Aidan Swope

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Research

Representation Learning for Remote Sensing: An Unsupervised Sensor Fusion Approach
First-author paper on training neural networks unsupervised to understand many-sensor aerial imagery. Open-source TensorFlow 2 code available at https://github.com/descarteslabs/contrastive_sensor_fusion.

Education

California Institute of Technology (Caltech) 2016 – 2020
B.S. in Computer Science. GPA: 3.8. *Pasadena, CA*

- **Selected Classes (Mathematics and Statistics)**: Machine Learning (various classes; Python), Representation Learning (TensorFlow), Numerical & Applied Linear Algebra (MATLAB), Bayesian Statistics, Probability Models, Statistical Inference, Introduction to Quantum Computing
- **Selected Classes (Computer Science)**: Algorithms, GPU Programming (CUDA), Operating Systems (C), FPGA Programming (VHDL), Computer-Assisted Theorem Proving (Coq)

Work Experience

Descartes Labs Summer 2019
Machine Learning Intern - Unsupervised Learning Research *San Francisco, CA*

- **Unsupervised Sensor Fusion Research**: Developed a new algorithm for training convolutional neural networks unsupervised on many sensors at once. Paper described under "Research" above.
- **Transfer Learning Model**: Trained a large sensor-fusion model on 20 TB of data with TPUs. Transfer learning from this model is the basis for Descartes Labs' current computer vision models.

Caltech Spring 2019 - Spring 2020
Student Lecturer *Pasadena, CA*

- **TensorFlow Class**: Led a class on deep learning with TensorFlow and Keras.

Descartes Labs Summer 2018
Machine Learning Intern - Computer Vision *Santa Fe, NM*

- **Tree Segmentation Model**: Developed convolutional neural network to segment trees in overhead imagery. Deployed across California and urban areas worldwide, creating 15 TB of product data.
- **Pointcloud Ingest Pipeline**: Developed and deployed a point cloud data pipeline to preprocess and ingest over 100 TB of data. Data used as ground truth for training multiple models since.
- **Computer Vision Tooling**: Wrote tools for data loading and machine learning model abstraction.

GE Digital Summer 2017
Software Development Intern *San Ramon, CA*

- **Distributed Ingest Software**: Developed distributed Flink data ingestion and processing stream.

Projects and Skills

Music Accompaniment VAE: Adapts a variational autoencoder to add accompaniment to music.

AlphaZero Othello Bot: An Othello bot trained with reinforcement learning.

Selected Technologies: TensorFlow, PyTorch, Keras, NumPy, Python, C, C++, Haskell, SQL