

# YINGFU (BEN) MA

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## EDUCATION

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### The Cooper Union for the Advancement of Science and Art

Masters of Engineering in Mechanical Engineering, GPA: 3.88/4.0

New York, NY

May 2020

Relevant Courses:

Computational Graphs for Machine Learning   Modern Control Theory   Autonomous Mobile Robots  
Industrial Robotics   Artificial Intelligence   Natural Language Processing   Statistics   Linear Algebra

### The Cooper Union for the Advancement of Science and Art

Bachelors of Engineering in Mechanical Engineering, GPA: 3.78/4.0

New York, NY

May 2018

Hillary and Eric Hirschhorn Cooper Fund Scholar, Bioengineering Research Scholars Program

## PROJECTS & EXPERIENCE

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### Project - Occupational Therapy Salary Analysis

Summer 2020

- Cleaned and analyzed OT survey data
- Applied statistical and permutation tests to confirm a gender wage gap within a subset of OTs
- Implemented and tuned an XGBoost model to predict salaries with gridsearch
- Deployed model onto Heroku as a Python Flask application

### Project - Classifying Toxic Comments in Gaming Communities

Summer 2020

- Gathered over 300,000 reddit comments from three major gaming subreddits with the Reddit Pushshift API
- Solved Jigsaw Toxic Comments Classification problem and applied transfer learning to the Reddit comments
- Chose optimal classification threshold based on ROC/AUC and ranked subreddits based on the results

### Project - Path of Exile Currency Market Prediction

Summer 2020

- Analyzed daily time-series data from the PoE in-game currency market starting from 2016
- Implemented a naive, moving average, and RNN-based prediction model and compared MAE
- Used the RNN-based model during the 3.12 Heist league (Fall 2020) to earn in-game currency

### Deep Learning & Controls Research - Learning Model Dynamics for Controls Applications

Spring 2019

- Optimized a neural network to learn input-output plant dynamics of QUBE Servo 2 rotary pendulum
- Implemented finite difference method to propagate gradients through ODE solvers with differentiable programming
- Showed comparable results between neural network performance to state-space LQR controllers

### Deep Learning & Controls Research - Reinforcement Learning for Stabilizing Drone Controller

Fall 2018

- Developed an end-to-end neural controller for aerodynamic quadcopter control
- Framed quadcopter stability task as a reinforcement learning problem
- Implemented Proximal Policy Optimization and designed task reward to optimize stability
- Combined learned policy with a PI controller as a boosted learner to control the quadcopter during a flip

### Engineering Intern - Amber Agriculture Inc. - Shenzhen, China

Summer 2017

- Designed housing for individual nodes of a sensor network for DFM (plastic injection molding) and DFA
- Wrote Python script to parse node data to record and plot packet data in real time
- Sourced components and materials for manufacture including electronic passives and MEMS sensors
- Conducted mechanical and electrical testing on components to pass UL and FCC certifications
- Communicated with manufacturer's engineers to optimize manufacturing process

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**Presentations** - TEDx Cooper Union Speaker (2017), iGEM (2015), MIT Eurekafest (2013)

**Programming Languages** - Python (*Jupyter/Google Colab, Tensorflow, Numpy, Pandas, Scikit, XGBoost, PyGAD, Matplotlib/Seaborn/Plotly, Flask*), SQL (*MySQL*), MATLAB/Octave, C/C++, HTML/CSS/JS

**Skills** - Git, Data Analysis, Visualization and Reduction (*PCA, t-SNE, K-means*), Machine Learning (*Deep Learning, Reinforcement Learning, Decision-trees, RF, GBM, & XGBoost, SVM, KNN, Linear & Logistic Regression*), A/B testing

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Tau Beta Pi - Engineering Honor Society

Spring 2018 - Present

American Society of Mechanical Engineers

Fall 2014 - Present

The Cooper Union Orchestra, *Co-President and Conductor*

Fall 2015 - Spring 2018