Zach Bellay

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Education

SANTA CLARA UNIVERSITY

Master of Science, Computer Science and Engineering, June 2020 GPA: 3.37/4.0

Thesis: Applying deep learning (Generative Adversarial Networks) to video compression. Implemented using PyTorch and Keras.

Bachelor of Science, Computer Science and Engineering, June 2019 GPA: 3.26/4.0

Experience

FORD MOTOR COMPANY | Product Development Intern

Jun 2019 - Sep 2019 | Palo Alto, CA

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

ONEPOINTONE | Computer Vision Intern

Jan 2018 - Mar 2019 | San Jose, CA

- Developed image processing pipeline to remove lens distortion and to perform image stitching.
- Created multi-camera IoT array to capture images 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.

SCU ROBOTIC SYSTEMS LAB | Software Engineering Intern

Jan 2017 - Sep 2017 | Santa Clara, CA

- Built system to control indoor vertical farming system which was used in a pitch that resulted in $1.4M seed funding.

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.

"SELF DRIVING" FISH TANK

June 2017 – Present

- Designed self driving robot with mounted fish bowl which utilizes computer vision to navigate.

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

Keras • Scikit-learn
OpenCV • Numpy
Pandas • Jupyter Notebook • Matplotlib
PyTorch Lightning
PyTorch • Tensorboard

BACKEND & CLOUD

Docker • Kubernetes
Helm • MongoDB
MySQL • InfluxDB • AWS EC2 • Gunicorn • Flask

CAD

Fusion 360 • Blender • 3D Printing

Coursework

GRADUATE

Computer Vision I, II
Digital Signal Processing
ML & DSP on FPGA
Computational Creativity
Adv. Operating Systems
Adv. Computer Architecture

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