CALEB McIRVIN

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EDUCATION

BS with Honors in Computer Science, Virginia Tech, Blacksburg, VA — Expected Dec 2023, 3.97 GPA

- Mathematics in a Computational Context (Honors) ● Software Design and Data Structures 1, 2, & 3 ● Multivariable Calculus ● Computer Organization 1 & 2 ● Discrete Mathematics ● Combinatorics and Graph Theory ● Theoretical Statistics ● (Grad) Quantum Computation ● (Grad) Deep Learning ● Computer Systems ● Comparative Languages

EXPERIENCE

Quantum Software Co-Design Undergraduate Researcher, Virginia Tech, Blacksburg, Virginia — Sep 2022 – Present

- Exploring GPU performance of quantum algorithms using emulator tools to motivate NISQ-era developments
- Constructing customized Dockerfiles for use in quantum simulation, working with HPC technologies

Machine Learning Research Support, Virginia Tech, Blacksburg, Virginia — June 2022 – Present

- Identified 4000+ potential descriptors for historical costuming ontology development using NLP models
- Spearheading token similarity visualization using Python (Pandas, NumPy, Sklearn), Orange, and Gephi
- Constructed an interactive web app in Vue on AWS Lightsail to identify the relevance of potential descriptors
- Preparing a paper for publication in a peer-reviewed journal, developing technical writing abilities

Natural Language Processing Undergraduate Researcher, Virginia Tech, Blacksburg, Virginia — Sep 2021 – Present

- Pulled 60,000+ abstracts from multiple journals in the food science / food chemistry domain
- Finetuned Gensim Word2Vec models to perform exploratory data analysis on textual abstract data
- Collaborating on a results research paper for publication

CS Undergraduate Teaching Assistant, Virginia Tech, Blacksburg, Virginia — December 2022 – January 2023

- Provided guidance on programming assignments through daily office hours, emphasizing clear, insightful feedback

Software Engineering Intern, Exelaration, Blacksburg, Virginia — Nov 2021 – May 2022, Sep 2022 – Dec 2022

- Designed/implemented a website to store and display 30+ publications using the Vue.JS framework
- Collaborated using Git for version control, implemented features within a Dockerized application
- Boosted site performance by up to 2x through careful code analysis, bottleneck testing, and unit testing
- Completed 5 Codecademy training courses - HTML, CSS, JavaScript, SQL, and C#

Machine Learning Research Intern, IOMAXIS, Ballston, Virginia — June 2022 – Aug 2022

- Preprocessed NetFlow data on AWS EC2 instances, built custom PyTorch Lightning datasets/dataloaders
- Pretrained custom transformers using causal/masked modeling and visualized model loss in Tensorboard
- Finetuned pre-trained transformers on labeled NetFlow data for downstream tasks including generating user signatures and forecasting new sample data
- Co-authored two research result articles for publication

Software Development Engineering Intern, Wyze Labs, Seattle, Washington — May 2021 – Aug 2021

- Created software to scrape 200k+ Reddit posts/comments using Python and the PRAW API
- Extracted polarity and intensity of user sentiment from Reddit data using the VADER lexicon
- Enabled easy sharing among community team members, preprocessed data for graphical visualization

Web Development / Design Intern, King Grizzly Agency, Colorado Springs, Colorado — May 2020 – Aug 2020

- Built two websites independently using WordPress, Elementor, and custom HTML / CSS
- Applied principles of content marketing and value proposition design to client websites
- Wireframed outlines for three websites in Balsamiq; designed high-fidelity mockups in Adobe Illustrator

INDEPENDENT COURSEWORK

Udacity, Online

- **Intro to Self-Driving Cars Nanodegree -** Developed a matrix class, built a histogram filter, implemented A* search, created a traffic light classifier
- **Artificial Intelligence Nanodegree** - Explored constraint satisfaction problems, HMM POS tagging, and probabilistic models. Coded forward-planning agents as well as adversarial game-playing agents.
- **Artificial Intelligence Programming with Python Nanodegree** - Finetuned a pretrained model to classify dog breeds; coded a flower classifier with > 70% accuracy

LinkedIn Learning, Online

- 15+ courses related to Vim, Docker, artificial intelligence, machine learning, ethics, regexes, and statistics

SKILLS

- Programming languages – Python (PyTorch, PyTorch Lightning, NumPy, Pandas, Matplotlib, Seaborn, TensorFlow, Scikit-Learn), Java, HTML5, CSS, JS (Vue, React), C, C#, C++, SQL, LaTeX
- Software - 3D modeling applications (SketchUp, TinkerCAD, Autodesk Inventor, SOLIDWORKS), web development tools (WordPress, Elementor), graphic design tools (Adobe Illustrator, Balsamiq), software development tools (Jupyter Notebooks, Orange, SQL Server, Gephi), version control (Git, GitHub, GitLab, Bitbucket, Azure DevOps)