Harley Patton

hpatton@berkeley.edu
(310) 683-8818
2728 Channing Way, Berkeley, CA 94704
harleypatton.com

WORK EXPERIENCE

MAY 2018 - AUG 2018

Amazon
Software Development Engineer Intern

- Created a framework to measure the quality of neural machine translation models for the AWS Translate team.
- Conducted experiment to determine which translation quality metrics best correlated with human evaluations from a team of professional translators.
- Trained multilayer perceptron regression model to predict human evaluation scores of machine translations, where input features were derived from semantic and grammatical analysis of the source and target sentences.
- Shipped data pipeline to ingest customer requests and corresponding machine-translated responses, and then generate quality report to gauge how well the translation models perform on production data.

AUG 2016 - PRESENT

Lawrence Berkeley National Laboratory
Research Apprentice

- Trained generative adverserial networks to simulate the effects of particle collision events in a way indistinguishable from events measured at CERN, motivated by the fact that feed-forward networks are much more efficient than the current state-of-the-art simulators.
- Developed a heuristic that can be used to classify particle types from measured energy-loss readouts, and proved its optimality.
- Developed a regression model for extracting exclusive quark/gluon probability distributions from mixed particle jet distributions measured at CERN.

AUG 2016 - PRESENT

UC Berkeley Computer Science Division
Student Instructor

- Student instructor for Computer Science 170 (Efficient Algorithms and Intractable Problems). Course details at cs170.org.
- Teaches a discussion section of 50 students how to think about and develop algorithms.
- Leads development of the course's final project, which includes creating solvers, internal documentation, and a cloud autograding framework that can handle requests from over 700 students.

MAY 2017 - AUG 2017

Rigetti Computing
Software Engineer Intern

- Contributed to a python library (pyquil.readthedocs.io) that allow users to connect to and run programs on in-house quantum processing units over the cloud.
- Wrote and deployed an interactive website to demonstrate the ability of quantum algorithms to find approximate solutions to NP-complete problems.
- Deployed a data lake to AWS servers in order to store readout values from control system calibrations.

EDUCATION

AUG 2015 - PRESENT

University of California, Berkeley
B.A. in Computer Science, Applied Mathematics

GPA: 3.943
Relevant Coursework: Efficient Algorithms and Intractable Problems, Machine Learning, Artifical Intelligence, Database Systems, Computer Security, Data Structures, Machine Architecture, Probability and Random Processes, Optimization Models

AWARDS

2018 **Jim and Donna Grey Endowment**
University of California, Berkeley
Awarded to 7 computer science students for high academic acheivement

2018 **Outstanding Student Instructor**
University of California, Berkeley
Awarded to top 9% of student instructors

PROJECTS

Optimal Particle Identification

Heuristic to classify particle types (pion, kaon, proton) based off energy-loss readouts measured at CERN. Showed that a classifier using this heuristic outperforms the previous standard, and performs as well as a neural network with access to the full enery-loss distribution.

Check it out at github.com/harleypatton/particle_id

Quark/Gluon Regression Model

Regression model for extracting exclusive quark and gluon probability distributions from mixed particle jets. Demonstrated the effectiveness of this method on simulated particle-level data.

Read more at harleypatton.com/papers/regression.pdf

Open-Source Contributions to Forest API

Contributed to *Forest*, an open-source quantum computing platform. Implemented the Duestch-Jozsa Algorithm and Shor's Algorithm, and added functionality to measure multiple quibits into classical memory concurrently.

See my contributions at github.com/rigetticomputing/grove and github.com/rigetticomputing/pyquil

PUBLICATIONS

Harley Patton, Benjamin Nachman (2018). The Optimal Use of Silicon Pixel Charge Information for Particle Identification. arXiv:1803.08974 (preprint)