**George Hu**

Machine Learning Engineer

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**Experience**

**PathAI** July 2022 – July 2023

*Machine Learning Engineer II*

* Spearheaded development of multi-resolution FCN dense tissue segmentation model for Ulcerative Colitis histology. Integrated model outputs with human interpretable features for GNN prediction of clinical remission for healthcare settings, achieving an **89%** macro-F1 for sub-score prediction, outperforming pathologist consensus metrics by **9%**.
* Instituted distribution matching techniques and platform tooling to ensure company-wide domain generalization of clinical metadata in model training and analytical validation.
* Expanded annotation QC tools through weak supervision and model-in-the-loop pipelines.
* Coordinated partnership with FNIH Biomarkers Consortium on UC mucosal healing.

**Viasat** May 2021 – May 2022

*Machine Learning Engineer / Machine Learning Engineer Intern*

* Headed development of action detection algorithms for surveillance videos using 3D-CNNs. Employed optical flow and transfer learning, achieving a mean AUC-ROC of **93%**, enabling real-time detection of common tasks.
* Enhanced tracking and re-identification methods by adding deep learning-derived robust feature mapping.
* Streamlined training and deployment pipelines with MLFlow and Kubernetes (Argo).

**PayPal/Honey** June 2020 – Aug 2020

*Software Engineer Intern*

* Modularized networking sections of the Honey iOS app using Apollo GraphQL and Swift Package Manager.
* Developed a redesign of the Honey Gold section of the iOS app with Swift MVVM.

**Projects**

**Joint-Predictive Pretraining Enables Stain Invariance in Pathology** Aug 2023 – Present

*MARVL Lab, SAIL, Mentors: Professor Serena Yeung and Dr. Jeff Nirschl*

* Devised state-of-the-art paradigm for domain-aware self-supervision on vision transformers base upon I-JEPA and DINOv2. Incorporated masked-autoencoding and Fourier mixing to enable generalization over stains and histological features in digital pathology.
* Curated million-scale tissue dataset in PyArrow to facilitate downstream analysis.
* Evaluated approach on instance segmentation for Alzheimer’s Disease biomarkers, requiring only sparsely annotated data and improving upon previous works by **22% mAP**.

**Deformable 3D Human Mesh Recovery via Feature Upsampling** Mar 2024 – Present

*MARVL Lab, Mentors Professor Serena Yeung and Zeyu Wang*

* Established novel methodology on subpixel-precision 3D recovery of human meshes using deformable attention on semantic-aware super-resolution of transformer features.
* Applied methods to representative in-the-wild and synthetic scenes, reaching an average mesh vertex error of 75 mm, a **decrease of 5.1 mm** compared to traditional methods.

**Contrastive Learning with Generative Flows for BERT** Jan 2023 – Apr 2023

*NLP Course Project, Mentors: Professor Chris Manning*

* Pioneered self-supervision method combining MirrorBERT and BERT-flow to learn a generative flow model regularized by contrastive span-masking training objectives.
* Improved unsupervised semantic similarity on STS benchmark by **47.9%** over baseline BERT.

**Education**

**Stanford University ‘24**

*M.S CS, AI Specialization*

GPA: **4.04/4.3**

Coursework:

* 3D Computer Vision
* NLP + ASR
* DL for Biomolecules
* Algorithmic Fairness
* Large Scale Data Mining

**Brown University ‘22**

*B.S. Applied Math + CS*

GPA: **4.0/4.0**

Coursework:

* AI/ML/Deep Learning
* Modern Deep RL
* DL in Genomics
* Algorithmic Analysis
* Advanced Prob/Stat

*Teaching assistant for multiple AI courses*

Awards:

* 2nd Place Citadel Summer Invitational Datathon

**Skills**

Programming:

Python, C/C++, Java, JavaScript, Swift

Frameworks:

*----------- AI/ML -----------*

PyTorch/TF/JAX, LangChain, HuggingFace, Lightning, Pandas, Spark, Hydra, W&B, OpenCV, WebDataset, TorchScript

*---------- General ----------*

Git, Unix, Docker, Kubernetes, SQL, AWS/GCP/Azure, DVC