

# Sai Dhiren Musaloji

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## EDUCATION

- **New Jersey Institute of Technology** - *Master of Science in Data Science* Conferred: May 2025 | GPA: 3.85/4.0
- **Mahatma Gandhi Institute of Technology** - *B.Tech. in Electronics Engineering* Conferred: Jun 2023 | GPA: 3.0/4.0

## CERTIFICATIONS

- Microsoft Certified: Azure Data Scientist Associate
- Microsoft Certified: Azure AI Engineer Associate

## TECHNICAL PROFICIENCIES

- **Programming Languages:** Python, R, SQL, Java, Bash
- **Machine Learning Libraries:** Scikit-learn, TensorFlow, PyTorch, Keras, XGBoost, MLlib
- **Natural Language Processing:** Hugging Face Transformers, BERT, LSTM, Graph Neural Networks (GNNs),
- **Distributed Systems & Big Data Technologies:** Apache Spark, Hadoop, MapReduce, AWS Elastic MapReduce
- **Cloud Infrastructure & DevOps:** AWS (EC2, S3, SQS, Rekognition), Google Cloud Platform, Microsoft Azure, Docker, Kubernetes, MLflow, GitHub Actions (CI/CD), Apache Oozie, Snowflake, Jenkins
- **Data Visualization Tools:** Tableau, Power BI, Matplotlib, Seaborn, Plotly
- **Database Systems:** MySQL, PostgreSQL, Microsoft SQL Server
- **Architectural Specializations:** Design and implementation of ETL pipelines, modular microservice architectures, and cloud-native scalable platforms

## PROFESSIONAL EXPERIENCE

- AI Engineering Intern** — *Tech Mahindra, Makers Lab* — Pune, India Oct 2023 – Jan 2024
- Engineered natural language processing pipelines for linguistically underrepresented languages in collaboration with a cross-disciplinary team of AI researchers.
  - Developed and deployed a hybridized regular expression-based classification schema to sanitize a corpus exceeding 1 terabyte, resulting in a 20% reduction of toxic content and a commensurate enhancement in downstream model generalizability.
  - Delivered iterative technical briefings and maintained comprehensive documentation to support reproducibility and integration within enterprise deployment ecosystems.

## RESEARCH & DEVELOPMENT PROJECTS

- Spatiotemporal Forecasting of Urban Traffic Networks** — *ARIMA, LSTM, GNN, PCA, t-SNE, PEMS-BAY Dataset*
- Engineered a fusion architecture incorporating autoregressive forecasting, deep sequential modeling, and graph-structured learning to model both temporal trends and topological interactions within urban traffic systems.
  - Applied unsupervised dimensionality reduction to optimize sensor network inputs from 325 nodes, expediting model training while preserving variance and inter-node correlation.
  - Evaluated system resilience under data sparsity, quantifying performance across multi-horizon prediction intervals under peak and off-peak traffic dynamics.
- Advanced Generative and Reinforcement Learning Systems** — *PyTorch, GANs, Diffusion Models, BERT, RL Algorithms*
- Constructed diffusion-based generative models and adversarial networks for synthetic image generation under stochastic constraints; leveraged parallel computing strategies to optimize model convergence time.
  - Fine-tuned transformer-based architectures (e.g., BERT) and applied custom actor-critic and policy gradient-based RL agents for language modeling, control tasks, and reward-optimized prediction.
  - Conducted cross-domain evaluation across NLP and vision tasks using F1, BLEU, ROUGE, and RL-specific reward baselines, evidencing a 12% performance gain on standardized metrics.
- High-Availability Financial Analytics System** — *Flask, MySQL, JavaScript, CI/CD, Docker*
- Designed and implemented a transactional analytics system for real-time banking operations, with focus on fraud detection, session integrity, and throughput under concurrent loads.
  - Architected a responsive dashboard integrated with anomaly detection pipelines and time-series trend mapping, containerized via Docker for environment portability.
- Distributed Recognition Engine Using Cloud-Native Paradigms** — *AWS EC2, SQS, S3, Rekognition*
- Developed an asynchronous pipeline for image and text recognition, integrating decoupled AWS components with stateless compute strategies to ensure 99.9% uptime.
  - Configured dynamic scaling and resiliency features through visibility timeout calibration, message deduplication, and fault-tolerant retry mechanisms.
- Parallelized ML Pipeline for Oenological Forecasting** — *Apache Spark, AWS EMR, Docker, Python*
- Constructed a distributed learning system for predicting wine quality using Spark clusters deployed on AWS EMR, leveraging partitioned data and in-memory caching to enhance training speed by 60%.
  - Implemented autoscaling, alerting, and performance logging to support high-throughput batch inference with optimized cloud resource utilization (92% average).