ANIMESH MITTAL

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EXPERIENCE

Frankfurt Institute for Advanced Studies (FIAS) — **Frankfurt, Germany**
Machine Learning Researcher — Goethe Research Experience Program (fully funded) — *May 2026 – Sep 2026*

- To predict four psychopathology factor scores from resting-state EEG of **~3,155 subjects** (**HBN-EEG**, 11 BIDS releases, 128-channel nets at 100 Hz), built a PREP-style **MNE / mne-bids** preprocessing pipeline (bad-channel interpolation, re-referencing, adaptive bad-span rejection) on **SLURM** arrays with idempotent atomic writes, cleaning **2,842 recordings at a 98.3% success rate**.
- To make model comparisons leakage-free and repeatable, architected the training stack in **PyTorch Lightning, Hydra, and MLflow** with pluggable regression/classification/autoencoder strategies and release-level **subject-disjoint splits**; a recording-grouped sampler **kept RAM flat**, and a pytest suite covers configs, splits, and training.

Alberta School of Business, University of Alberta — **Edmonton, AB**
Machine Learning Research Assistant — Sports Analytics — *Oct 2025 – Apr 2026*

- To quantify how defensive pressure changes the value of each on-ball action, built a possession value model on **816K events from 323 elite matches** (2 World Cups, 4 Euros, Bundesliga; StatsBomb 360), engineering **13 tactical features** (pressure, ray-cast passing lanes, packing, defensive shape) into a calibrated, monotone-constrained **XGBoost** model.
- Ranked players by **value added under pressure**; trained a spatio-temporal **GATv2 + Transformer** graph network on HPC GPUs.

Alberta School of Business, University of Alberta — **Edmonton, AB**
Machine Learning Research Assistant — Patent Similarity — *May 2025 – Aug 2025*

- To support similarity analysis across 50 years of USPTO claims and summaries (1976–2025, **over 500M rows**), architected a pipeline converting raw TSVs into curated per-year samples (**1M rows/year**) with tolerant parsing, normalized patent IDs, and deterministic naming, **eliminating schema errors** and enabling reliable cross-dataset joins.
- Computed pairwise text similarity at scale, using sparse **TF-IDF** via batched CSR dot products (**~5B pairs per batch**) and dense **BERT** embeddings via cosine similarity, with atomic writes and automated manifests that make every run **reproducible**.

PCL Construction — Industry Capstone, University of Alberta — **Edmonton, AB**
Machine Learning Researcher — *Jan 2025 – Apr 2025*

- To beat a rule-based baseline at inferring connectivity in Building Information Models (BIM), built a graph-learning pipeline (candidate-edge generation, sub-node reconstruction) and trained **GCN, GAT, and GraphSAGE** with variational Bayesian calibration, raising **recall-weighted F2 from 0.69 to 0.91 (+32% relative)**.
- Automated the clash-detection workflow, **eliminating a manual annotation stage**; co-authored "Predicting Connectivity in Graph-Based BIM Using Neural Networks" (UAlberta repository, 2025).

LuxeVeda — **Remote**
Software Engineer Intern — *Jun 2024 – Aug 2024*

- To grow engagement and conversion on the e-commerce site, refactored checkout and account flows across a **MongoDB / Express / Vue / Node (MEVN)** stack, lifting site engagement **+29%** and conversion **+15%**.
- To gate purchases for compliance, implemented **Passport.js** authentication with a U.S. government member-verification integration, enabling orders from **100+ countries**.

PROJECTS

Wireframe AI — Text-to-CAD Jewelry Engine | *React, Node.js, Firebase, Gemini, OpenCascade, WebAssembly, Three.js* *2025 – Present*

- Built an end-to-end **AI pipeline** that turns plain-English requests into manufacturable 3D jewelry models; the LLM predicts **about 15 design parameters** instead of raw shapes, so every model has real-world measurements.
- Built a **Gemini LLM service** on Firebase Cloud Functions with schema-enforced JSON output and automatic fallback across **up to 6 models**, verified by **52 automated tests**.
- Cut stone-weight estimation error **from 25% to under 2%** across 7 cuts; with **OpenCascade, WebAssembly, and Three.js**, 3D previews render in the browser in **under 1 second**, with no server cost for 3D work.

EDUCATION

University of Alberta — **Edmonton, AB**
B.Sc. Computing Science (Specialization) | *GPA: 3.7 / 4.0* — *Graduated May 2026*

- Certificates in Innovation & Entrepreneurship and Data Science. Dean's List 2025; Faculty of Science Scholarship (2×); Education Abroad Scholarship. **Head Peer Tutor**, Academic Mentorship Program (Sep 2024 – Apr 2026), mentoring **50+ students per semester**.

TECHNICAL SKILLS

ML & Data: PyTorch, PyTorch Lightning, PyTorch Geometric, TensorFlow, scikit-learn, NumPy, Pandas, MNE-Python, BERT/Transformers, TF-IDF, Graph Neural Networks (GCN/GAT/GraphSAGE), Matplotlib, Seaborn
Languages: Python, Java, TypeScript, JavaScript, C, SQL (PostgreSQL, MySQL), HTML, CSS
Cloud & Tools: Google Cloud (Cloud Run, Functions, Tasks, Storage), Docker, Hydra, MLflow, SLURM, Git, CI/CD, Vercel, Figma, R
Web & Backend: React, Vue.js, Node.js, Express, REST APIs, Three.js, Tailwind CSS, Firebase, MongoDB, WebAssembly