

Caleb E. Strait

Data Scientist

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Skills

Communication

Data Visualization

Statistical Modeling

Machine Learning: K-Means, PCA, SVM, Linear & Logistic Regression, Artificial Neural Network, Decision Trees, Naive Bayes, NLP

Matlab: Psychtoolbox

Python: Flask, Pandas, Numpy, Jupyter Notebook, SciKit-Learn, Matplotlib

Web: HTML, CSS, JS, API

OS: Mac, Windows, Linux

SQL: SQLAlchemy, PostgreSQL

Java, C++/C#, SPSS

Education

University of Rochester

Ph.D., Brain & Cognitive Sciences
May 2016

M.A., Brain & Cognitive Sciences
January 2014

Oberlin College

B.A., Psychology
Concentration, Cognitive Science
Minor, Computer Science
May 2011

Experience

Data Science Fellow Insight Data Science 2017

- Devised and wrote a custom recommendation algorithm: averaging reviewer scores to create an initial item recommendation hierarchy, and using reinforcement learning to recalculate that hierarchy as the user gives feedback on recommendations.
- Built a proof-of-concept web application, "Nextgame," which gives increasingly personalized video game recommendations by prompting user feedback for each of a series of recommended games. Collected data with web scraping and the igdb.com API, cleaned data with regular expressions, and stored data in a PostgreSQL database hosted with AWS. Built a front end in Flask that queries this database for each user using SQLAlchemy. **(Python)**
 - Hosted at nextgame.site
 - Repo at [goo.gl/2dGQ3C](https://github.com/calebstrait/nextgame)
- Analytically validated the app's performance after saving usage data from 42 users. Used a binary cumulative density function test on logistic regression coefficients to show that there were significantly more users than we would expect by chance for whom recommendations were increasingly positively received given more feedback. **(Python)**
- Presented the algorithm and web app to over a dozen Insight client companies, including Facebook, Amazon, and Microsoft. **(PowerPoint)**

Senior Scientist University of Rochester 2011-2016

- Designed and programmed 30+ custom experiments to characterize neural signal processing during human decision-making. **(Matlab, C++)**
- Led a team of three laboratory technicians and four research assistants in recording behavioral, eye-movement, and neurophysiological data during these experiments.
- Estimated mid-decision neuronal spike frequencies from extracellular voltage measurement time series data using PCA with K-Means. **(Matlab, OmniPlex)**
- Wrote a series of custom signal processing toolkits for use with decision-making experiment datasets whose formats I had standardized. Used sliding-window logistic regression models of neuronal spike frequencies to characterize how the recorded brain area's neurons encode decision parameters. **(Matlab)**
 - Example at [goo.gl/1TndRV](https://github.com/calebstrait/1TndRV)
- Demonstrated that neurons encoding an option's value tended to do so relative to its best alternative, suggesting that these regions encode decision-relevant information in a way that computationally subtracts an option's pros from its cons. Published these findings across four 1st-author peer-reviewed articles in some of the highest impact-factor journals in psychology and neuroscience. **(Matlab)**
 - Hosted at calebstrait.com
- Wrote and successfully defended a doctoral thesis around these works, "Neural Mechanisms of Reward-Based Choice," through a series of public departmental talks. **(PowerPoint)**
 - Hosted at [goo.gl/VT4KNJ](https://github.com/calebstrait/VT4KNJ)