Rohit Vernekar

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Education

Rutgers University — New Brunswick, NJ, USA
Master of Science in Data Science – GPA: 4.0/4.0 — *Expected Dec. 2024*

Visvesvaraya Technological University — Belagavi, KA, India
Bachelor of Engineering in Computer Science – GPA: 8.55/10.0 — *Jul. 2019*

Experience

Lutron Electronics — Philadelphia, PA, USA
Data Engineering Intern — *Jun. 2024 – Aug. 2024*

- Developed a serverless streaming pipeline with **Amazon Kinesis** and **Firehose** to optimize log processing and retention.
- Automated ETL using **AWS Glue** and **Redshift**, improving query performance and reducing processing costs by 80%.
- Used Infrastructure as Code (**IaC**) with **CloudFormation** and **Terraform** to efficiently manage pipeline infrastructure.
- Created **QuickSight** dashboards, reducing **New Relic** telemetry costs by 75% and enabling more advanced visualizations.

Aera Technology — Pune, MH, India
Machine Learning Engineer — *Jan. 2021 – Aug. 2023*

- Built an ML deployment pipeline using **Redis** as a message broker for seamless model deployment on **Kubernetes**, with a web service for API interaction, supporting both real-time and batch inference.
- Reduced ML model deployment time by 95%, from 10 minutes to 30 seconds, by integrating pre-built **Docker** images.
- Developed an **Autosklearn**-based framework that autonomously generates optimal ML models for varying datasets, enhancing model accuracy and reducing development time.
- Built a data validation and drift detection system to continuously monitor and ensure the performance of ML models, which helped maintain model accuracy and reliability over time.
- Created a high-performance asynchronous task execution framework, using **Redis** as a message queue for inter-process communication, reducing resource usage by 75%.

Tata Consultancy Services — Pune, MH, India
Systems Engineer — *Jul. 2019 – Jan. 2021*

- Built an interactive dashboard framework for automotive software components using **Matlab**, enhancing system monitoring and reducing debugging time by 30%.
- Automated Matlab model testing and report generation with **GitLab-CI**, reducing testing time by 15 minutes per model and accelerating project delivery. Received On-the-Spot award for outstanding project impact.

Intern — *Jan. 2019 – Mar. 2019*

- Implemented a Spatio-Temporal Autoencoder to detect anomalous patterns in video data, improving the accuracy of anomaly detection in client projects.
- Designed a real-time 3D visualization system using three.js, enhancing object movement analysis for client applications.

Projects

Unconditional Diffusion Modeling for Time Series Applications | *Python, Pytorch*

- Implemented TSDiff, an unconditional diffusion model for time series forecasting, refinement, and data generation.
- Analyzed TSDiff's self-guidance mechanism for task conditioning during inference.

Optimizing Ranking Algorithms for Retrieval-Augmented Generation (RAG) | *Python, Pytorch, Transformers*

- Implemented TSDiff, an unconditional diffusion model for time series forecasting, refinement, and data generation.
- Analyzed TSDiff's self-guidance mechanism for task conditioning during inference.

Data Alignment for Enhanced Decision-Making | *Python, Pytorch, Transformers*

- Developed strategies to improve document retrieval quality for open-domain question-answering in RAG systems.
- Experimented with various ranking algorithms to enhance responses' overall performance and relevance in generation tasks.

Time Series Analysis with Conformal Prediction | *Python, Yahoo Finance APIs*

- Built a forecasting tool using Conformal Prediction, improving uncertainty estimates for stock market predictions.
- Used quantile regression to improve prediction accuracy by leveraging temporal dependencies in financial data.

Autonomous Traffic System | *Python, OpenCV, Flask, HTML, CSS*

- Built a real-time traffic light control software with image processing, reducing traffic congestion by 15% in simulations.
- Awarded "Best Final Year Project" for technical innovation and societal impact.

Technical Skills

Languages: Python, R, Java, C/C++, Bash, PowerShell

Databases: SQL (MySQL, Amazon Athena and Redshift), NoSQL (Neo4j, MongoDB, Redis)

Machine Learning & AI: Ensemble Methods (Bagging, Boosting), AutoML (Auto-sklearn), Deep Learning (TensorFlow, PyTorch), Natural Language Processing (spaCy, NLTK, LLMs, LangChain, OpenAI API, Hugging Face Transformers).

Cloud and Infrastructure: AWS (ECS, S3, Lambda, Glue, Kinesis, Firehose, CloudFormation, Step Functions, Firelens), Microsoft Azure, Docker, Kubernetes, Jenkins, Gitlab-CI, Github Actions, Terraform, Apache Spark

Software and Libraries: Numpy, Pandas, Scikit-learn, XGBoost, Flask, Celery, OpenCV, YOLO, Three.js, Celery

Data Visualization: Matplotlib, Seaborn, Plotly, Amazon Quicksight, Tableau, New Relic