

Nikita Ravi

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WORK EXPERIENCE

Salesforce | Software Engineer AI/ML

July 2024 – Current

- Developed and trained a **Multinomial Naive Bayes** classifier using **scikit-learn** to predict the appropriate Milvus collection for document retrieval based solely on customer queries, **achieving 88% precision** and improving query-to-collection mapping accuracy.
- Integrated a **Human-in-the-Loop** feedback loop to validate model predictions with customers and built a **continuous retraining pipeline**, enabling the classifier to learn from user-confirmed corrections over time.
- Initiated and launched a **RAG pipeline** for the network troubleshooting agent, implementing data ingestion, vectorization using dense and sparse embeddings, and **hyperparameter optimization** across index types, search modes, distance metrics, and hybrid re-ranking algorithms — improving **retrieval accuracy to 94%** and **demoed during the organization's town hall**.
- Architected a **multi-agent supervisor** framework via **LangGraph/LangChain**, coordinating sub-agents for **retrieval** and **quantitative analysis**, enabling natural language data access without manual filtering or complex queries.
- Coordinated with **cross-functional teams**, including EinsteinGPT, to identify and **resolve critical bugs** in the latest LangChain–OpenAI integration, restoring **system stability** and ensuring seamless SDK compatibility.
- Enhanced EinsteinGPT's extensibility by enabling **proxy request handling** and **implementing tool binding support**, improving SDK onboarding for remote hosts and accelerating new feature development.

Salesforce | Software Engineer Intern

June 2023 – August 2023

- Engineered and preprocessed **domain-specific** network monitoring data to create **high-quality training and validation datasets** for model fine-tuning.
- Fine-tuned and optimized a pre-trained causal LLM** using **HuggingFace** for question answering on Salesforce's internal network health data, improving response quality and model alignment.
- Performed **extensive hyperparameter tuning and optimization**, achieving a **92.85% accuracy** on held-out validation data and enhancing reliability for internal diagnostic queries.

Salesforce | Software Engineer Intern

May 2022 – August 2022

- Processed and cleaned raw network configuration files to remove non-informative parameters, **improving downstream feature quality**.
- Transformed configurations into **numerical TF-IDF vectors** and **trained a K-Means clustering model** using **scikit-learn** to **detect devices with anomalous configurations** indicative of misclassification.
- Performed dimensionality reduction** using **PCA** to visualize clustering results in 3D, enabling clear identification and validation of outlier devices.
- Deployed** the resulting product, now actively used by network engineers to **detect configuration anomalies** across diverse network devices.

Lenovo | DevOps Engineer Intern

June 2021 – August 2021

- Built and **fine-tuned a spaCy Named Entity Recognition (NER) pipeline** to automatically **detect and redact** Lenovo's confidential information and customer PII (e.g., emails, phone numbers, device IDs) from JSON datasets.
- Developed a Python-based **anonymization framework** with **data preprocessing, rule-based entity labeling, and ranking logic** to customize redaction severity, **reducing manual sanitization time from 1 week to under 15 minutes**.
- Enhanced model performance** and interpretability by implementing **iterative training with SGD optimization, dropout regularization, and F1-score evaluation**, achieving reliable entity detection across large-scale production data.

Lenovo | Data Science Engineer Co-Op

January 2020 – August 2020

- Performed **data analysis** using **SQL** to **detect anomalies** in parts records, such as inconsistent manufacturer entries, **improving data quality** and enabling more **accurate reporting** across procurement systems.
- Engineered **automated ETL pipelines** to extract, transform, and load customer support and operational data into **analytics-ready tables**, improving data accessibility and report generation efficiency.
- Trained and evaluated a **supervised Decision Tree model** using **scikit-learn** to predict customer support case resolution outcomes with **99% accuracy**, enabling proactive issue management and data-driven service improvements.

RESEARCH EXPERIENCE

SERIS Lab | Research Assistant

August 2023 – May 2024

- Reproduced the TRUNK model's **PyTorch training pipeline** on **EMNIST** and **SVHN**, identifying major reproducibility gaps such as the $85.77\% \rightarrow 63.62\%$ drop on EMNIST and revealing dataset-dependent instability.
- Performed a **CIFAR-10 sensitivity analysis**, showing accuracy shifts from $67.6\% \rightarrow 63.8\%$ due to volatility-threshold changes, **quantifying** the model's non-determinism.
- Developed and published a **reproducibility framework** that provides a concrete, reproducible solution for reliable model reproduction.

Probabilistic and Understandable Machine Learning Lab | Research Assistant

January 2022 – May 2022

- Constructed a **StarCraft II Benchmark dataset** that is easily accessible and useable for ML projects.
- Trained the **ResNet-18 Network** using **PyTorch** to predict the number of casualties from a specific frame of the game.

PUBLICATIONS

N. Ravi, A. Goel, J. C. Davis, G. K. Thiruvathukal, "Improving the Reproducibility of Deep Learning Software: An Initial Investigation through a Case Study Analysis", [Link]

A. Goel, C. Tung, N. Eliopolous, N. Ravi, N. Synovic, I. Ahlgren, J. West, G. K. Thiravathukal, J. C. Davis, Y.-H. Lu, "Advancing Low-Power Computer Vision at the Edge", [Link]

B. Chou, P. Jajal, N. J. Eliopoulos, T. Nadolsky, C.-Y. Yang, N. Ravi, J. C. Davis, K. Y.-J. Yun, Y. Lu, "A Musician's Muse: Detecting Performance Errors with Transformers", AAAI Submission, [Link]

PROJECTS

Computer Vision Pipeline for the Lunar Rover

August 2022 – December 2022

- Developed **end-to-end computer vision pipeline** using **PyTorch**, integrating **DeblurGAN-v2**, **Detectron2**, and **UnetXST** networks to transform front-facing lunar surface images into bird's-eye-view perspectives, achieving **97.62% categorical accuracy** and **0.88 Mean IOU** for autonomous rover navigation.
- Implemented **semantic segmentation** model using Detectron2 Mask R-CNN to identify lunar surface features (rocks and pebbles) with **95% average precision**, enabling obstacle detection for NASA Lunabotics competition.

Text Classification of Short Sentences

August 2021 – December 2021

- Re-implemented **STCKA** deep learning model for short text classification using **PyTorch**, by coding **BiLSTM** layers, **self-attention**, and **knowledge-powered attention mechanisms** from scratch, achieving **92.63% accuracy** and **0.92 F1-score** on ambiguous sentence classification.
- Experimented with CNN vs. linear network architectures, systematically converting all fully-connected layers to convolutional layers and benchmarking performance across 5 trials, **discovering 31% faster training time with linear networks** while **CNNs improved precision by 0.2%**

SKILLS

Programming Languages: Python, SQL, Java, C, MATLAB, LATEX

Machine Learning: PyTorch, Scikit-Learn, HuggingFace, Langchain, LangGraph, OpenCV, Pandas, Numpy

Tools: Git, Jenkins, Linux, MySQL, Milvus, Redis, Elasticsearch, Cassandra, Weights and Biases, SLURM, FastAPI

Languages: English, Japanese (JLPT N2), Telugu

EDUCATION

Purdue University

August 2022 - May 2024

M.S. Computer Engineering

Purdue University

August 2018 - December 2022

B.S. Computer Engineering

COURSEWORK

Courses: Artificial Intelligence, Computer Vision, Deep Learning, Statistical Machine Learning, Natural Language Processing, Python for Data Science, Data Structures and Algorithms, Object Oriented Programming in Java, Differential Equations, Linear Algebra, Quantum Computing

Awards: Dean's Honor List, Semester Honors