Frank Yu

M.Sc. Computer Science

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Education

2020 – 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
Thesis: Explicit and Implicit Warping for Accurate Human Pose Estimation and Low-Latency Neural Rendering

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
GPA: 4.47/4.50

Work Experience

June.2022 – Jan.2023 **Google (Project Starline)**, Research Intern/Student Researcher
- Researched deep learning-based models to advance the future of telepresence

Publications

WACV 2023 **Scaling Neural Face Synthesis to High FPS and Low Latency by Neural Caching**, *Poster*
Frank Yu, *Sidney Fels, Helge Rhodin*
Paper — Project Page

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

Demos

SIGGRAPH Asia (XR) 2022 **TeleViewDemo: Experience the Future of 3D Teleconferencing**
Kaseya Xia, **Frank Yu**, *Beibei Xiong, Emily Jia, Rosaline Baek, James Gregson, Xingzhe He, Helge Rhodin, Sidney Fels*
Paper

Research Experience

June.2021 – Dec.2021 **Research Assistant at University of British Columbia**
Project: Low Latency Neural Rendering

- 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 at University of British Columbia**
Project: Articulated Neural Radiance Fields (NeRFs)

- Reimplemented 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 at University of British Columbia**
Project: 3D Human Pose Estimation

- 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 at University of Manitoba**
Project: Video Anomaly Detection

- 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

Spring 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