Frank Yu

M.Sc. Computer Science Student

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Education

Sept.2020 – Feb.2023 **University of British Columbia**, *MSc in Computer Science*
GPA: 96.8%
Major Scholarships: NSERC CGS-M ($17,000), BCGS ($15,000)
Advisor: Professor Helge Rhodin
Areas of Interest: Computer Vision, Neural Rendering, 3D Vision, 3D Pose Estimation, Deep Learning

2015 – 2020 **University of Manitoba**, *BSc in Electrical Engineering with Distinction*
Standing: #1 in Electrical Engineering
Total Scholarship Value: $\$72,850$
Awards Faculty of Engineering Medal in Electrical Eng., President Scholar, Dean's Honor List
GPA: 4.47/4.50
Concentration: Power and Energy Systems Engineering
Capstone Project: "Smart DC Solar Lighting Enclosure for Microgrid Applications"

Work Experience

Oct.2022 – Jan.2023 **Student Researcher @ Google (Project Starline)**
Hosts: Lynn Tsai, Osman Ulusoy

June.2022 – Sept.2022 **Research Intern @ Google (Project Starline)**
Lynn Tsai, Osman Ulusoy

Publications

WACV 2023 **Low-Latency Novel View Synthesis by Neural Caching and Implicit Warping**
Frank Yu, *Sidney Fels, Helge Rhodin*

NeurIPS 2021 **A-NeRF: Surface-free Human 3D Pose Refinement via Neural Rendering**, *Poster*
Shih-Yang Su, **Frank Yu**, *Michael Zollhoefer, Helge Rhodin*
Paper — Project Page

CVPR 2021 **PCLs: Geometry-aware Neural Reconstruction of 3D Pose with Perspective Crop Layers**, *Poster*
Frank Yu, *Mathieu Salzmann, Pascal Fua, Helge Rhodin*
Paper — Code

ECCV 2020 **Few-Shot Scene-Adaptive Anomaly Detection**, *Spotlight Paper*
Yiwei Lu, **Frank Yu**, *Mahesh Kumar Krishna Reddy, Yang Wang*
Paper — Code

Research Experience

June.2021 – Dec.2021 **Research Assistant at University of British Columbia**
Supervisor: Professor Helge Rhodin

- Designed, implemented, and tested an end-to-end deep learning-based pipeline for efficient, low-latency neural rendering for use in telepresence applications
- Developed a novel neural rendering technique that warps previously cached neural network features to reconstruct images at the current timestep
- Achieved >60% reduction in latency with minimal degradation in reconstruction quality

Jan.2021 – June.2021 **Research Assistant @ University of British Columbia**
Supervisor: Professor Helge Rhodin

- Re-implemented state-of-the-art 3D human pose detection pipelines for processing numerous datasets
- Participated and provided feedback in the design of the overall neural rendering pipeline
- Utilized and scripted Blender to automate the process of capturing 3D character motion sequences from multiple cameras

Apr.2020 – Sept.2020 **Visiting Researcher @ University of British Columbia**
Supervisor: Professor Helge Rhodin

- Research focused on improving state-of-the-art performance in 3D human pose estimation
- Investigated the potential shortcomings of Spatial Transformer Networks (STNs) and how to overcome them using a combination of deep learning and traditional computer vision techniques
- Designed and conducted experiments to evaluate the effectiveness of removing perspective distortions from input modalities.

Sept.2019 – Mar.2020 **Undergraduate Research Assistant @ University of Manitoba**
Supervisor: Professor Yang Wang

- Trained an anomaly detection model to detect people falling in RGB-D data
- Created a custom data loader for performing meta-learning training
- Implemented, trained, and tested a meta-learning approach for scene adaptive anomaly detection in videos

Teaching Experience

May.2021 – Jun.2021 **TA for CPSC 340 - Machine Learning and Data Mining**

- Led and created materials for weekly and final exam tutorials to further examine and clarify topics taught throughout the course. Assisted in grading course assignments and the final exam.

Coursework/Projects

Fall 2020 **CPSC 533R - Topics in Computer Graphics/AI**, *Grade: 96%*

- Focused on state-of-the-art and influencial contributions to the fields of computer vision and graphics using deep learning
- **Course Project**: Leveraged course knowledge and current SOTA research to develop and train a model to perform physically accurate video prediction using VAEs and contrastive learning.

Winter 2021 **CPSC 532S - Topics in Artificial Intelligence**, *Grade: 100%*

- Focused on applying state-of-the-art deep learning techniques (CNNs, GANs, and Transformers) on multimodal data using PyTorch
- **Course Project** Designed and implemented a pipeline that uses transformers, CNNs, and GANs to generate sign language videos given a multilingual natural language input

Winter 2021 **CPSC 533V - Learning to Move (Reinforcement Learning)**, *Grade: 95%*

- Course on advanced/recent methods for reinforcement learning, with an emphasis on how to leverage these techniques for robotics and animation.
- **Course Project** Using PyTorch, we trained adversarial agents in a multi-agent tag-like setting using reinforcement learning to observe any emergent behavior.

Skills

Python, PyTorch, Jax, Deep Learning, Computer Vision, Neural Rendering, 3D Vision

Honors and Awards

2020 Faculty of Engineering Medal in Electrical Engineering — *Highest Standing in Elec. Eng.*
2019 IEEEXtreme 24-Hour Programming Competition — *1st U of M/6th Canada*
2019 IEEE Winnipeg Section Prize for B.Sc. Design Project — *3rd Place*