ELLIOT HILL

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DATA SCIENCE PROJECTS

- Wrote a program to generated a computer vision dataset and trained deep learning models to detect biological structures in images to aid in the discovery of nature-inspired solutions to aerospace challenges

- *Masters thesis*: discovered best practices for reducing the computational cost of training machine learning algorithms and statistical models by up to 18% without sacrificing prediction accuracy

- Designed a novel regression regularization method that improved model prediction test error by over 5% on pathological data compared to ridge and lasso regression models

- Developed an optimization scheme that lowered the prediction error of logistic regression models on class-imbalanced data by up to 9% compared to standard stochastic gradient descent

- Built an end-to-end machine learning pipeline that ingests text data from the streaming service Twitch and stores it in a relational database before training natural language processing models

- *Capstone project*: developed hierarchical Bayesian models for spatial multiple systems estimation

- Used census data to assist the organization HousingNOLA uncover in housing disparities

- Processed and analyzed protein sequence data to discover taxonomic variation in protein composition

- Implemented PCA for dimensionality reduction, image compression, and PCA regression

- Fit linear mixed models to analyze the effect of global environmental change on biodiversity

- Cleaned, visualized, and analyzed police report data to determine spatial and temporal trends in arrests

- Created an interactive dashboard visualization for real-time optimization benchmarking

- Simulated an influenza epidemic using SIR models and discovered strategies for preventing outbreaks

- Used non-parametric correlation analysis to investigate spatial-ecological patterns

- Fit linear mixed models to experimental bat echolocation data

- Fit linear models to data to discern the relationship between diet and telomere length

- Programmed the boardgame Azul and analyzed game simulations to gain strategic insights

- *Honors thesis*: investigated behavioral data using social network analysis to predict competitive outcomes

- Derived and tested finite difference and interpolation schemes for solving moving boundary value problems

- Assisted in processing of geospatial data for a geolocator study on seasonal migration

- Programmed Conway's game of life

- Coded a program that removes artifacts in images

- Implemented Dijkstra's algorithm from scratch and used it to process Manhattan street data

- Built a program to visualize NumPy matrix dimensions