Anurag Jain

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EXPERIENCE

Undergraduate ML Researcher April 2025 - Present
University of Alberta, AB.

- Developed a **Gym-compatible Skat game environment** and implemented policy gradient models using Transformers.
- Integrated batched rollouts and trajectory-based sampling to improve training stability in **imperfect information game settings**.
- Working with C++ - based solver and Java frontend to bridge environment logic with custom model pipelines.

Founder & Developer April 2025 - Present
CodeNeuron, AI/ML Learning Platform

- Built an **interactive web-based platform** to help students practice and learn AI/ML through **real-world coding problems, auto-evaluated solutions, and concept walkthroughs.**
- Designed and implemented a cloud-native backend using **Node.js, Firestore, and Docker** to support real-time code evaluation and ML problem solving.
- Engineered an **isolated sandbox environment** for secure execution of Python code using **containerized microservices**.
- Integrated a real-time in-browser IDE with **backend APIs and authentication services**, enabling seamless user interaction and extensible system design for AI/ML problem-solving.
- Deployed evaluation **pipelines on Google Cloud (GCP)** with **CI/CD** (Docker + GitHub Actions) for automated code testing and scalable execution.

Machine Learning Intern January 2025 - April 2025
PCL Construction, Edmonton, AB.

- Developed ML models analyzing **BIM data** to predict spatial relationships (Training Acc: 98.21%, Test Acc: 95.17%).
- Implemented **Python data preprocessing workflows** (Pandas, IFCOpenShell).
- Created **graph-based probabilistic models** (Train F1: 0.92, Test F1: 0.81), validating effectiveness with 692 training and 288 testing true positives supporting efficient construction planning.

Software Developer Intern May 2024 - August 2024
PaySpaze, San Francisco, USA

- Developed and deployed **two cross-platform Flutter applications** for iOS and Android.
- Implemented secure **digital authentication** methods, managing **end-to-end development** from design to deployment.

EDUCATION

University of Alberta, *Edmonton, Alberta, CANADA* Expected Graduation: 2026

- Bachelor of Science - Computing Science, Specialization
- **Achievements:** Dean's Honors List 2024, 2025
- Coursework: **Artificial Intelligence, Machine Learning,** Deep Learning, Reinforcement Learning, Data Science, Visual Recognition.

PROJECTS

Vision Transformer (ViT) and Image Captioning with GPT-2 September 2024

- Built **ViT** achieving **80% test accuracy (CIFAR-10)** with advanced training pipeline (augmentation, cosine LR, early stopping).
- Developed **ViT+GPT-2** captioning system for **Flickr8k**, fine-tuned **HuggingFace models (BLEU 0.06).**

Object Detection and Semantic Segmentation on MNIST October 2024

- Built and trained a **UNet-based model** for **object detection** and **semantic segmentation** on noisy, overlapping digit images.
- Achieved **94% accuracy**, **82% Intersection over Union (IoU)** for detection, and **75% segmentation pixel accuracy** on test sets.
- Tuned hyperparameters and optimized performance on **Google Colab GPUs**, handling class imbalance, visual occlusions robustly.

Generative Models on FashionMNIST November 2024

- Designed and evaluated **VAE**, **DDPM**, and **DDIM** models from scratch to generate **class-conditioned FashionMNIST images**.
- Achieved up to **86% classification accuracy** on generated samples using a pre trained classifier, meeting rigorous quality targets.
- **Implemented training pipelines** with model checkpointing, data padding to **32×32**, cosine noise scheduling, and gradient clipping.
- Leveraged **U-Net architectures** for noise prediction in diffusion models and employed **sinusoidal embeddings** for time-step encoding, improving sample diversity and realism.

TECHNICAL SKILLS

Programming Languages: **Python,** C++,Java , CSS, Dart, Flutter, HTML, Assembly, JavaScript, React Native, MySQL.
Tools & Technologies: **Matplotlib, SciKit-Learn, TensorFlow**, OpenAI Gym, GCP, Scipy, PyTorch, OpenCV, Pandas, Auth0, Figma, RISC-V, TypeScript, Firebase, Docker.