# Eric Ho

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## Education

Dec 2018 **University of California, San Diego**, *MS Electrical Engineering*.
Overall GPA: 3.633; Specializing in Machine Learning and Data Science

June 2017 **University of California, San Diego**, *BS Electrical Engineering*.
Major GPA: 3.582; Specializing in Machine Learning and Control

## Work

June 2018 – Sept 2018 **Platform/Machine Learning Intern**, *Brain Corporation*, La Jolla.
- Created **point clouds visualizations** to analyze the effects of LIDAR scans on glass walls
- Implemented a synthetic environment to model glass walls and to collect data
- Trained a **LSTM** and multilayer perceptron (**MLP**) to detect glass walls using **Keras** with 85% accuracy
- Developed unit tests with **pytest** to ensure reliability and reproducibility

Nov 2017 – June 2018 **LabVIEW/Matlab Consultant**, *LinOptix LLC*, La Jolla.
- Converted software to control a digital micromirror device (DMD) from C++ to LabVIEW and Matlab
- Synced a charged-coupled device (CCD) with a DMD to take an image at 30kHz
- Applied object oriented analysis and design principles to create a modular set of VIs

## Publications

March 2018 **Quantifying Gaze Behavior during Real World Interactions using Automated Object, Face, and Fixation Detection**, *IEEE Transactions on Cognitive and Developmental Systems*.
- Utilized **Faster R-CNN** with **Caffe** framework to detect and locate specific objects with 77% accuracy
- Implemented a face recognition and object recognition system with eye tracking glasses
- Lead a 5 student team in creating and labeling training and test sets in Matlab
- Link to paper: https://ieeexplore.ieee.org/document/8328848/

## Projects

Feb 2018 – March 2018 **Classical Music Generator**, *Python, PyTorch*.
- Designed a character-level **LSTM RNN** with PyTorch that can generate classical music in ABC notation
- Optimized the RNN by using **GRU units**, **dropout layers**, and adaptive learning rates via **RMSprop**
- Implemented a "temperature" parameter that changes how random/structured the generated music is

Jan 2018 – March 2018 **Doppelganger Face Generation using DC-GAN**, *Python, TensorFlow*.
- Created a **Deep Convolutional General Adversarial Network** (DC-GAN) that generated realistic human faces
- Found the closest face by using various **similarity metrics** such as Euclidean and Minkowski distances
- Applied feature extraction using principal component analysis (**PCA**) and discrete cosine transform (**DCT**)

Jan 2018 – Feb 2018 **Multi-layer Backpropagation Neural Network**, *Python*.
- Implemented **multi-layer perceptron** with 2 hidden layers to classify MNIST digits with **97.8%** accuracy
- Created neural net from scratch in Python and Numpy with forward and **backpropagation** functionality
- Improved model using **Nesterov momentum**, tanh activation function and cross-entropy cost function

Sept 2017 – Dec 2017 **Bayesian Classifier with Gaussian Mixtures**, *Matlab*.
- Segmented an image of a cheetah into the foreground (cheetah) and background by classifying each pixel using Bayes decision rule
- Found the **maximum likelihood** parameter estimates of Gaussian mixtures using the expectation maximization **(EM) algorithm**
- Achieved 4.6% probability of error with 64 Gaussian components densities

Sept 2017 – Oct 2017 **Red Barrel Detector**, *Python, OpenCV*.
- Trained a probabilistic color model to detect a red barrel by classifying each pixel using Bayes decision rule (**BDR**) of Gaussian distributions and estimating the parameters using maximum likelihood estimation (**MLE**)
- Utilized OpenCV to hand-label training images and to draw bounding boxes after segmenting the image
- Predicted the distance of barrel using **linear regression** based on the height and width of the bounding box

## Skills

Programming **Python (Keras, PyTorch, Caffe, TensorFlow), Matlab, C, Java, C++, LabVIEW, Latex**

CAD/Software **PyCharm, SolidWorks, InkScape, Anaconda, Docker, GitHub**