CHARLES BOLTON
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EDUCATION:

2020: **Master of Science in Computer Science**
Portland State University (Portland, OR)

2018: Accelerated Undergraduate **Computer Science**
Portland State University (Portland, OR)

2017: Sonic Arts/Audio Engineering
Portland Community College (Portland, OR)

2015: Post-Baccalaureate Inquiry World History, Politics, Economics
Portland State University (Portland, OR)

2014: **Mandarin Chinese** HSK 5 and Advanced Oral HSK Certification
Confucius Institute/Hanban (Portland, OR)

2010: Bachelor of Arts in **English Literature**
Portland State University (Portland, OR)
ESL Certification (Portland, OR)

PROJECTS:

Fullstack Trivia App:

Fullstack application using embedded postgreSQL, Javascript, HTML/CSS and Bootstrap. Made API calls to a database of trivia questions and presented them to users in game.

AI:

Projects include: Euphonomimesis, an experiment involving FFT and genetic algorithms, for determining whether a GA can mimic audio samples. Other AI projects: a puzzle-solver comparing A* with several heuristics and the 8-queens puzzle using genetic algorithms.

ML:

Projects include: NBA success prediction: recreation of a paper from students at SMU. A team project comparing four different ML models for predicting NBA player success using SVM, Regression, Naive Bayes and Random Forest. Other ML projects: Comparing simple perceptron model

to multilayer perceptron using MNIST handwritten digits data. Predicting spam email using probabilistic Bayesian and logistic regression models. Unsupervised K-means clustering on random data.

Markov Chains in Haskell:

Two projects using Markov chains and functional programming in Haskell to generate text (based on authors like Joyce, Woolf, etc) and MIDI (based on classical keyboard music like Bach, etc).

Cryptographic Protocols:

Three projects: Twofish-like cryptographic protocol using a Feistel structure and other symmetric methods. Elgamal asymmetric key exchange and encryption scheme using square multiply and Miller-Rabin primality test. Graduate lecture on elliptic curve cryptography and ECC Diffie-Hellman key-exchange.

Countries Database:

Created a small relational database and corresponding embedded-SQL application with countries of the world data related to statistics such as human rights, wealth and income, etc. Used postgreSQL, pandas, sqlalchemy and psycopg2 in toy app which iteratively built up sql query strings based on user input.

MIT Battlecode:

Software Engineering project using MIT's battlecode as background. Was project manager for a small team of engineers using an agile-like sprint process with the goal of building a complicated Java program to compete in the battlecode robot competition, an annual exercise in developing features for a multithreaded interface.

Digital Signal Processing & Ear Trainer:

Exploration into the physical foundations of music, digital signal processing, and waveform generation, composition, and decomposition. Created over 5000 .wav files of sine, square, saw, and triangle waves, and combined them in many musical ways, then wrote a Discrete Fourier Transform which listened to the combined waves and decomposed them. Made a game/practice tool for audio engineers and musicians.

Candidate Solutions for Post-Quantum Cryptography:

Group research paper investigating some interesting topics related to cryptographic solutions and cryptosystems for the next era of cryptography such as dihedral coset/hidden subgroup problem vis a vis lattice crypto, supersingular isogenies and code theory.

RESTful API and Spreadsheet Parser:

Project completed as capstone for PSU. Internship with ecommerce consulting company The Good. Worked with a strategist and two software developers over the course of five months. Data wrangling from spreadsheets to REST API using pandas, flask, json, postman.