Zach Bellay

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Education

SANTA CLARA UNIVERSITY

Master of Science, Computer Science and Engineering, June 2020 GPA: 3.5/4.0
Thesis: Deep learning (GANs) for image compression.

Bachelor of Science, Computer Science and Engineering, June 2019 GPA: 3.3/4.0

Experience

ONEPOINTONE (Indoor Vertical Farming Startup) | Software Engineer

Jun 2020 - Present | San Jose, CA (Remote)

- Developing plant analysis service using deep learning and traditional computer vision techniques.
- Managed the labeling of multiple custom datasets.
- Fine-tuned instance segmentation models, classification, and detection models for plant analysis.
- Developed an algorithm that calculates plant germination rate from imagery.
- Developed gradient descent based image stitching pipeline.

FORD MOTOR COMPANY | Product Development Intern

Jun 2019 - Sep 2019 | Palo Alto, CA

- Prototyped and deployed test air quality sensor network from scratch. Used Docker, Kubernetes, Python Flask, AWS, Fusion 360, Arduino.
- Compared Support Vector Machines (SVM) and Convolutional Neural Network (CNN) in traffic sign detection.

ONEPOINTONE (Indoor Vertical Farming Startup) | Computer Vision Intern

Jan 2018 - Mar 2019 | San Jose, CA

- Utilized traditional computer vision techniques for camera calibration.
- Programmed multiple raspberry pi cameras to capture images of of plants on a vertical plane.

FORD MOTOR COMPANY | Product Development Intern

Jun 2018 - Sep 2018 | Palo Alto, CA

- Developed applications for Ford's "Arduino for cars."
- Prototyped vehicle data marketplace using Ethereum blockchain and InterPlanetary File System.

Projects

ROBUST MOVING OBJECT DETECTION

June 2018 – May 2019

- Developed and implemented robust moving object detection using L1 principal component analysis with Python.

FINGERPRINT MATCHING

May 2019

- Compared SIFT, SURF, and CNN feature extraction methods for fingerprint matching on the SOCOFing fingerprint dataset.

Publications & Patents

[1] S. Bertram et al. Vertical farming systems and methods, Nov. 2018. US Patent Application 20190159415. Patent Pending.

[2] Y. Liu, Z. Bellay, P. Bradsky, G. Chandler, and B. Craig. Edge-to-fog computing for color-assisted moving object detection. In F. Ahmad, editor, Big Data: Learning, Analytics, and Applications, volume 10989, pages 9 – 17. International Society for Optics and Photonics, SPIE, 2019.

Skills

LANGUAGES

Python • C • C++
MATLAB • JavaScript
HTML/CSS • Bash

MACHINE LEARNING & COMPUTER VISION

Pytorch • OpenCV
Scikit-learn • Numpy
Tensorboard • Jupyter Notebook • Matplotlib
MMDetection

BACKEND

Flask • FastAPI •
Gunicorn • Uvicorn •
Docker • PostgreSQL

Coursework

GRADUATE

Computer Vision I, II
Digital Signal Processing
Simultaneous Localization and Mapping
ML & DSP on FPGA
Mathematical Finance
Adv. Algorithms

UNDERGRADUATE

Applied Machine Learning
Data Science
Theory of Algorithms
Software Engineering
Computer Networks
Operating Systems
Computer Architecture
Web Infrastructure

Awards

2019 - 2nd Place Ford Summer Hackathon
2019 - Best in Session Senior Design Conference
2018 - 1st Place Ford Summer Hackathon
2018 - 2nd Place Hack for Humanity