

Franklin Heng

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Computer vision engineer experienced in leading projects from 0 - 1. Built applications for healthcare, climate, and robotics.

WORK EXPERIENCE

Computer Vision Engineer, Running Tide

March 2022 - June 2024

- Built object-detection algorithm that analyzes images captured from buoy sensors and monitors the movement of biomaterials deployed in the ocean. Mask-RCNN was used for segmentation (Tensorflow) and at the final stage the sinking rate was computed by measuring the percentage of biomaterials floating (OpenCV, Scikit-Image). I was responsible for data collection, data-labeling, model training/evaluation, and deployment. I containerized the pipeline using Docker and deployed to production using Google Cloud Composer and Airflow. [[view abstract](#)]
- Worked on classification model for detecting shellfish on our robotic platform with the requirement of 90%+ accuracy and processing speed of .125s per image, and developed post-processing scripts to fine-tune detection bounding boxes (Tensorflow, OpenCV).
- Developed an algorithm to predict the weight of macroalgae. Vision Transformer (ViT) model was used to identify and segment macroalgae with 90% (IoU) accuracy and a linear regression model was used to predict weight within 1 gram.
- Generated 3D reconstructions and measured macroalgae on land and underwater. A robotic system was built to spin the macroalgae and capture images from multiple viewpoints. Images were used to create a point cloud reconstruction (COLMAP, Metashape) and compute 3D shape measurements (Open3D). [[view abstract](#)]

Computer Vision Scientist, UC San Francisco Hospital (UCSF)

June 2019 - March 2022

Breathily (August 2020 - March 2022)

- Co-lead research project that aims to develop a novel solution that enables patients with physically debilitating diseases, such as ALS, to measure their lungs using computer vision and camera systems properly. [[view demo](#)]
- Developed computer vision algorithms to compute lung function values from visual data captured by stereo cameras. Pipeline involved pose estimation (MediaPipe), RGB-D image processing (OpenCV), 1-D signal analysis (SciPy), 3D mesh estimation (Pixel2Mesh), and CNN+LSTM networks (Keras)
- Co-inventors of U.S. patent application entitled “Methods for Pulmonary Function Testing With Machine Learning Analysis and Systems for Same” filed February 2, 2022. [[view patent](#)]
- Raised \$100K in non-dilutive funding by placing 2nd in the UC Launch Accelerator Program, obtaining the UCSF Catalyst Award, and being accepted into the NSF National I-Corps Program

Pulmonary Function Lab (September 2018 - August 2020)

- Developed deep-learning algorithms to automate the detection, visualization, and characterization of airway mucus plugs in lung CT scans. The process involved segmentation and bounding box predictions (Mask-RCNN), Triangulations/ 3D mesh generation (Scikit-Image, MATLAB), and 3D visualizations (pyOpenGL, MATLAB). [[view publication](#)]

Student Research Assistant, UC Berkeley

May 2017 - June 2019

- Developed computer vision algorithms (Tensorflow, MATLAB) to compute the height and width of sorghum (plant) and designed sensor suits that were placed on the agricultural robotic platform. [[view publication](#)]

Computer Vision Intern, NASA (JPL)

September 2015 - July 2016

- Assisted in the development of automatic edge detection models on aircraft imagery data (IR). Researched and tested multi-correlation and image filter manipulation methods to improve edge detection

EDUCATION

B.A, Computer Science, University of California, Berkeley

December 2018

SKILLS

Languages: Python, MATLAB, C++

Computer Vision: Tensorflow, PyTorch, Keras, Hugging Face, OpenCV, SciKit-Image, Google Vertex AI

3D Vision: COLMAP, Metashape, Open3D, RGB-D sensors, Lidar

Software: Docker, Google Cloud Composer, Apache Airflow