HO WAI CHEUNG, ARTHUR

Machine Learning Engineer

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PROFILE SUMMARY

Current Machine Learning Engineer in the Film and Visual Effects (VFX) industry at Framestore. Previously worked as a Computer Vision Research Engineer at iProov conducting research on biometrics and facial anti-spoofing. I hold an MSc from University College London with a focus on Computer Vision and am passionate about its real-world applications. Proficient in Python, C/C++, and JavaScript, with hands-on experience using tools such as PyTorch, OpenCV, Pandas, Three.js, and WebGL. My research interests include Neural Rendering, Photorealistic 3D Reconstruction, Object Detection, Image-to-Image Translation, GANs, etc.

EDUCATION

University College London   *Sep 2021 - Oct 2022*
MSc Computer Graphics, Vision and Imaging   Grade: Distinction (75%)   *United Kingdom*

The University of Manchester   *Sep 2016 - Oct 2020*
BSc Computer Science   Grade: First Class Honours (73%)   *United Kingdom*

WORK EXPERIENCE

Framestore   *Sep 2023 - Present*
Machine Learning Engineer   *London, United Kingdom*

- Conduct research in digital human creation including face age transformation, face detection and landmark localization, face recognition, face swapping, image relighting, semantic segmentation, etc.
- Develop machine learning algorithms and integrate them into the film production pipeline.
- Evaluate the performance of different state-of-the-art deep learning models.
- Prepare training data including data cleaning, preprocessing, and create custom datasets for training.

iProov   *Jun 2022 - Oct 2022*
Computer Vision Research Engineer   *London, United Kingdom*

- Conducted research in facial anti-spoofing and face identification methods for face recognition systems.
- Developed a 3D reconstruction pipeline to reconstruct point clouds of human faces.
- Trained and evaluated the performance of various point cloud classification models.
- Designed a small human-face dataset for training and testing the face anti-spoofing algorithm.

HMX Media   *Mar 2021 - Sep 2021*
JavaScript Developer   *London, United Kingdom*

- Optimized the rendering performance for the company's custom 3D engine.
- Integrated the 3D engine into commercial applications for clients such as Microsoft, Dell, etc.
- Created new features to showcase 3D models in Augmented Reality mode using WebXR.

PROJECTS

Face Re-Aging Network for Age Transformation
May 2024

- Pytorch reimplementation based on Disney's Face Re-Aging Network (FRAN) paper.
- Created an age-labeled dataset using FFHQ dataset and Style-based Age Manipulation (SAM) model.
- Using UNet as the generator to predict the aging delta and trained with a PatchGAN discriminator.

Deep Reflectance Field for Face Relighting
Sep 2023

- Pytorch reimplementation based on Deep Reflectance Fields paper by Abhimitra Meka et al.
- Generated a One-Light-At-A-Time (OLAT) relit image by inputting two gradient images and lighting direction.
- Created a synthetic OLAT and gradient images dataset instead of acquiring them using Lightstage.

Photo Attacks Detection Based On 3D Reconstruction (MSc Thesis)
Oct 2022

- Proposed a 3D reconstruction-based face anti-spoofing method to detect printed photo attacks.
- The detection pipeline first takes in the video of the user's face for reconstructing 3D point clouds, which will then be fed into the point cloud classification network to classify whether it represents a real or fake user.
- Reimplemented PointNet and PointNet++ using Pytorch for point cloud classification.
- **Thesis Link : https://chwarthur.com/pdf/Arthur_Msc_Thesis.pdf**

Seamless Cloning by Poisson Image Editing
Mar 2022

- Reimplemented based on the Poisson Image Editing paper by Pérez et al.
- Produced seamless cloning effects by importing and mixing gradients using Poisson Equation.
- Applied Poisson Equation to create special effects such as texture flattening and local illumination changes.
- **Demo : github.com/arthur715/Poisson-Image-Editing**

Face Morphing
Nov 2021

- Generated face morphing effect to smoothly transform a person from one identity to another.
- Improved the temporal consistency of the output video by using different Facial Landmark Detection models such as Sparse Local Patch Transformer and Deep Equilibrium Model.
- **Demo : github.com/arthur715/Image-Morphing**

More projects available on: chwarthur.com

SKILLS

Programming Languages

- Python | C/C++ | JavaScript | TypeScript | MATLAB | Java

Machine Learning

- PyTorch | TensorFlow | Scikit-learn | NumPy | SciPy | Pandas | CUDA | ONNX

Computer Vision, Graphics, and VR

- OpenCV | Kornia | dlib | open3D | OpenGL | WebXR | Unity | Nuke | Colmap | Meshroom | Maya

Web Development

- React | NextJS | VueJS | ThreeJS | WebGL | NodeJS | ExpressJS | MongoDB | Django | Tailwind CSS

Others

- Git | Docker | Podman | Google Cloud Platform | JSON | Linux | Bash | XML

Languages

- English | Mandarin | Cantonese | Japanese