Kaleb Crans

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Education

The University of California, Davis Graduated June 2023

Bachelor of Science in Applied Mathematics, Computer Science Minor *3.65 GPA*

- **Computer Science Coursework**: Object Oriented Programming, Data Structures and Algorithms, Computer Organization & Machine-Dependent Programming, Discrete Math, Databases, Machine Learning
- **Math Coursework**: Multivariate Calculus, Statistics, Linear Algebra, Probability Theory, Real Analysis, Stochastic Processes, Differential Equations, Complex Analysis, Numerical Analysis, Optimization
- Outreach Coordinator for Davis Computer Science Club
- Dean's Honor List

Technical Skills

Languages: Python, C/C++, R, and SQL
Developer Tools: Git, Linux, Vim, Bash, and Jupyter Notebooks
Libraries: NumPy, Matplotlib, pandas, Tidyverse, and PyTorch

Personal Projects

Data Analysis of Little Free Libraries | *R + Python* April 2023

- Used python to scrape data from littlefreelibrary.org and the associated map API
- Aggregated the (messy) data from multiple endpoints and transformed it into one dataset
- Cleaned data and validated location information using the sf R library and GADM datasets
- Performed regression analysis in conjunction with county-level ACS (American Community Survey) data
- Visualized data using ggplot and associated spatial data tools

Titi Monkey Technology | *Python* April 2022 – December 2022

- A multi-platform app written in python designed for running visual stimuli experiments with non-human primates
- Modular design to allow different researchers to run and modify experiments according to their specifications
- Wrote multiple GUI utilities to make common administrative tasks easier for end-users
- Overall, it can be run on MacOS/Windows/Linux, is easy to configure with JSON, and has many more features compared to the old IOS app used in the lab

L-Store Database System | *Python* January – March 2022

- Developed a python-based version of L-Store, a lineage-based HTAP database system with columnar storage
- Experimented and visualized the effects of different bufferpool sizes on performance
- Implemented durability with a contention-free "merge" background process
- Created a simplified SQL-like query interface that supports operations like select, update, sum, etc.
- Used the threading Python module for multithreading with a strict 2PL concurrency protocol

Spectral Clustering in C++ | *C++, Eigen template library, Python/Matplotlib* March 2021

- Wrote a version of the unnormalized spectral clustering algorithm in C++
- Used Eigen for matrix computations and linear algebra operations
- Also wrote a k-means algorithm implementation in C++ for performance comparison
- Tested on datasets from SNAP and from P. Fänti and S. Sieranoja
- Visualized clustering in action with Matplotlib

Non-Technical Experience

Undergraduate Reader September 2021 – May 2022

UC Davis *Davis, CA*

- Performed grading duties in undergrad math courses
- Worked with professors and TAs to make grading schemes for homework assignments
- Have read for each course in the Real Analysis sequence, Combinatorics, and Intro to Abstract Math

Eagle Scout May 2019

BSA *Troop 99*