https://andrewnc.github.io

Andrew Carr

andrewcarr06@gmail.com

Education

P.h.D Computer Science; 4.0 2022
Brigham Young University *Provo, UT*

B.S. Applied and Computational Mathematics; 3.81 2018
Brigham Young University *Provo, UT*

Relevant Experience

Google Brain - Research Intern May - Oct 2020

- Contributed key mathematical and algorithmic insights into a new self-supervised pretraining method that leverages recent advances in differentiable programming and representation learning
- Defined new state of the art performance for audio and vision based tasks
- Streamlined and standardized several scattered experiments across notebooks and code bases. This drastically increased team productivity and we were able to launch multiple large scale experiments daily
- Designed and developed two novel metrics to measure experimental success which were used by the team to communicate our findings to key stake holders
- Orchestrated foundational experiments across several hundred GPUs and decreased data loading time from 5 minutes to 300ms
- Explored the literature and successfully reproduced results from the field which increased our ability to iterate and improve upon existing research

Lyft, Level 5, Autonomous Vehicles - Prediction Intern June - Aug 2019

- Developed A/B testing platform in high performant C++ to compare prediction models locally and in the cloud greatly increasing my team's development velocity
- Identified predictive features and developed real-time feature extraction system for use in machine learning pipeline
- Explored statistical and neural models for dynamical vehicle motion prediction leading to a 22.5% performance improvement
- Lead 3 engineers in exploratory 20% project for semantic code search

Qualtrics - NLP Intern May - Aug 2018

- Achieved ∼96% accuracy with a .005% false positive rate, matching state of the art on phishing detection by researching and implementing system using sophisticated NLP feature engineering and machine learning
- Increased speed of system 3x resulting in a 63% reduction in hardware costs while handling 3 million daily requests by engineering asynchronous API using parallel processing and high performance computing techniques
- Identified, explored, and implemented state of the art emerging topic tracking system which allowed my team to reach their stretch goals for the quarter and led to a **patent**
- Built question similarity tool using sentence embeddings after collecting and curating a dataset of ∼130,000 questions. Improved f1 score from .3 to ∼.7 built using both structured and unstructured datasets
- The final estimated impact of my internship is $300k - 500k in yearly savings

Amazon Alexa Prize: Team Eve - Machine Learning Researcher Jan - Apr 2018

- Member of team Eve for the Alexa prize challenge. One of eight teams selected out of hundreds to research and build a social chatbot system to hold arbitrary conversation for 20 minutes on any topic
- Designed and built an offensive speech filtering system using probabilistic methods, which performed ∼3% better than current industry standards
- Researched and designed a complex sentiment analysis tool that classified sentences as having complex sentiment used for noteworthy knowledge retrieval

Private Capital Group - Software Engineer, Intern May - Oct 2016

- Developed web solutions to significantly increase back-office employee effectiveness by creating automated systems that resulted in yearly savings of over $200,000
- Collected, cleaned, and analyzed internal and external data which was built into reporting dashboards that tracked key business insights and allowed partners to make informed decisions
- Decreased product downtime by 47% by implemented full testing suite and fixing critical bugs

Carnegie Mellon University - IT Lab Research Fellow June - Aug 2015

- Performed secondary research on police effectiveness in the presence of body cameras. We found a 70% decrease in violence on both sides when using body cameras
- Analyzed data from user studies and developed a custom web game to help local refugees learn English

Other Experience

President's Leadership Council Presentation: Selected by faculty and staff to represent my college's 4,000+ students by presenting my research to BYU's $1 million+ donors and top administration

1^{st} **place Student Research Conference 2019**: Presented novel findings to staff and peers

2^{nd} **place BYU ACM Hackathon 2019**: Built a computer vision pong game that is controlled with hand detection

2^{nd} **place BI Wolff Hackathon 2018**: Built prescriptive ML solution to predict individual risk of becoming homeless

1^{st} **place BYU ACM Hackathon 2017**: Created Auto Dino program to perfectly play the chrome dino no wifi game

1^{st} **place BYU ACM Hackathon 2016**: Created *Mathify* app using polynomial interpolation to display text as math

2^{nd} **place Global Legal Hackathon Utah**: Made a chrome extension using NLP to summarize terms and conditions which I grew to 2000 active users and sold

Python 3.8 Open Source: Fix small doc bug in cpython pull #11683

pyprobml Open Source: A primary contributor for Machine Learning a Probabilistic Perspective Python code

TA Control theory: Developed curriculum for optimal control, built small self driving car platform for student projects

TA Graduate Deep Learning: Developed labs, held help sessions, and taught lectures on advanced deep learning concepts

Applied Math Curriculum Development: Developed and wrote labs for students to practice mathematical and algorithmic stills, wrote solutions manual to applied math textbook

Data Science Blog: 300+ monthly readers. Data science problems solved with esoteric programming languages

Ranked 8th in world: Tetris in spring of 2011