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| **EDUCATION**  *Johns Hopkins University* May 2020  M.Sc.Eng. Biomedical Engineering 3.7/4.0  *Northeastern University* Aug 2018  B.Eng. Biomedical Engineering 3.9/4.0 | **SKILLS** **Programming:** Python, R, SQL, Batch Scripting  **Packages & Frameworks:** NumPy, Pandas, Tidyverse, NLTK, Keras, PyTorch, TensorFlow  **Machine Learning:** GLM, Random Forest, SVM, PCA, CNN, LSTM  **Data Visualization:** Tableau, Matplotlib, Seaborn, ggplot2, plotly  **Data Science:** A/B testing, Hadoop, Kaggle |

## **WORK EXPERIENCE**

**Research Assistant, The Johns Hopkins Data Science Lab**Baltimore, MD | Nov 2019 – Jan 2020

*Survival analysis of time-series data using Python, R*

* Cleaned National Health and Nutrition Examination Survey (NHANES) data using **dplyr**, **tidyverse**
* Reduced dimensionality of data using **PCA** to capture essence of the data
* Selected features using **tree-based model**, **AIC/BIC** to achieve better predictive performance of model
* Constructed a spectral-based convolutional neural network (**CNN**) on 3000 patients using **Keras** to predict mortality with 71% accuracy
* Improved mortality prediction accuracy to 86.45% using **regularized logistic regression**
* Hosted **R shiny** website comparing **PCA**, **k-means**, **UMAP**, **t-SNE** and visualizing clustering results using **ggplot2**, **plotly** (demo: <https://luchaoqi.github.io/Shiny_clustering/#1>)

**Data Analyst Intern, The Johns Hopkins Bloomberg School of Public Health** Baltimore, MD | May 2019 – Aug 2019

*Association analysis between lifestyle patterns and body mass index (BMI) via generalized linear model*

* Wrangled time-series data of 32971 subjects and built pipeline to front-end dashboard using **MySQL**
* Explored user distribution on **Hadoop** using **MapReduce** to maximize the dataset’s value
* Trained a generalized linear model (**GLM**) to predict user BMI with 46.07 mean squared error (MSE)
* Reduced prediction error by 13% using **ANOVA** and feature engineering method (**normalization, Random Forest**) through 10-fold **cross-validation**
* Identified statistically significant (p-value < 0.5) impact of lifestyle patterns on BMI to encourage the performance of multiple good health behaviors

**Senior Researcher, Paul C. Lauterbur Lab at SIAT** Shenzhen, CN **|** Nov 2016 - Jan 2017

*EMG signal pattern recognition for hand gestures using spectral analysis*

* Designed, constructed and assembled EMG data acquisition system for arm activities recognition
* Converted time-domain data of 200 gestures into frequency domain using **fast fourier transform** to denoise signal
* Classified different hand movements using support vector machines (**SVMs**) with 82% accuracy
* Improved accuracy by 3% training a neural networkproviding insight for the medical rehabilitation system

## **SELECTED PROJECTS**

**Reinforcement Learning on Super Mario Bros (NES)** Mar 2020 – Apr 2020

*AI that learns to play Super Mario Bros using Deep Q-Network (DQN) in TensorFlow*

*Demo:* <https://github.com/LuchaoQi/Reinforcement_Learning>

* Built **reinforcement learning** environment using **OpenAi Gym** and emulated NES using **nes-py** in Python
* Constructed a convolutional neural network (**CNN**) model with 5 hidden layersas an agent in **TensorFlow**
* Trained the agent using **deep Q-learning** and reduced training time by 20% using **Adam** optimizer
* Completed different levels of Super Mario Bros successfully without death which was twice as fast as averaged human players

**Amazon Rating Prediction** June 2019 – Aug 2019

*Detection of suspicious or fake Amazon product reviews using machine learning in Python*

*Demo:* <https://www.kaggle.com/luchaoqi/making-predictions-over-amazon-recommendation-data>

* Extracted Amazon Food Reviews data from Kaggle and cleaned data using **pandas**, **numpy** and **dfply**
* Tokenized unstructured text of user reviews using **NLTK** for feature construction
* Converted text to vector using **bag-of-words model (uni-gram/bi-gram)** with **scikit-learn**
* Predicted customer ratings using **logistic regression** with 0.94 AUC
* Reduced prediction error by 3% using **random forest** to improve detection of abusive reviews

**Investigation of Yelp User Funnels, Key Performance Indicators (KPIs)** March 2019 - May 2019

*Performance analysis of Yelp users & restaurants using SQL*

*Demo:* <https://github.com/LuchaoQi/Yelp_Data_Set_SQL>

* Wrote **web crawler** to scrape and parse unstructured data from Yelp using **Xpaths**, **BeautifulSoup** in Python
* Created a database using **MySQL workbench** and imported ~10 GB data file into the database
* Visualized geographic distribution of restaurants with average ratings using **Tableau**
* Performed metrics analysis (**bracket retention, DAU/MAU**) using SQL to measure customer engagement and making suggestions for ways to improve upon KPIs via **A/B testing**

## **PUBLICATIONS**

1. **Qi L**, Zhang Q, Tan Y, et al. Non-contact High-frequency Ultrasound Microbeam Stimulation: A Novel Finding and Potential Causes of Cell Responses. *IEEE Trans Biomed Eng* 2019.
2. **Qi L**, Zhang Q, Lam KH, et al. Calcium fluorescence response of human breast cancer cells by 50-MHz ultrasound microbeam stimulation. Presented at 2017 IEEE International Ultrasonics Symposium (IUS), 6-9 Sept. 2017 2017.