ANISH AMBRETH

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SUMMARY

Researcher with strong foundations in probability, statistics and machine learning. Experienced in Federated Learning, Agentic AI and predictive modeling.

EDUCATION

Mohamed bin Zayed University of Artificial Intelligence (MBZUAI), UAE — *Aug 2024 – May 2026*
M.Sc. in Machine Learning — GPA: 3.95/4.00

- Fully funded scholarship from the UAE government
- Thesis: Adversarial Robustness in Federated Learning

Indian Institute of Technology (IIT) Hyderabad, India — *Aug 2020 – May 2024*
B.Tech in Mathematics & Computing and Engineering Sciences — GPA: 3.42/4.00

PUBLICATIONS

1) Tameem, B.*, **Anish, A.***, Nils, L. (2026). Collaborative Threshold Watermarking. *Accepted for publication at ICML 2026. (∗ equal contribution).*

2) **Anish, A.**, Naveen, k., Mohsen, G. (2026). Client-Level Defense Placement for Adversarially Robust Federated Reinforcement Learning. *Under review at TMLR'26*

3) **Anish, A.**, Naveen, k., Mohsen, G. (2026). Strategic Client-Level Defense Placement in Mobile Federated Learning. *Under review at Mobihoc'26*

4) **Anish, A.**, Naveen, k., Mohsen, G. (2026). OTPA: Optimal Transport-Based Model Alignment Poisoning in Mobile and Edge Federated Learning. *Under review at Mobihoc'26*

TECHNICAL SKILLS AND COURSEWORK

- **Core:** Python, NumPy, pandas, scikit-learn, PyTorch
- **Statistics & Math:** Probability theory, statistical inference, regression, hypothesis testing, optimization, numerical methods
- **Tools:** Jupyter, Git, Docker, SQL

PROFESSIONAL EXPERIENCE

ML Quantitative Research Intern – Vatic Labs (UAE) — *Jan 2026 – Apr 2026*

- Developed a research pipeline for alpha factor mining from raw order book data using a multi-agent system to generate candidate predictive signals.
- Incorporated generated factors into predictive models, including Linear models, TCNs and LSTMs, and tested their impact on historical forecasting performance.
- Supported the buildout of an end-to-end systematic trading research workflow, from signal generation to model evaluation, with future extension toward execution.

ML Quantitative Research Intern – Standard Chartered (UAE) — *Jul 2025 – Aug 2025*

- Predictive models for FX rate dynamics (PKR, INR, NPR), focusing on robustness.
- Engineered and evaluated feature sets derived from market and competitor pricing data to support return-sensitive pricing decisions.

Research Intern – Dubai Health (UAE) — *Apr 2025 – Jul 2025*

- Developed and deployed a **lightweight snoring detection** algorithm on ESP Sense for sleep monitoring, using signal processing and ML to infer events directly on-device.
- Achieved **99% reduction** in storage/processing and **50% lower** power consumption compared to phone-based app approaches, enabling scalable, cost-effective deployment.
- Worked with clinicians and engineers to **align model behavior with medical requirements**, presenting findings in an accessible, non-technical way.

Data Science Intern – ADNOC (UAE) — *Jan 2025 – Mar 2025*

- Built forecasting and scoring models on heterogeneous time-series and textual data to rank emerging technologies.
- Designed evaluation metrics and validation schemes to reduce noise and bias in model-driven rankings.
- Automated feature extraction and scoring pipelines, reducing manual analysis time by 90%.

Machine Learning Intern – Proshort (India) — *Jun 2024 – Aug 2024*

- Fine-tuned and quantized LLMs (LLaMA-3-8B, Phi3-mini-128k-Instruct) in PyTorch, tracking experiments with Weights & Biases to systematically optimize quality and latency.
- Deployed models using **Docker** and **FastAPI**, integrating RAG pipelines to improve response quality and accuracy by **30%**, evaluated with ROUGE-2 and human feedback.
- Designed and optimized **LangGraph-based workflows** and user session management, improving conversation continuity and robustness in production.

Software Developer Intern – **Denso International** (India) *May 2023 – Jul 2023*

- Built ECU data analysis software for Suzuki Motors to process and visualize error codes, **reducing manual analysis effort by 70%**.
- Developed an application for **ADAS data collection**, integrating camera and GPS streams for synchronized viewing and diagnostics, improving debugging efficiency for engineering teams.

Research Intern – **Santa Fe Research** (India) *May 2022 – Sep 2022*

- Optimized vehicle routing using **OR-Tools** with time, capacity, and dimensional constraints, integrating 3D bin packing to improve logistical efficiency.
- Formulated and solved operations research problems with a focus on **scalable, algorithmic decision-making** in real-world routing scenarios.

PROJECTS

Quantitative Reasoning for Text-to-Image Generation

- Curated a benchmark dataset to evaluate **quantitative reasoning** (counting, proportionality, fractions) in text-to-image diffusion models.
- Fine-tuned Stable Diffusion XL with **LoRA** and **DPO**, improving quantitative faithfulness in generated images; analyzed performance across multiple prompt categories.

Quantitative Analysis of Time Series Methods Performance

- Modeled and forecasted volatility and price dynamics of Gold, S&P 500, and Bitcoin using ARIMA, LSTM, XGBoost, and Prophet.
- Engineered lagged, rolling, and volatility-based features; evaluated models using MAE, RMSE, and stability across regimes.
- Analyzed bias–variance tradeoffs and robustness of models under non-stationary conditions.

Study of Differential Equations in Fluid Dynamics and Solute Dispersion

- Developed and analyzed partial differential equation models for fluid flow and solute dispersion.

POSITIONS OF RESPONSIBILITY

Graduate Assistant – MBZUAI (UAE) *Aug 2025 – Oct 2025*

- Assisted faculty with course and lab delivery, including content preparation, assignment support, and grading logistics.
- Helped organize and evaluate examinations, ensuring consistency and fairness across students.

Basketball Team Lead *Aug 2020 – Present*

- **Team Lead** | Led IIT Hyderabad team to nationals, securing 4th place twice out of 23 teams.
- **Team Lead** | Leading MBZUAI team in competitions, coordinating training, strategy, and team dynamics.

VOLUNTEER EXPERIENCE

- **Well-being Coordinator** – Hosted events with 300+ attendees, fostering student well-being and engagement. *Aug 2024 – Present*
- **Cultural Events Coordinator** – Organized Diwali celebration for 200+ international students, showcasing culture and building community. *Oct 2024 – Nov 2024*