine Learning, enabling real-time document classification and integration with other applications through a Streamlit interface.

Timeseries Forecast of Solar Cycle 25 Using Deep Neural Networks
- Collected historical data on solar activity, preprocessed and analyzed the time series data, identifying patterns, trends, and seasonality to prepare it for model training.
- Designed and implemented a hybrid deep learning model combining WaveNets and LSTMs to capture both the long-term dependencies and complex temporal dynamics of solar activity.
- Trained and evaluated the model using various performance metrics, comparing its predictions to actual solar cycle data and optimizing hyperparameters for improved accuracy.

- Generated forecasts and visualized the model's predictions and compared them to historical trends to communicate the expected solar activity and potential impacts.

Education and Certifications

University of Alabama in Huntsville, Ph.D. in Electrical and Computer Engineering — Aug 2016 – May 2021

University of Alabama in Huntsville, M.S in Electrical and Computer Engineering — Jan 2011 - Dec 2012

Geethanjali College of Engineering and Technology, B. Tech in Electrical and Electronics Engineering — Sept 2006 - May 2010