Allen Zeng

AI & Machine Learning Software Engineer

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Education

University of California, San Diego (UCSD) Sep 2020 — Jun 2022
Electrical and Computer Engineering, M.S. *GPA: 3.9*
- Intelligent Systems, Robotics, and Control Specialization
- MicroMBA in Technology Management and Entrepreneurism

University of California, Berkeley Aug 2014 — Dec 2017
Electrical Engineering and Computer Science, B.S.

Experience

Toyon Research Corporation Jan 2018 — Present
Senior AI/ML Software Engineer — Algorithms & Applied Research

Leadership and Project Management
- Led cross-functional teams of 2–4 software and hardware engineers, and supervised labeling interns.
- Wrote, won, and managed 2 Small Business Innovation Research (SBIR) contracts worth **$280k**.
- Presented 50+ monthly briefings to customers, and authored interim and final technical reports.

Autonomous Ground Robot Mapping and Data Processing
- Developed a plane detection and low-polygon modeling algorithm for point cloud data; compressing **5.2 million points/sec into 10 MB polygon mesh** 3D models.
- Parsed RGB-Depth camera, LIDAR, IMU, and GPS data from ROS messages and rosbags, using Python libraries `NumPy, SciPy, OpenCV`, and `Open3D`.
- Implemented a Segment Anything Model and human-in-the-loop data labeling program to label over 8 hours of video and LIDAR data, producing panoptic segmentation masks for subsequent training.

Object Detection, Classification, and Labeling
- Trained an Oriented-RCNN model with `PyTorch` and `MMRotate` to find aircraft and ships in gigapixel satellite images ($\geq 30k \times 30k$ px), tagging detected objects with oriented bounding boxes.
- Created the *SatLabeler* program for labeling both EO and SAR satellite images without tiling.
- Supervised a team of 4 interns to **label over 200k objects** with polygon masks and class IDs.
- Defined devcontainers and CI/CD processes for the labeling, training, and inference libraries.

Semantic Segmentation, 3D Reconstruction, and Depth Regression
- Matured a Structure from Motion (SFM) pipeline from `MATLAB` into `C++/CUDA` that removes satellite image distortion, calculates dense point clouds, and outputs digital surface models for ML training.
- Automated data cleaning to curate **300GB of satellite data** for training, and designed CNNs in PyTorch for monocular semantic segmentation of buildings and height regression of terrain.
- Established key metrics to analyze models and determine which will scale best to clients' needs.

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.
- **1st Overall** and **1st in Social Impact** at StartR Demo Day (solo pitch), out of 21 teams.
- **1st in Audience Choice** and **2nd 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, Open3D, Shapely, Pandas, Git, Docker`
Languages	`Python, C++, MATLAB, Bash`
Technologies	Deep Learning, Computer Vision, Convolutional Neural Networks (CNN), Transformers, Vision Transformers (ViT), Generative AI, Diffusion Models, Large Language Models (LLMs)