Arpit Patil

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Education

M.S. in Computer Science (ML), Stevens Institute of Technology, Hoboken, NJ — GPA: 3.75/4.00
Courses: Deep Learning, NLP, Applied Machine Learning — Sept 2024 – Dec 2025

Technical Skills

- **Programming Languages**: Python, Matlab, C/C++, GNU Octave, SQL, Java, LaTeX, HTML/CSS.
- **Machine Learning**: TensorFlow, Scikit-learn, Keras, and Deep Learning - CNN, LLM, NLP
- **Databases/libraries**: NumPy, Pandas, SeaBorn, Matplotlib, Dash, Folium, Scikit-learn, DB2, MySQL.
- **Tools/Technologies**: Jupyter Notebook, Anaconda Navigator, Jira, Power BI.

Experience

Co-Founder — July 2023 – June 2024
Electrify Mobility: Enhancing Mobility & Independence – Mumbai, IN — link

- Developed RF based electro-mechanical (IoT) device centralizing vehicle controls for drivers with lower limb disabilities.
- Led e2e development, across technical architecture, financial planning, team coordination, and firmware engineering.
- Secured **₹5L ($6,000)** funding under the NIDHI PRAYAS scheme of Govt. of India for the development of prototype.
- Delivered a functional prototype tested in real-world conditions, enabling future commercialization with **Ferro-Equip**.

Research Intern — Jan 2023 – July 2023
Indian Institute of Technology Bombay (IIT-B) – Mumbai, IN — link

- Built open-source co-simulation framework with FEMM 4.2 and Octave for steady-state analysis in EV machine design.
- Implemented numerical solvers in Octave for EV circuits with non-linear cores, achieving convergence in **<20 iterations**.
- Optimized simulation runtime by 35% via image-based FEMM caching strategy within GNU Octave-FEMM integration.
- Extended framework for simulating transformers and motors, achieving **<8% deviation** across test cases against ANSYS.

Projects

ARQIVE: Audit Report Query & Insight Vector Engine

- Developing an AI-based system to parse and query audit documents, achieving **92%** semantic match accuracy using BERT.
- Reduced about **65%** manual audit review time through the real-time, section-specific answers to natural language queries.
- Built scalable backend (FLASK) and frontend UI (Streamlit), providing multi-document indexing with sub-400ms latency.

Questify: Hybrid NLP Question Answering System

- Fine-tuned RoBERTa model on SQuAD, with **15%** accuracy gain via optimized tokenization and confidence thresholding.
- Integrated RoBERTa with LLaMA generative fallback for low-confidence queries, increasing answer coverage by **30%**.
- Applied softmax-logit multiplication and uncertainty quantification for dynamic model selection across 10k+ validations.

CardioCare: Cardiovascular Anomaly Detection — link

- Developed an anomaly detection machine learning model to diagnose abnormalities in heart pulse using ECG Waveform.
- Achieved **95%** classification accuracy for the prototype using Random Forest and CNN models on the PTBDB dataset.
- Built a pipeline with missing value handling, Z-score scaling, and PCA reduction (65% reduction, 95% variance retained)

Qubit Play: Quantum Gaming Platform — link

- Developing the Quantum Chess and Particle Puzzle game, using quantum principles like Superposition and entanglement.
- Used Next.js, TypeScript, and Tailwind CSS, to achieve sub-500ms load times and 99.9% uptime via Vercel deployment.
- Integrated NextAuth.js for secure, session-based authentication, enabling personalized user experience progress tracking.

Patents & Publications

Electrify Mobility: Enhancing Mobility and Independence — Patent No.: 202421034129

German Utility Model: Ein Automobi-elektrisiertes Mobilitätssteuersystem — Grant No.: 202024102302.1