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| Scott D. Graham   |  |  |  | | --- | --- | --- | | 7 Ronaele Rd, Medford, MA 02155 | [scott.d.graham@gmail.com](mailto:scott.d.graham@gmail.com) | cell: 617.803.5265 | |

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| **EDUCATION** | **University of Oklahoma** | **Norman, OK** |
| 1996 – 2003 | **Degrees:** Master of Science in Electrical Engineering, GPA 4.0/4.0Bachelor of Science in Electrical Engineering Minor in Mathematics  **Focus:** Embedded Systems Programming and Robotics  **Courses:** Applied Statistics, Numeric Analysis, Digital Signal Processing, Math Models  **Leadership:** Team lead for OU Battlebots entries, Chair of OU IEEE society |  |

**SKILLS** Machine Learning, Modeling and Simulation, Data Analysis and Visualization, Probability and Statistics,

Software Architecture, Agile Development, Technical Leadership

**PROGRAMMING** **Languages**: Python, Java, PHP, SQL, Matlab

**Tools**: Docker, Git, Jenkins, SVN, Jira, Arcanist, Phabricator

**Agile Processes**: Scrum, Kanban

**TOOLS** **Machine Learning**: Vowpal Wabbit, Scikit-Learn, XGBoost

**Big Data**: Spark, Hadoop, Kafka

**Data Analysis / Visualization**: Pandas, Numpy, Flask, Matplotlib

**Misc**: Linux, OSX, Windows, Office

**LINKS** <gramhagen.github.io>

<https://www.linkedin.com/in/scott-graham-3a23822>

**WORK Nanigans**

**EXPERIENCE Senior Software Architect – Data Science / Optimization 2016 – Present**

* Design, develop, and deploy algorithms to provide accurate estimates of ad values and optimized campaign spend across ads for hundreds of clients using thousands of models.
* Extend real-time bidding model training infrastructure to tune models via hyperparameter optimization
* Develop new and improve existing software agents to operate automated ad management functions
* Subject Matter Expert for bidding, pacing, spend limiting and real-time bidding algorithms
* Review new and existing technologies and processes to improve team code quality and effectiveness
* Provide architectural guidance to ensure algorithms and features are technically sound, efficient and scalable
* Developed slack bot to improve devops workflow for troubleshooting tickets and automating tasks

**Senior Optimization Engineer – Data Science / Optimization 2013 – 2016**

* Designed and implemented fully automated model generation pipeline in Java (MapReduce) and Python: ETL, Feature Engineering, Training, Calibration, Evaluation, and Deployment
* Developed A/B Testing platform to evaluate performance improvements between ad groups and strategies
* Improved spend pacing algorithm to handle gaps in spend and different time zones
* Evaluated machine learning tools for building regression and classification models on large data sets
* Built model prediction service to provide sub-second predictions for Vowpal Wabbit and SK-Learn models
* Created model analysis framework and dashboard to support fast iteration on model experimentation
* Developed regression and classification machine learning models to estimate user behavior and value
* Designed new modeling approaches to improve accuracy under highly-imbalanced data sets

**Raytheon Integrated Defense Systems**

**Systems Architecture Design and Integration Directorate 2003 – 2013**

**Modeling & Simulation Lead**

* Managed multi-disciplinary teams for multiple efforts developing software systems to demonstrate capability for autonomous target tracking, data fusion and classification
* Produced detailed technical plans, budgets, and schedules. Assess progress regularly and develop mitigation plans to ensure end product meets ever changing customer specifications
* Led teams through all aspects of technical design, writing requirements, developing prototypes, integration, performance analysis and customer demonstration
* Wrote whitepapers for new classification algorithms and briefed system design and performance results
* Developed and maintained multi-threaded, object-oriented Java code for simulation and signal processing
* Implemented MATLAB prototypes and offline test scripts to train and evaluate classification performance

**Research & Development Lead**

* Led development of algorithms to recognize patterns in multi-phenomenological data and provide a means of fusing data across multiple sensors
* Identified several techniques leveraging statistics, probability and information theory, Bayesian Networks and rule-based expert systems that improved classification capabilities
* Developed innovative machine learning techniques to quantify level of estimation uncertainty
* Implemented Java based test harness to rapidly evaluate each classification algorithm over a broad range of test conditions
* Integrated algorithms into simulation and demonstrated capability for fusing information from multiple classifiers across multiple sensors

**Algorithm Team Lead**

* Led algorithm development team performing analysis of heterogeneous multi-sensor discrimination architectures and algorithms
* Investigated impact of fusing data in both distributed and centralized sensor networks and developed techniques for graceful degradation when data from networked agents are unavailable
* Defined requirements and chaired change control board for Java-based multi-sensor simulation framework
* Prepared and conducted multiple demonstrations of software to customer and technical community to demonstrate classification accuracy improvement of fusing data across multiple sensors

**Algorithm Developer**

* Developed a common process to streamline supervised learning of classification databases
* Investigated techniques for feature selection (n-dimensional distances and mutual information based)
* Investigated supervised learning approaches for developing Gaussian Mixture Models (Expectation-Maximization and Support Vector Machines)
* Implemented performance analysis metrics and evaluation system using a computing cluster to rapidly measure classification performance across a broad range of test cases
* Wrote MATLAB code to extract feature data and execute all stages of database learning and performance characterization
* Authored a technical whitepaper describing the database generation process and prototype results
* Implemented heuristic based optimization algorithm for prioritizing dynamic sets of tasks

**OSS Contributions Vowpal Wabbit**

* Developed python bindings and sk-learn interface for popular open source vowpal wabbit machine learning project and PyPI packaging
* <https://github.com/JohnLangford/vowpal_wabbit>

**TensorFlow skflow**

* Fixed model saving/loading issue
* <https://github.com/tensorflow/skflow>

**ML-Agent**

* Developed Flask-based prediction service which can use Scikit-Learn or Vowpal Wabbit models
* <https://github.com/gramhagen/ml-agent>

**ML-Toolbox**

* Created Docker image with many machine learning toolkits installed as well as Jupyter Notebook to simplify experimentation and evaluation
* <https://github.com/gramhagen/ml-toolbox>

**ML-Dashboard**

* Flask-based dashboard on a Docker image to simplify deployment and integrate with existing datastores to make simple graphs and charts for visualizing ML dashboards or data sets: <https://github.com/gramhagen/ml-dashboard>

**REFERENCES** Available upon Request