Jacob Dugan

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Education

University of Edinburgh Sep 2024 – Sep 2025
MSc, Artificial Intelligence *Edinburgh, UK*

– Designed an end-to-end NLP/ML pipeline (feature extraction→aggregation→calibration) with strict temporal CV and robust leakage audits; delivered calibrated, interpretable predictions.

Pepperdine University Dec 2023
BA, Economics — Minor in Data Science, Magna Cum Laude, GPA 3.71 *Malibu, CA*

Experience

Research Assistant — Medical Imaging Sep 2023 – Apr 2024
Pepperdine University *Malibu, CA / Remote*

– Built a 3D Variational Autoencoder (TensorFlow/Keras) to synthesize cerebral-angiogram volumes, scaling a 50-scan dataset to 1,000+ to enable lab-scale training and validation.

Keck Scholars Fellow — Geospatial ML May 2023 – Aug 2023
Keck Data Science Institute *Malibu, CA*

– Engineered a national routing pipeline (Python/Docker, OpenStreetMap + openrouteservice) computing 84k tract→hospital travel times (∼110M lat-lon pairs) and shipped an interactive Mapbox choropleth highlighting rural/low-income gaps.

Projects

Graph Recommendations — Heterogeneous GNN Spring 2025

– Extended a state-of-the-art graph recommender (RecipeRec) with tag nodes & nutrition features: added 500 tags + 500,000 recipe-tag edges; trained on URI-Graph (7,958 users; 68,794 recipes; 8,847 ingredients; edges: 135k UR, 647k RR, 463k RI, 146k II); improved ranking: Hit@10 0.449→0.471 (+4.9%), NDCG@10 0.316→0.331 (+4.8%) (PyTorch Geometric; HGAT + SetTransformer).

Computer Vision Segmentation — Oxford-IIIT Pet Spring 2025

– Benchmarked 4 approaches (UNet, autoencoder, CLIP (ViT-L/14), prompt-guided) on ∼7.4k images / 37 classes; expanded Train/Val 3,681→40,480 via probabilistic augmentations (geometric/photometric/elastic; test 3,711 held out unaugmented); CLIP-based ranked #1 across metrics and remained robust under perturbation tests; trained with Cross-Entropy + Dice (PyTorch).

Sequence Tagging — BIO-Constrained NER Fall 2024

– Built an embedding-based tagger with Viterbi decoding to enforce 100% BIO legality; improved date-span boundary coherence vs. a most-frequent baseline (PyTorch).

Technical Skills

Languages: Python (proficient) · SQL (basic) · Bash (basic)

ML Frameworks: PyTorch · PyTorch Geometric · torchvision · OpenCV · Hugging Face Transformers · scikit-learn · XGBoost · TensorFlow/Keras

Data & MLOps: NumPy · Pandas · time-series & spatiotemporal analytics · Matplotlib/Plotly · Docker · Git · AWS (S3, EC2) · CUDA

Publications & Honors

Dugan J. *et al.* "Mapping Accessibility Differences of Acute Stroke Centers in the United States." *Stroke* — International Stroke Conference, Abstract #5200 (2024).

Keck Scholars Fellowship — Level 1 research grant, $13.5k (2023).