Erica **Brooks**

Data Scientist | Machine Learning Engineer

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Summary

Master's in Data Science (May 2025) with hands-on experience building and deploying ML systems using LLMs, Whisper, Docker, and GCP. Strong background in software validation, model deployment, CI/CD pipelines, and cloud infrastructure. Passionate about ethical AI, autonomous agents, and reinforcement learning.

Skills

Programming	Python, R, SQL, SAS, LaTex
Packages	NumPy, Tensorflow, Keras, PyTorch, Pandas, Matplotlib, Plotly, Scipy, Librosa, Whisper, SciKit-Learn
Tools	VSCode, RStudio, Github, AWS, GCP, Jupyter(Anaconda), Milvus VDB, Docker, PowerBI, Tableau
Machine Learning	NLP, Linear/Logistic Regression, Decision Trees and Forests, Support Vector Machines, Transformers, Gradient Boosting Machines, Clustering (K-means, KNN, DBSCAN), Principal Component Analysis (PCA)
Deep Learning	LLMs, Convolutional Neural Networks (CNN), Recurrent Neural Networks (RNN), Generative Adversarial Networks (GAN), Reinforcement Learning (RL)
Core Competencies	Machine Learning and AI Algorithms | Data Science and Statistical Analysis | Software Validation and Compliance | System Performance Optimization and Cross-Functional Team Collaboration | Training and Mentorship | Data Engineering | Digital Transformation and Automation | Natural Language Processing | Project Management Leadership | Cloud Computing and Infrastructure Management | Model Deployment and Scaling, Standard Operating Procedures (SOPs) Development

Professional Experience

Bausch + Lomb

Greenville, SC

Quality Software Specialist

Safeguard the accuracy and compliance of computerized laboratory systems through meticulous data evaluations and rigorous validation techniques. *Oct 2019 - Present*

- Developed and validated automated systems under regulatory compliance frameworks (GxP, FDA 21 CFR Part 11).
- Led digitization efforts across lab systems, increasing workflow efficiency and data integrity.
- Implemented deployment processes and change management pipelines for validated software systems.
- Experience with cross-functional teams and documentation that mirrors ML model governance in regulated environments.
- Drafted, updated, and refined Standard Operating Procedures (SOPs), validation protocols, user requirements, and memos by following strict adherence to industry best practices.

Bausch + Lomb

Greenville, SC

Associate Trainer III

Trained and mentored new associates in the operational procedures, product knowledge, and quality standards in line applicable compliance with regulatory requirements and company policies. *Jul 2014 - Oct 2019*

- Developed and launched video training programs, resulting amplifying team engagement and knowledge retention, leading to improved training efficiency and reduced on-boarding time.
- Drafted and enforced e-learning materials for site and departmental use, aimed at streamlining training processes and improving accessibility for remote and in-person employees.
- Revamped and updated the training process, integrating multimedia content to accommodate diverse learning styles and improve overall training effectiveness.
- Cut training time through the creation of streamlined by keenly focus on training materials, resulting in improving learning retention and reducing on-boarding duration.

Siemens (BASF Chemical Company)

Anderson, SC

Additional Experience:

Lead Computer Operator II *Sept 2005 - Nov 2013*

- Oversaw system performance and application batch processing, resolving hardware failures and initiating system restores.
- Managed operations in the LAN/Server room, ensuring seamless system functionality and infrastructure reliability.
- Diagnosed and resolved system failures, proactively addressing issues that impacted business productivity.
- Optimized batch job schedules and performed database and file restores, ensuring efficient operations and data integrity.

Projects | Research

Voice Biometric Authentication GitHub | Journal | Youtube

Author | Capstone Project

- Implemented a voice biometric authentication system, enhancing user interactions by personalizing and streamlining device experiences.
- Developed a multi-modal, web-based UI for seamless data capture, integrating voice print data for real-time authentication and validation.
- Integrated Milvus VDB for efficient storage and retrieval of voice prints, optimizing system performance and scalability.
- Utilized advanced tools (Librosa, Milvus, Docker, Whisper LLM) and published findings in the SMU Data Science Journal Review, contributing to innovations in biometric authentication.
- Containerized the full application using Docker, enabling consistent and reproducible environments across development and deployment stages.
- Deployed the application to Google Cloud Platform (GCP) using Cloud Run, ensuring secure, scalable, and serverless execution of the authentication service.
- Configured CI/CD pipelines and environment variables for smooth deployment and automated updates via GCP.

Aligning AI Models with Human Values Youtube

Machine Learning 2 (class) Project

- Investigated the alignment of AI models with human values through direct evaluator feedback, optimizing human-AI interaction.
- Demonstrated Reinforcement Learning with Human Feedback (RLHF), detailing its role in refining AI decision-making and ethical alignment.
- Analyzed the application of Proximal Policy Optimization (PPO) to improve AI performance through effective learning strategies.
- Integrated RLHF and PPO methodologies to enhance AI model behavior, ensuring the models more accurately reflect human preferences.

Dense Neural Network for Predicting Class GitHub

Quantifying the World (class) Project

- Developed a binary dense neural network classifier to predict outcomes from a moderate-size dataset, improving classification accuracy.
- Applied advanced data preprocessing techniques, optimizing dataset quality for more precise model evaluation.
- Constructed a PyTorch-based feed-forward neural network model, delivering exceptional prediction performance.
- Designed a custom cost function to account for business impact, prioritizing the mitigation of misclassification risks and enhancing decision relevance.

Education

Southern Methodist University *Dallas, TX*

M.S. in Data Science, **GPA:** 3.6 *2023 - 2025*

East Tennessee State Uiversity *Johnson City, TN*

B.S. in Computer Science, Minor in Management *2002 - 2005*

Licenses + Certifications

Project Management Institute *National*

Project Management Professional, PMP *April 2022 - April 2028*