# Cashel Fitzgerald

cashel@utexas.edu linkedin.com/in/cashelfitzgerald github.com/CashelF cashel.dev

## Education

**Cornell University, NYC — Master of Engineering in Computer Science (GPA 4.06)** *2025 – 2026*
**University of Texas at Austin — B.S. in Electrical & Computer Engineering (GPA 3.8)** *2021 – 2025*

## Experience

**Modern Intelligence** **March 2025 – Present**
*Machine Learning Engineer Intern* *Austin, TX*

- Engineered a distributed training pipeline (AWS multi-node) processing 10M+ custom-labeled frames, utilizing knowledge distillation to compress state-of-the-art transformers for edge deployment.
- Fine-tuned large-scale transformer detectors (Co-DETR, RF-DETR) on custom aerial datasets, achieving 0.47 mAP and optimizing inference latency by 30% via operator fusion and BF16 quantization.
- Built a pre-label script linking our Deformable DETR model to Encord for auto-annotations, cutting labeler workload

**8am (formerly AffiniPay)** **May 2024 – August 2024**
*Software Engineering Intern* *Austin, TX*
*Provider of advanced payment processing and project management solutions for professional services firms.*

- Key contributor to the technical system design that guides the evolution of how AffiniPay bills merchants ($300M+ annual revenue, $20B+ yearly transactions) using event-driven architecture.
- Created event reactor for Java service to consume Kafka events with merchant data and update billing accounts.
- Implemented major behavioral change to Scala microservice to handle HTTP redirects and upload external files to S3.
- Built microservice to propagate Kafka partition and offset info, enabling async event tracing through the API gateway.

**Favor Delivery** **June 2023 – August 2023**
*Software Engineering Intern* *Austin, TX*
*On-demand delivery platform connecting customers to efficient delivery services from their favorite local businesses.*

- Implemented a real-time metrics tracking system using Micrometer, Prometheus, and Grafana for integrated merchants.
- Automated error monitoring with cross-service alerts, reducing integration failure lead time by 99.3%.
- Refactored the merchant POS system integrations logging infrastructure, enhancing efficiency and maintainability.

**Voyant** **May 2022 – August 2022**
*Software Developer Intern* *Austin, TX*

## Extracurriculars and Projects

**Activities**: Texas Luminescence (Director of Engineering), Sanger Learning Center Calculus Tutor, IEEE @ UT

**Agentic Knowledge Graph Framework** | *Python, LangChain, Neo4j, LLMs* **January 2026**

- Architected an autonomous agent system capable of grounding LLM actions via a procedural Knowledge Graph, enabling complex multi-step desktop automation.
- Implemented a Graph-RAG pipeline to retrieve structured context for reasoning, significantly reducing hallucination rates in few-shot imitation learning tasks.
- Designed a shared workflow memory system, allowing agents to generalize learned tasks across different environments.

**Test-Time Speaker Adaptation in VSR** | *Transformers, Computer Vision, Multimodal* **December 2025**

- Built a hypernetwork to output per-sample, gradient-free LoRA for speaker adaptation in visual speech recognition.
- Integrated adapters into the frozen conformer achieving a 4.1% relative WER reduction with zero test-time fine-tuning.

**PageFox** | *Flask, SQL, React Native, Linear Contextual Bandits, Recommendation System* **July 2024**

- Designed multi-layered architecture (data models, services, API, client), enabling scalable recommendation serving.
- Created a relational database using MySQL with SQLAlchemy ORM, enabling efficient data management and retrieval.
- Built a contextual-bandit recommendation system with modular ranking pipeline; dynamically adjusted recommendations based on user interaction signals, improving click-through proxy metrics.

**Vision-Based RL Agent in Minecraft** | *Deep Q-Learning, Deep Q-Networks, Bootstrapping, Self-Play* **March 2024**

- Engineered an autonomous agent using Deep Q-Networks (DQN) to map raw pixel inputs to tactical actions in a 3D environment; implemented self-play and custom reward shaping to achieve high-performance reactive combat behaviors.

## Technical Skills

**Languages**: Python, Java, C++, Scala, SQL, JavaScript, HTML/CSS, R
**ML Concepts**: Computer Vision (ViT, DETR), Agentic AI, Knowledge Distillation, Graph RAG, Reinforcement Learning (DQN, DDPG, PPO, Self-Play), NLP, Transformers, Edge Computing, Optimization
**Frameworks/Infra**: PyTorch, TensorFlow, Docker, Kubernetes, AWS (EC2, S3, EFS, Lambda), Kafka, LangChain, Neo4j, Numpy, Pandas, Flask, MongoDB, Linux, Unix, ReactJS, React Native, Spring, REST, Grafana, SciKit Learn, MySQL, ONNX, Hugging Face Transformers, BigQuery, Accelerate, TensorRT, Optuna