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.

- Performed exploratory data analysis by summarizing and visualizing data (Pandas, Seaborn)
- 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 Environment, 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 course and group discussions of scientific material for group of novices; delivered talk on applications of data science in scientific fields.

Experience

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

- Active member of two academic research groups which confront diverse problems in astrophysics.
- Contribute 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 membership; Recognized for exceptional commitment to service.

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 groups of students.

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

- Led team of researchers in the design scientific tests; Deployed work to achieve victory at competition.

Education

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

- 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. Georgia Institute of Technology (Beginning Fall 2020) | Analytics