Harley Patton

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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.
- Used probability outputs of a neural network trained to indentify fluent translations as a numerical metric of sentence translation quality, where input features were derived from semantic and grammatical analysis of the input sentences.
- Shipped data pipeline to ingest customer requests and corresponding machine-translated responses, and then generate the ML model quality report.
- Conducted experiment to determine which translation quality metrics best correlated with human evaluations from a team of professional translators.

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

Facelift

Web application that adds imperceptible noise to photos that contain faces in order to cause deep facial recognition algorithms to misclassify, allowing users to protect their privacy online. Uses Haar-cascade facial detection algorithms and a partial gradient descent based adverserial attack.

Musical MCMC

Markov Chain Monte Carlo (MCMC) method to generate novel pieces of music similar to any provided piece. Uses the Metropolis Hastings algorithm and samples the resulting distribution to produce a new unique piece of music that matches the general characteristics of the original piece.

Enigma

Computer simulation of the German M4 Enigma Machine used to encrypt messages during World War II. Recreates the full Enigma system used by the German Navy, consisting of eight moving rotors, two fixed rotors, and two reflectors. Implements a progressive substitution cipher, allowing for 614,175,744 unique possible encryptions of any text string.

PUBLICATIONS

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