Bob Wei

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Skills

Languages Python, C/C++, CUDA C++, Golang, Java, JavaScript, Objective-C, Swift, C#, Scala, SQL, LateX

Technologies Pytorch, TensorFlow, Docker, Unity3D, OpenCV, Postgres, Mongo, Django, Node.JS, Unix, Git, GCP

Experience

X, the Moonshot Factory (Formerly Google X)
Mountain View, CA

Software Engineer Intern *May 2021 - Present*

- Bridging the gap between humans and robots at the Everyday Robots Project, through joint language & vision models
- Replaced suite of task-specific classifiers with a single pre-trained model that generalizes out-of-distribution
- Productionized large-scale **transformer** models for image and natural language processing on edge devices (robot) and on the cloud (**Google Cloud ML Engine**); deployed performant **TFLite** graphs with post-training quantization
- Developed and maintained a large **Tensorflow** codebase with users across Google Brain and Google X

Nvidia
Toronto, ON

Research Scientist Intern *February 2021 - May 2021*

- Sped up training of large GAN's (PixelGAN, BigGAN) on real-world datasets (FFHQ, ImageNet); supervised by **Dr. Sanja Fidler**
- Implemented and maintained custom optimizers and higher order gradient algorithms in a large **Pytorch** codebase

Nvidia
Santa Clara, CA

Software Engineer Intern (Computer Vision) *June 2020 - September 2020*

- Reduced object detection post-processing time from **7ms** to **1.7ms** in **C++** production codebase for Tegra autonomous systems. Implemented novel probabilistic voting method with efficient **CUDA** kernels, replacing current state-of-the-art
- Proposed a novel scale-invariant loss for poly-line detection, increasing F1 score by > **5%**

Uber Advanced Technologies Group
Toronto, ON

Research Scientist Intern *September 2019 - May 2020*

- First authored a paper accepted to **IEEE ICRA 2021** (*arxiv.org/abs/2011.01153*); supervised by **Dr. Raquel Urtasun**.
- Spearheaded the research and development of a novel, end-to-end neural network for vehicle motion planning

Side Effects Software
Toronto, ON

Software Engineer Intern *January. 2019 - April. 2019*

- Designed an interactive 3D terrain generation tool: *sidefx.com/tutorials/machine-learning-data-preparation/*
- Developed machine learning models (**pix2pix GAN**) to simulate erosion over **50,000×** faster than conventional methods
- Engineered a full **C++** and **Python** frontend + backend for training and deploying neural networks within **SideFX Houdini**

Projects

Flow

uWaterloo Course Ratings + Reviews

- **uwflow.com** is the primary website for course related info and reviews at uWaterloo with over **25,000** monthly active users
- Built the backend infrastructure from the ground up with **Golang**, **Postgres**, and **Hasura** at the core
- Designed a new authentication flow supporting Facebook, Google, and Email login using **OpenID** and **Oauth 2.0** protocols

Agent Curiosity in Reinforcement Learning

github.com/bobqywei/curiosity-driven-exploration

- Exploration of current state-of-the-art methods for encouraging environment exploration in RL agents
- Implemented baseline **Advantage Actor-Critic** algorithms and various intrinsic curiosity formulations
- Demonstated much faster learning (>**3.0×**) in challenging **OpenAI Gym** environments with sparse rewards

Image Inpainting

github.com/bobqywei/inpainting-partial-conv

- Image editing tool for semantically-aware inpainting, removing undesired objects from images
- Implemented **UNet** model with partial convolutions based on Nvidia research, providing open-source **Pytorch** code

Education

University of Waterloo

Bachelor of Science in Honours Computer Science *September 2017 - Present*

- Cumulative GPA: **3.95/4.0** or **92%**