# RUI HUANG

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## INTERESTS

**Deep Learning, Computer Vision, Machine Learning**
**3D Deep Learning, Representation Learning, Deep Generative Models, Detection and Segmentation**

## EDUCATION

**Carnegie Mellon University** Pittsburgh, PA, USA *Aug. 2017 - Dec. 2018*
**M.S. in Electrical and Computer Engineering** GPA: 3.95/4.0

**China University of Geosciences** Beijing, P.R.China *Sep. 2013 - July 2017*
**B.E. in Computer Science and Technology** GPA: 3.84/4.0 Rank: 1/59

## WORK EXPERIENCE

- **Google**, Mountain View CA, USA *Nov. 2023 -*
  Senior ML Algorithm Engineer in Google Labs [Info]
- **Apple**, Cupertino CA & Seattle WA, USA *Jan. 2021 - Nov. 2023*
  Senior ML Algorithm Engineer in Video Computer Vision org.
  - Applied research and engineering for real-time on-device computer vision and machine perception technologies. Design, implement, evaluate and iterate on deep learning models; lead and coordinate end-to-end effort on data collection and labelling protocol, data analysis, model quantization, integration and deployment.
  - Launched Face ID with mask [Info] or in Landscape (horizontal) mode [Info], Optic ID for Vision Pro [Info].
- **Google Research**, Mountain View CA, USA *July 2019 - Jan. 2021*
  AI Resident (full time employee); Advisor - Dr. Alireza Fathi, Prof. Thomas Funkhouser
  - Researched in designing 3d sparse convolution LSTM network on temporal point clouds, and exploring the synergy of 3d object detection and flow estimation on point cloud. The model improves 3d object detection performance by 7.5% [ECCV paper].
  - Open sourced Tensorflow 3D [Blog][Code], a 3d scene understanding codebase that contains the 3d sparse convolution op and models for 3d semantic and instance segmentation and detection.
- **NVIDIA Research**, Santa Clara CA, USA *Jan. 2019 - July 2019*
  Research Intern in Learning & Perception team; Advisor - Dr. Zhiding Yu, Dr. Wonmin Byeon, Dr. Jan Kautz
  - Researched in recurrent linear propagation model for semantic segmentation, and boundary detection. The model conducts message passing in a dynamically constructed graph, and alternatively refines the prediction of both tasks, outperforming state-of-the-art models [NeurIPS paper] [Patent].
- **Mitsubishi Electric Research Laboratories**, Boston MA, USA *May 2018 - Aug. 2018*
  Research Intern in Computer Vision Group; Advisor - Dr. Tim Marks
  - Researched in self-supervised GAN for class conditional image generation. Improved the training of GAN via inducing the discriminator to examine the structural consistency of images and learn a structure sensitive representation [WACV paper].
- **Carnegie Mellon University**, Pittsburgh PA & Mountain View CA, USA
  Graduate Assistant in Machine Learning Department; Advisor - Prof. Katerina Fragkiadaki *Dec. 2017 - Dec. 2018*
  - Researched in domain adaptation for semantic segmentation. Used the epistemic uncertainty measurement on prediction, multi-modality fusion, and spatial geometric cues to improve model's generalization ability. Obtained state-of-the-art performance boost.

  Graduate Assistant in Cylab Mobility Research Center; Advisor - Prof. Bob Iannucci *Aug. 2017 - Dec. 2017*

- Researched in real-time online training of weakly-supervised object detectors on streaming video. The weak click supervision for the detector is boosted by using a pre-trained class-agnostic segmentation model and propagated with optical flow to unlabelled data.

- **Institute of Automation, Chinese Academy of Sciences**, Beijing, P.R. China *Mar. 2016 - June 2017*
  Research Assistant in National Laboratory of Pattern Recognition; Advisor - Prof. Ran He
  - Researched in synthesizing a frontal view image from a profile face with Generative Adversarial Network (Deep Learning) and boosting face recognition rate under large pose [ICCV paper];
  - Developed a software to reconstruct a 3D face model from 2D motion in real time, using techniques for face alignment and Structure from Motion.

## PUBLICATIONS

- **Coupled Segmentation and Edge Learning via Dynamic Graph Propagation**
  Zhiding Yu*, **Rui Huang***, Wonmin Byeon, Sifei Liu, Guilin Liu, Thomas Breuel, Anima Anandkumar, Jan Kautz
  *35th Conference on Neural Information Processing Systems* (NeurIPS), 2021 & [Patent]

- **An LSTM Approach to Temporal 3D Object Detection in LiDAR Point Clouds**
  **Rui Huang**, Wanyue Zhang, Abhijit Kundu, Caroline Pantofaru, David A Ross, Thomas Funkhouser, Alireza Fathi
  *16th European Conference on Computer Vision* (ECCV), 2020

- **Beyond Face Rotation: Global and Local Perception GAN for Photorealistic and Identity Preserving Frontal View Synthesis**
  **Rui Huang***, Shu Zhang*, Tianyu Li, Ran He
  *IEEE International Conference on Computer Vision* (ICCV), 2017

- **FX-GAN: Self-Supervised GAN Learning via Feature Exchange**
  **Rui Huang**, Wenju Xu, Teng-Yok Lee, Anoop Cherian, Ye Wang, Tim Marks
  *IEEE Winter Conference on Applications of Computer Vision* (WACV), 2020

- **ClickBAIT: Click-based Accelerated Incremental Training of Convolutional Neural Networks**
  Ervin Teng, Joao Diogo Falcao, **Rui Huang**, Bob Iannucci
  *IEEE Applied Imagery Pattern Recognition Workshop* (AIPR), 2018

- **A Stable Online Scheduling Strategy with Makespan Guarantee in Big Data Stream Computing Environments**
  Dawei Sun, **Rui Huang**
  *IEEE Access* Vol. 4, 2016

- **Analyzing and Evaluating Topology Structure of Online Application in Big Data Stream Computing Environment**
  **Rui Huang**, Dawei Sun
  *International Journal of Wireless and Mobile Computing* Vol. 10, No. 4, 2016

* indicates equal contribution.

## GRADUATE COURSES

Computer Graphics, Computational Photography, Introduction to Machine Learning, Deep Reinforcement Learning and Control, Distributed System, Analytical Performance Modeling & Design of Computer Systems, Foundations of Computer Systems, Cloud Computing

## SKILLS

- **Programming Language:** Python (current), C, C++, Java, Go, Matlab
- **Software and Platform:** Tensorflow, PyTorch, OpenCV, Hadoop, MapReduce, Spark, Linux