Peter Kim

Canadian Citizen | Korean F-4 Visa | Toronto, ON

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Experience

3DII — Seoul, South Korea
Research Engineer — Apr 2024 – Present

- Achieved **<1 cm accuracy using only 5 images** for foot reconstruction by incorporating DUSt3R into a Python pipeline for multi-view 3D modeling.
    - Achieved **9× resolution upscaling without fine-tuning**, for DUSt3R's transformer using a novel positional encoding adaptation derived from LLM research by Meta—endorsed by the model's primary author.
    - Implemented a credit card segmentation method using YOLO to achieve scale rectification.
- **Reduced implant surgical planning time by 4x** by automating the planning process.
    - Trained and deployed a 3D volume segmentation model for CT scans and developed a panoramic curve detection algorithm (**Ongoing 100% success rate for 600+ mandibular surgical cases**). Iteratively made the panoramic curve detection algorithm **25x faster** by using OpenMP and refactoring the code. **Reduced GPU memory consumption by 50%** during post-processing of the segmented volume with minimal impact on execution time.
    - Designed, trained, and deployed a diffusion model for missing-tooth filling by integrating image data with depth maps using ONNX and C++.
- Engineered a transformer-based deep learning model to segment partial oral mesh scans.

Software Engineer — Oct 2023 – Mar 2024

- **Reduced image annotation time by 50%** by creating a 2D data-labeling tool with Segment Anything Model.
- Architected an iOS app using Swift and Firebase based on the Model-View-View-Model design pattern to streamline image capture for a 3D teeth reconstruction pipeline, significantly increasing data acquisition efficiency. Integrated YOLO via CoreML to automatically filter out low-quality images, further enhancing data quality for downstream processing.

Synaptive Medical — Toronto, Canada
Optics Engineer — May 2018 – Sep 2019

- Conducted analysis of intraoperative optical parameters to optimize search space and improve instrument performance.
- Identified optimal horizontal disparity configurations across various optical settings, enhancing imaging system accuracy.
- Developed and executed optical test protocols to determine minimal stray light angles and assess temperature impacts on imaging quality.

Projects

Monocular Human Pose Estimation — Sep 2022 – Apr 2023

- Implemented a CNN-based deep learning pipeline for 3D human pose estimation.
- Reverse-engineered NVidia's "Physics-based Human Motion Estimation and Synthesis from Videos" by relaxing rigid assumptions, adapting the technology for real-world applications.
- Applied noise filtering, Catmull-Rom spline fitting for robust post-processing and integrated physics-based optimization using RBDL, cvxopt, and Pybullet to boost model reliability.

Skills

Languages: Python, C++, Swift | **Frameworks:** Pytorch, ONNX Runtime

Education

University of Toronto
Master of Engineering, Computer Engineering. **3.66/4.0**

University of Toronto
Bachelor of Applied Science, Mechanical Engineering. **3.74/4.0**
Dean Honour's List