Nicholas Susemiehl

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Projects

Stellar Astrophysics Research

Calculated fraction of small stars that exist as members of binary pairs using data science techniques.

- Designed experiment to use novel approach of synthesizing data and making inferences about large populations.
- Utilized Python (Numpy, SciPy, Matplotlib) and R (Tidyverse) for data cleaning, analysis, simulation, and visualization.
- Created model using Markov Chain Monte Carlo for parameter estimation to achieve statistically significant fit.
- Resulted in numerous presentations and first-authorship astrophysics paper to be submitted for publication soon.

Kaggle Competitions (Titanic: Machine Learning, Digit Recognizer)

Python-based data science projects which scored among top submissions at times of completion.

- Engineered features, imputed missing values, and encoded categorical variables to clean data and optimize analysis.
- Assembled boosted random forest model to solve binary classification problem (Scikit-Learn).
- Designed convolution neural network architecture for computer vision classification (Tensorflow, Keras).
- Complimented work with independent study of machine learning methods.

Predicting Card Prices (In Progress)

Exploring how the attributes of a Magic: The Gathering card can be used to predict its price with Python and SQL.

- Constructed relational databases through web scraping (Requests, BeautifulSoup, Pandas), organized data with MySQL.
- Implemented statistical methods (LASSO, Stepwise Subset Selection, Tree-Based) to select significant features.
- Devised machine learning model via cloud computing (Scikit-Learn, AWS SageMaker) to predict the price of a card.
- Will measure prediction accuracy and summarize results through visualizations and written report.

Skills & Abilities

Technical

- Programming: Python (4 years), R (2 years), SQL (1 year), HTML/CSS (1 year), C++ (<1 year)
- Other Software: Jupyter Notebooks, Anaconda, Microsoft Office Suite, Amazon Web Services

Statistics and Modeling

- Linear/Logistic Regression, Supervised/Unsupervised Learning, Probability, Hypothesis Testing

Scientific Communication

- Presented work at three university poster sessions and one major national conference to experts, led members of public through numerous tours of scientific facilities, delivered talk on applications of data science in scientific fields.

Experience

Research Assistant | Dept. of Astronomy, Univ. of Michigan | September 2016 - Present

- Contributing to big-picture group goals using data science techniques in a stellar astrophysics project.
- Spearheaded the implementation of new technologies (AWS) to increase group efficiency.

Webmaster | Student Astronomical Society, Univ. of Michigan | May 2019 – May 2020

- Managed club's online presence to promote increased visibility and inform recruitment and retention strategies.
- Recognized by the university for exceptional service and ability to communicate complex topics to diverse audiences.

Instructional Aide | Dept. of Astronomy, Univ. of Michigan | September 2017 – March 2020

- Facilitated laboratory sections where I explained technical concepts in a hands-on manner to large classes of students.
- Led course and group discussions of advanced scientific material for small group of novices.

Sub-Team Leader | Mich. Mars Rover Team, Univ. of Michigan | September 2017 – June 2018

- Directed team of researchers in the design scientific tests, deployed work to achieve victory at competition.

Education

B.S. Astrophysics | University of Michigan – Ann Arbor

- Majors: Astronomy & Astrophysics, Interdisciplinary Physics. Minor: Statistics
- Course Highlights: Statistical Computing (Data Science with R), Computational Astrophysics (Applied Statistical Analysis and Machine Learning), Data Mining, Linear Algebra, Theoretical & Applied Probability

M.S. Analytics | Georgia Institute of Technology (Takes place remotely; begins Fall 2020)