Bob Wei

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Skills & Technologies

Python	C/C++	Java	Objective C	Matlab	Swift	C#
PyTorch	Unity3D	SQL	OpenCV	UNIX	Cuda	Git

Work Experience

3D Software Developer | *Side Effects Software* — January 2019 – Current

Demo in Houdini 17.5 launch: youtube.com/watch?v=w-8qrehON8Q&t=4145s

- Designed an interactive terrain generation algorithm using generative adversarial networks, specifically using a Unet generator to approximate the mapping between 2D sketch and real-world height-field (extracted from satellite imagery of Rocky Mountains)
- Developed and tuned machine learning models to apply simulated erosion and weathering to high-res terrains (4K), achieving similar qualitative and quantitative results (>95% SSIM) nearly 50,000x faster than the conventional methods in VFX
- Created an asynchronous, pipelined environment integrated into SideFX Houdini for optimized hyper-parameter space search
- Currently working with Libtorch C++ to expand machine learning support and visualization into SideFX products

Software Developer Intern | *BlackBerry Messenger* — May 2018 – August 2018

- Accelerated BBM iOS performance through reactive programming in Objective C + Swift and code refactoring on the architecture level: moving from MVC to the more dynamic Clean architecture. UI redesign for BBM Channels features

Research & Projects

EquiSurf: Computer Vision Research

- Currently working with graduate students, building upon the depth-aware convolution established in their “SurfConv” CVPR 2018 paper, and looking to improve the image segmentation performance through super-resolution techniques
- Experimenting with current state-of-the-art in single image super-resolution using deep ResNet and GAN based models, studying the effect of added depth information and the semantics of the super-resolution task itself
- Interpolated sparse depth maps to more useful, high-density maps through nearest neighbors and barycentric coordinates
- Developed Numpy code for projecting LIDAR depth maps to 3D point cloud representations to be visualized using mesh rendering

Image Inpainting Project

Demo: youtube.com/watch?v=Iaq6mqo0r-E

- Developed a Unet based generator to perform image inpainting, filling in irregular holes in an input image through a single forward pass (1-2 seconds on CPU). Achieves excellent visible results on the Places2 dataset consisting of over 1 million images.
- PyTorch implementation of partial/masked convolutions based on published research from Nvidia
- Currently maintaining code base on GitHub, investigating issues with checkerboard artifacts at higher resolutions

UWFlow

Active site: uwflow.com

- UWFlow is the primary website for course related info and reviews at UWaterloo
- Working together with a small team of developers to maintain and eventually overhaul the front-end and back-end source code
- Currently fixing active issues on the Python backend, addressing the concerns of the public user base
- Planning the transition towards a more lightweight backend framework (Falcon) for serving static webpages

Infinity Runner 3D Platformer

Demo: youtube.com/watch?v=rk8PiT0AI7s

- Designed a Unity3D, platformer game for both iOS and Android platforms, utilizing procedurally generated level design
- Defined behavior of player and the terrain using C# scripts attached to Blender 3D assets

Education

Bachelor of Software Engineering | *University of Waterloo (3.95 GPA)*

Interests

Rowing (Crew) | Basketball | Weight Training | Graphic Design | Computer Hardware | Product Design