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

Google X: Everyday Robots *Mountain View, CA*

Machine Learning Engineer *July 2022 - Present*

- Trained and deployed **joint vision & language models (VLM)** for robot perception, enabling new **scene-level classification** and real-time **open-vocabulary object detection**, with > **60k** inferences across diverse production services
- Led integration of perception models into **end-to-end** QT-Opt **RL** algorithms, reducing error by > **60%** in long-horizon manipulation tasks, and drastically improving adaptation to unseen environments (paper under review)
- Built official **Keras diffusion** model *inpainting workflow*. Scaled up with **Flume** for synthetic data augmentation pipeline. Improving perception and manipulation model long-tail performance
- Revamped production **robot log collection** and **training dataset extraction** pipelines
- Co-led development of **point-cloud** models and end-to-end data pipelines for object grasp pose prediction.
- Developed and maintained large **Tensorflow** VLM codebase with users across Google Brain and Google X

Waabi *Toronto, ON*

Software Engineer Intern *September 2021 - December 2021*

- Developed and optimized **PyBullet** based simulator for self-driving vehicles, details under NDA

Nvidia *Toronto, ON*

Research Scientist Intern *February 2021 - May 2021*

- Sped up training of large GAN's (PixelGAN, BigGAN) on real-world datasets (FFHQ); 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 serial NMS
- 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 generative models (**pix2pix GAN**) to simulate erosion over **50,000×** faster than conventional methods

Projects

Flow

uWaterloo Course Ratings + Reviews

- **uwflow.com** is the go-to website for course reviews at uWaterloo with over **25,000** monthly active users
- Co-developed the backend infrastructure from the ground up with **Golang**, **Postgres**, and **Hasura** at the core

Image Inpainting

github.com/bobqywei/inpainting-partial-conv

- Image editing tool for semantically-aware inpainting, **Pytorch** partial conv U-Net based on Nvidia research

Education

University of Waterloo

Bachelor of Science in Computer Science (Dean's Honours, 3.95/4.0 GPA, 92%) *September 2017 - Present*

- Courses: Machine Learning, Optimization, Computational Vision, Networks, Operating Systems, Stochastic Processes