Jonathan Stokes

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Profile

Research scientist / Data scientist with PhD. in Electrical Engineering. As a PhD. student working on research projects I had to take complete ownership of my work in order to finish papers. In researching I gained experience coding in Python, a theoretical background in data structures and algorithms, probability, and linear algebra. My natural inclination is to think big. What would a general purpose AI be like? What would it be like to work with a general purpose AI? These are the kinds of questions that inspired me to read SciFi and got me though eight years of engineering education. However my PhD. has taught me that to deliver results one needs to take small steps. While there are paradigm shifts in engineering and science they are unpredictable and most advances are the culminations of a series of incremental steps. Since graduating I have taken initiative, gaining experience working with structured and unstructured data sets by building predictive and explanatory models for Kaggle competitions and potential employers for a variety of problem domains. My ambition is to join an innovative business that offers the potential to develop my skill sets and grow a career.

Education

PhD. of Electrical Engineering — **Drexel University**; Philadelphia, PA
Advisor: Steven Weber — Graduation: December 2018 | GPA: 3.7/4.0

Masters of Electrical Engineering — **Drexel University**; Philadelphia, PA
Advisor: Steven Weber & Mark Hempstead — Graduation: December 2015 | GPA: 3.7/4.0

Bachelors of Science in Electrical Engineering — **University of Rhode Island**; Kingston, RI
Graduation: May 2012 | GPA: 3.8/4.0

Experience

Software Engineer (Contract): Centrly - San Diego — January 2020 - April 2020

Project: Designing and testing web scrapers.

- Created several web scrapers using Python, Selenium, and AWS to collect business intelligence data.
- Required correctly scoping various projects, designing web scrapers, implementing the scrapers, and testing that they functioned as initially scoped, all in a relatively short time frame.

Student and Research Assistant: Drexel University - Philadelphia — September 2013 - September 2018

Project: Estimate the expected cost of star sampling to find a target node in a large graph.

Procedure: Identified a tractable problem. Read related research. Formulated solution. Iterated. Tested solution.

Reason: Given a graph and computational constraints, one may want to know if star sampling will find a target node.

- Estimated the expected unit and linear cost to find a target node in Erdős Rényi (ER) graphs under three types of star sampling: Star sampling with replacement (SS-R), Star sampling with center removal (SS-C), Star sampling with star removal (SS-S).
- Proved asymptotically in the size of the graph the probability of finding a target node on a given sample under the three variants of star sampling is approximately equivalent.
- Coded the simulations showing the estimates of the expected unit and linear cost of using star sampling to find a target node are accurate on ER graphs and can be accurate on real-world graphs.

Project: Estimate the expected steps for a biased random walk in a large graph to find a maximum degree node.

Procedure: Identified a tractable problem. Read related research. Formulated solution. Iterated. Tested solution.

Reason: Given a graph and computational constraints, determine if a biased random walk will find a target node.

- Developed a Self Avoiding Walk Jump (SAWJ) algorithm to search large graphs for maximum degree nodes.
- Modeled a rough upper bound on the expected number of steps required by SAWJ to find a maximum degree node using a discrete time Markov chain model which is shown to be accurate if the joint degree distribution of the graph is known.
- Coded the simulations showing that SAWJ outperformed competing algorithms in the literature on degree assortative ER graphs and some degree assortative real-world graphs.

Dissertation & Key Papers

Dissertation: "*Performance of random walks and sampling for graph search*" (2018)

IPL: "*Common greedy wiring and rewiring heuristics do no guarantee maximum assortative of given degree*" (2018)

KDD Workshop MLG: "*Star Sampling with and without Replacement*" (2017)

IEEE BigData: "*The Self-Avoiding Walk-Jump (SAWJ) Algorithm for Finding Maximum Degree Nodes in Large Graphs*" (2016)

Skills Summary

- Artificial Intelligence
- Artificial Neural Networks
- C++
- Data Stuc & Algorithms
- Flask
- GCP
- git
- Graph Theory
- Jupyter Notebooks
- KNN
- Linear Regression
- Linux
- Logistic Regression
- Markov Chains
- Naive Bayes
- OpenCV
- Pandas
- PCA
- Probability
- Python
- Random Forests
- scikit-learn
- Statistics
- SQL
- SVM
- TensorFlow

Relevant Coursework

- Artificial Intelligence
- Cryptography
- Data Struct. & Alg.
- Detection & Estimation
- Economics & Computation
- Information Theory
- Machine Learning
- Optimization
- Probability
- Stochastic Processes
- Wireless Systems
- Web Security