Nicholas Barrett

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EDUCATION

Master of Science, Applied Mathematics and Statistics, **GPA 3.4/4.0**
Stony Brook University, SUNY, Sep 2020-May 2022

Advanced Graduate Certificate, Data and Computational Science, **GPA 3.7/4.0**
IACS, Stony Brook University, SUNY, Jan 2021- May 2022

Bachelor of Science, Mechanical Engineering, **GPA 3.0/4.0**
University at Buffalo, SUNY, Sep 2015-May 2019

PROJECTS (Reports and Code available)

Regression Analysis on Genetic and Environmental Interaction

- Genetic analysis to determine correlates for outcomes with ~2000 genetic indicators and 6 environmental variables in R Studio. Included missing value analysis, data imputation methods, building, and evaluating regression models including up to third order interaction terms. Modeling included using ANOVA, Ridge regression, LASSO, AIC/BIC for selection.

Deep Q-Learning Car Simulator

- Deep Q-Learning Network and Car simulator built from Tensorflow and Keras and a custom environment based Open AI's Gym to train a deep learning model utilizing the Q-learning framework developed by Google DeepMind. Trained convolutional DQN on "sight" vector from car agent in a custom developed environment. Used reward signals based on survival and crashes to train.

2D Convolutional Neural Network for Sudoku Prediction

- Used a 2D convolutional network in TensorFlow to train a sudoku solver using data found on Kaggle.com, by predicting the most likely next number and iterating

U.S. Wellness Visualization Dashboard

- Visualization dashboard (video link) for investigative data analysis on high dimensional US Wellbeing data aggregated from multiple data sources. Analyzed interactively with clustering and latent space methods. Built with python and plotly dash.

TECHNICAL SKILLS

Programming Languages

- **Python:** Experienced with NumPy, SciPy, Pandas, Keras, Tensorflow, Sklearn, for data analysis, modeling and machine learning. Experienced with matplotlib, plotly, dash for visualization
- **R/R-Studio:** Experienced with dplyr, readr, tidyverse, caret, MASS, glmnet, MICE, ggplot2, plotly, and the default packages for data wrangling, processing, and analysis
- **Matlab/Simulink:** Primary experience in linear algebra and differential equation simulations for robotic systems, Control system analysis (System ID and Control, State Space)
- **SQL:** Familiar with SQL database methods and scripting

Statistical and AI Methods

- Expert in classical data modeling and analysis techniques including regression, generalized linear models, analysis of variance. Practiced in data reduction and latent space methods.
- Experienced in machine learning methods for training and analysis including neural networks, random forests, clustering (KNN, DBSCAN, K-Means, E-M), SVM, ensemble methods, Q-Learning, reinforcement learning, and data utilization methods like bagging/bootstrapping and cross validation. Familiar with model and hyperparameter tuning.
- Practiced in missing value analysis and data imputation methods
- Proficient with techniques in traditional AI including graph search methods (bfs, dfs, minimax, AB pruning, A*), and bayes network inferences

WORK EXPERIENCE

Graduate Student Assistant for Data Management, Oct 2021 - May 2022
Stony Brook University, Osher Lifelong Learning Institute

- Established and maintained procedures for data management systems at OLLI, Managed workflow processes around sales and membership data collection and cleaning.
- Utilized Excel and Microsoft office tools in conjunction with Peoplesoft (Oracle Database) for internal data management, CampusCE for registration and program management.
- Used Excel functions and macros to clean, sort, and merge data across data sources to provide accurate reporting of registration and sales figures for management,

ADDITIONAL WORK EXPERIENCE

Design Engineer, Curtiss Wright Corp. at Target Rock, May 2019 - Aug 2020
Professional Reference: **Will Velkoff, PE,** Design Engineering Manager,
Contact Info, wvelkoff@curtisswright.com, 1.631.396.4544

- Performed design and analysis of valves and actuators for use in nuclear and defense systems.
- Managed project for the design and development of prototype technology for metal seated ball valves used in high temperature/pressure reactor loops. Managed financial requirements and budgeting, equivalent industry product and patent research to facilitate design process.
- Performance of finite element analysis and computational fluid dynamic analysis for validation of mathematically derived models and estimations for existing and new valve designs.
- Maintained drawing and model catalog for developing and production valves and actuators using Siemens NX 3d CAD software with Teamcenter for version control.
- Updating drawings, models, and specification calculations in accordance with project engineering and manufacturing departments.