Anuj Patel

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Education

New York University **Sep 2023 – May 2025**

Master of Science in Electrical Engineering (GPA: 3.8/4.0) *New York, NY*

- Coursework: Machine Learning, Deep Learning, Big Data, Probability & Stochastic Processes, High Performance Machine Learning, Computer Vision, Wireless Communications, Digital Signal Processing, Internet Architecture & Protocols
- Graduate Teaching Assistant: Fundamentals of Communication Theory

Vellore Institute of Technology **Jul 2019 – May 2023**

Bachelor of Technology in Electronics and Communication Engineering (GPA: 9.16/10) *Vellore, India*

Technical Skills

Programming: Python, MATLAB, R, C++, Java, Bash, SQL, LabVIEW
Technologies: Pytorch, TensorFlow, Keras, NumPy, Pandas, Scikit-Learn, matplotlib, Apache Spark, Hadoop, HDFS, Hive, Apache Kafka, Airflow, PostgreSQL, NoSQL, CosmosDB, MongoDB, CI/CD, CUDA Programming, MLOps, ETL, Kubernetes, Docker, AWS, Azure, BigQuery, Google Cloud, 5G Protocols, TCP/IP, Tableau, Git, Linux, Distributed and Parallel Systems, MS Office

Professional Experience

Johnson & Johnson **Jun 2024 – Aug 2024**

Data Science Intern *New Brunswick, NJ*

- Engineered a ML model to predict tissue seal cycle average burst pressure, achieving an R^2 value of 0.77 and an improvement of 17% in model accuracy compared to baseline methods.
- Boosted predictive accuracy by 40% using ensemble methods and classical models on complex dataset with electrical and experimental parameters along with thermograms of the surgeries.

Indian Space Research Organization (SAC) **Dec 2022 – May 2023**

Quantum Communications Researcher *Ahmedabad, India*

- Automated polarization component analysis and characterization for a QKD testbed, reducing manual intervention by 85% via custom Python and C++ scripts.
- Improved convergence time for evaluating multiple predictive models by 50% by optimizing polarization error correction using advanced SU(2) transformation gadgets.
- Designed and implemented a robust end-to-end wireless communication channel for free space BB84 QKD using NI USRP, achieving BER of $10E-10$ and correlation of 0.8.

Indian Oil Corporation Ltd. **May 2022 – Jul 2022**

Network Intern *Vadodara, India*

- Reduced MPLS and SD-WAN routing speeds by 20% by identifying bottlenecks through a smart data center survey and exploring ways to traverse data via alternate paths.

Projects

Efficient Federated Learning using Gradient Pruning and Adaptive Methods | *Python, PyTorch* **Sep 2024 - Dec 2024**

- Pioneered an efficient FL framework with gradient-based pruning and adaptive federated optimization to mitigate I/O overheads, cutting training time by 22% and boosting model generalization in distributed systems.
- Increased bandwidth efficiency by 143% using gradient compression techniques and mix-precision training, ensuring accuracy on ResNet models with PyTorch DDP, DeepSpeed and Hugging Face Accelerate.

Transformer-Based Multi-Modal Emotion Recognition System | *Python, PyTorch, OpenCV* **Sep 2024 - Dec 2024**

- Enhanced a transformer based framework for emotion recognition, achieving 33.96% top-1 and 98.13% top-5 precision on RAVDESS data integrating both facial and vocal cues.
- Applied advanced modality fusion techniques with feature extraction and preprocessing pipelines, processing 4,000+ video and audio signals to improve robustness in noisy/incomplete datasets.

RecommenderX: Movie Recommendation System with NCF | *Python, PyTorch, PySpark, SQL* **Sep 2024 - Dec 2024**

- Built and deployed a scalable movie recommendation system using NCF, achieving 50% Hit Ratio on MovieLens 1M with distributed Spark processing and SQL integration for data warehousing.
- Streamlined a 1M-record data pipeline with preprocessing, negative sampling, SQL-driven backend, and a Streamlit frontend, reducing recommendation retrieval time by 33%.

Publications

- Apurva Patel, **Anuj Patel**, Dhruva Uplap. "Intelligent Road Illumination Network using IoT" (2022). International Journal for Research in Applied Science & Engineering Technology (IJRASET) (ISSN: 2321-9653). link
- **Anuj Patel**, A V Vamsi, Dhruva Uplap, G Sai Ritish. "Automated Toll Collection System with Vehicle Categorization and Enhanced Security" (2022). International Research Journal of Engineering and Technology (IRJET), vol. 09, issue 10, (e-ISSN: 2395-0056). link