

# Allen Zeng

AI & MACHINE LEARNING SOFTWARE ENGINEER

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allenjzeng.github.io



## EDUCATION

### University of California, San Diego (UCSD)

Electrical and Computer Engineering, M.S.

Sep 2020 – Jun 2022

GPA: 3.9

- Intelligent Systems, Robotics, and Control Specialization

- MicroMBA in Technology Management and Entrepreneurism

### University of California, Berkeley

Electrical Engineering and Computer Science, B.S.

Aug 2014 – Dec 2017

## EXPERIENCE

### Toyon Research Corporation

Jan 2018 – Present

Senior AI/ML Software Engineer – Algorithms & Applied Research

#### Leadership, Project Management, and Technical Writing

- Wrote, won, and managed 2 Small Business Innovation Research (SBIR) contracts worth \$280K.
- Led teams of 2-4 engineers, ensuring on-time and on-budget task completion.
- Presented in 40+ customer technical briefings and authored 10+ project final reports.

#### Automated Building Information Model (BIM) Generation

- Implemented a Segment Anything Model and human-in-the-loop data labeling program to label 8+ hours of video and LIDAR data, producing panoptic segmentation masks for subsequent training.
- Developed a plane detection and low-polygon modeling algorithm for real-time BIM generation from point cloud data; for sending compressed, semantically labeled 3D models over degraded radio links.
- Parsed RGB-Depth camera, LIDAR, IMU, and GPS data from ROS messages and rosbags.

#### Image Labeling, Object Detection and Classification

- Created the *Relabeler* program for efficiently labeling gigapixel satellite images ( $\geq 30k^2$  pixel) of aircraft and ships. Both EO and SAR images are labeled directly without tiling.
- Supervised a team of 4 interns to label and validate over 200K instances of objects.
- Trained object detection and classification models to estimate oriented bounding boxes (OBBs).
- Defined devcontainers and maintained CI/CD processes for the inference library.

#### Satellite Image 3D Reconstruction, Semantic Segmentation, and Depth Regression

- Established domain-specific metrics and key performance indicators, based on customer feedback, to analyze models and determine which will scale best to clients' needs.
- Matured a Structure from Motion (SfM) pipeline from MATLAB into C++/CUDA that undistorts satellite push broom images, calculates dense point clouds, and outputs digital surface models.
- Validated data and designed CNNs for monocular semantic segmentation and depth regression.
- Implemented Guided Anisotropic Diffusion to iteratively clean and update noisy ground truth labels over several hyperepochs, leading to improvements in model generalizability.

### WellMind

Sep 2021 – Jun 2022

Cofounder – Software

- Developed WellMind, a personalized behavioral solution for mild-to-moderate depression and anxiety, founded between UCSD Neural Engineering and Translation Labs (NEATLabs) and Rady MBA students.
- 1<sup>st</sup> Overall and 1<sup>st</sup> in Social Impact at StartR Demo Day (solo pitch), out of 21 teams. 1<sup>st</sup> in Audience Choice and 2<sup>nd</sup> Most Promising Venture at Rady Lab-to-Market Incubator Final Pitch, out of 30 teams.
- Raised \$10K in pre-seed from competitions and grants, not including private funding.

## SKILLS

**Libraries/Tools** PyTorch, NumPy, Matplotlib, OpenCV, Git, Docker, ONNX, MMDetection, MMCV

**Languages** Python, C++, C, MATLAB, Bash

**Technologies** Deep Learning, Computer Vision, Convolutional Neural Networks (CNN), Vision Transformers (ViT), Simultaneous Localization And Mapping (SLAM), Augmented & Virtual Reality