# Mohammad Ayaan Khan

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## Education

**University of Southern California** — Los Angeles, CA
*Master of Science in Computer Science; CGPA: 3.50/4.00* — *Aug. 2025 – Present*

**Manipal University Jaipur** — Jaipur, Rajasthan
*Bachelor of Technology in Electronics and Communication; CGPA: 3.54/4.00* — *July 2020 – Oct. 2024*

- Honored with Dean's List recognition twice

## Professional Experience

**Central Research Laboratory (Bharat Electronics Limited)** — Ghaziabad, Uttar pradesh
*Research Trainee, Dept. of Artificial Intelligence* — *March 2024 – July 2024*

- Engineered a ResNet-18 classifier processing **65M+** AIS positional records across **6,042** vessels to automate surveillance, achieving **81%** accuracy and eliminating manual analysis
- Architected a MongoDB geospatial pipeline with PyMongo indexing to handle AIS transmissions per vessel per minute, reducing trajectory query latency to under **3 seconds**
- Devised a Folium-based trajectory visualization system generating **400+** georeferenced maps across **4 time intervals** to enable pattern recognition for illegal fishing detection
- Improved model performance by building a PyTorch data augmentation pipeline that expanded the dataset **5x** and raised validation accuracy from **68%** to **81%** over 30 epochs

**Indian Institute of Information Technology Nagpur** — Nagpur, Maharashtra
*Research Intern, Dept. of Computer Science* — *June 2023 – Jan. 2024*

- Designed a multimodal sentiment classifier to overcome text-only sentiment limitations, fusing **CNN-BiLSTM** text models with **ResNet-18** image features, achieving **94.65%** accuracy
- Built a sentiment analysis pipeline for high-volume social media data, processing **1.6M** tweets using **GloVe embeddings** and **CNN-BiLSTM** models to achieve **92.8%** accuracy
- Optimized a movie-review sentiment classifier by tuning **TF-IDF** features and **SVM kernels**, reducing model bias and achieving **91.5%** precision with **8.5%** error
- Accelerated deep-learning experimentation by using GPU training, optimized batching, and parallel model evaluation to shorten training cycles and speed up iteration

## Academic Projects

**Skin Disease Classification**

- Constructed a lesion-analysis pipeline using **K-Means segmentation** to suppress boundary noise, improving ROI clarity by **35%**
- Fused **ResNet** and **Inception** features through a **Fuzzy-CNN**, achieving **91%** accuracy and **28%** improvement over baselines
- Validated the model on real-world images with varied lighting and skin tones, maintaining performance within **±4%** variance

**Tire Wear Prediction**

- Developed a tire-degradation pipeline with **32%** signal improvement via feature engineering on F1 telemetry dataset
- Mitigated error rates by **27%** and attained **88%** prediction accuracy using a **hybrid XGBoost-LSTM**
- Generated real-time tire-wear alerts up to **12 laps** in advance, supporting safer driving performance decisions

**Driver Behavior Analysis**

- Collected and processed a novel dataset of gyroscope and accelerometer samples from on-road smartphone sensors
- Identified risky driving patterns with **92%** accuracy using Random Forest and SVM models on IMU time-series data
- Reduced false detections by **18%** via feature threshold refinement, sustaining **±5%** performance consistency across drivers

## Technical Skills

- **Languages**: Python, C++, Java, C, JavaScript, SQL, HTML/CSS
- **Machine learning & AI**: Deep Learning, Computer Vision, NLP, Reinforcement Learning, Data Mining
- **Frameworks & Libraries**: TensorFlow, Keras, PyTorch, Scikit-learn, Pandas, NumPy, Flask
- **Developer Tools**: Docker, Git, GitHub, VS Code, Google Cloud Platform (GCP), AWS

## Additional Experience

**SmartInternz** — Jaipur, Rajasthan
*Salesforce Developer* — *May 2023 – July 2023*

- Implemented **Apex/Visualforce** features supporting **3–4** internal workflows, reducing manual data handling
- Streamlined **10+ Salesforce Object Query Language** queries with validations to improve response time and data integrity
- Resolved **Salesforce automation** and **integration** issues across modules, improving system stability