Brandon Leung

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Education

University of California, San Diego (UCSD) **Sep. 2015 – Apr. 2022**

- **M.S. in Machine Learning & Data Science**. GPA 3.86/4.
- **B.S. in Computer Science**, graduated August 2019. GPA 3.88/4 (Magna Cum Laude, with highest distinction).

Significant Projects

Drone Flight Dataset for Neural Network Classification Robustness [details] **Sep. 2018 – Present**

- Lead software developer of a novel drone flight system, led a team of 13 towards 120,000 image dataset.
- Conducted experiments showing neural network vulnerabilities to pose & camera shake which was improved by 32%. Extensively used Python, PyTorch, OpenCV, and ROS in an Ubuntu environment.
- Emphasized clean code & software engineering practices (e.g. version control, DRY, tests, docs, OOD, modularity)

Refining Single View 3D Reconstructions with Self-Supervised Machine Learning [details] **Jan. 2021 – Present**

- Developed a novel neural network refinement algorithm to generate 3D meshes from a single image.
- Used self-supervised learning & symmetry regularization; beats state-of-the-art (up to 47%), across many datasets.

Self-Driving Cars using 2D/3D Action and Explanation Prediction [details] **Feb. 2021 – Present**

- Guided formulation & development of a model fusing 2D images & 3D pointclouds for self-driving car navigation.
- 2D & 3D explanations from Faster R-CNN & MVX-Net are jointly predicted with actions, justifying model decisions.
- Annotated new action & explanation annotations labels from Amazon Turk to add to the Waymo Open dataset.

Statistical Linguistic Analysis for User Chat Message Logs [details] **Feb. 2021 – Jul. 2021**

- Built an interactive dashboard to analyze user chat logs and describe their linguistic behavior.
- Applied NLP transformer models (RoBERTa, GPT-2) to sentiment analysis, clustering, style transfer, & generation.
- Used Jupyter Notebooks & Voilà. Tested with pytest; documented with Sphinx. Deployed using AWS (EC2 and S3).

Selected Publications

- **Leung**, Ho, & Vasconcelos. *Black-box test-time shape refinement for single view 3d reconstruction*. Published in CVPRW 2022.
- **Leung***, Ho*, Sandstrom, Chang, & Vasconcelos. (2019). *Catastrophic child's play: Easy to perform, hard to defend adversarial attacks.* Published in CVPR 2019.
- **Leung**. *Understanding Learned Visual Invariances Through Hierarchical Dataset Design and Collection*. MS Thesis 2022.
- **Leung,** Singh, Horodniceanu. *Domain adaptation for real-world single view 3d reconstruction.* ArXiv:2108.10972 2020.

Professional Experience

Machine Learning Researcher **Statistical Visual Computing Lab, UCSD** **Jun. 2017 – Present**

- Researching & developing software relating to machine learning & computer vision under Prof. Nuno Vasconcelos. Focus in 2D/3D detection, domain adaptation, 3D rec., self-supervised learning, efficient ML, and explainable ML.

Software Engineer, Intern **Himax Imaging** **Summers 2015 & 2016**

- Developed internal quality control programs in Java for a R&D/fabrication company specializing in CMOS image sensors used in smartphone cameras and car backup cameras.

Awards and Additional Experience

- **NSF Graduate Research Fellowship** (GRFP), Mar. 2020.
- **Sloan Foundation Graduate Fellowship**, Sep. 2019.
- **UCSD Undergraduate Research Award**, May 2019, awarded to 2 graduating UCSD ECE students yearly.
- **NSF REU Research Grant**, Sep. 2018.
- **Teaching Assistant at UCSD, Data Science Theory (DSC 40A/B) and Programming (CSE 8A)**, Jan. 2018 – Jan. 2019.
- **UCSD Research Program Mentor**, 2018 – 2021, mentored students for UCSD's SRIP, GEAR, and ENLACE programs.
- **Conference Reviewer** at ECCV 2020, ICCV 2021, CVPR 2021, CVPR 2022.
- **IT Technician, UCSD**, 2016 – 2017, gave networking, software, and hardware support for UCSD's students & staff.

Technical Skills

- **Expertise in:** Python, PyTorch, Jupyter Notebooks, OpenCV, Numpy, Plotly, Bash, Docker, pytest, Sphinx.
- **Experience with:** Java, C, C++, HTML/CSS, JavaScript, AWS, Matlab, Amazon Turk.