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| **LUCHAO QI** | **Research Data Scientist** | <https://www.linkedincom/in/LuchaoQi/> |
|  | lqi9@jhu.edu | <https://luchaoqi.github.io/> |
| Baltimore, MD 21218 | 443-839-9129 | <https://github.com/LuchaoQi> |

# SKILLS

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| **Programming:** Python, R, SQL, Linux | **Data Visualization:** Tableau, Matplotlib, Seaborn, ggplot2 |
| **Packages:** NumPy, Pandas, NLTK, Keras, PyTorch, TensorFlow | **Machine Learning:** GLM, Random Forest, SVM, PCA, CNN  **Data Science:** A/B testing, Hadoop, Kaggle |

# EDUCATION

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| THE JOHNS HOPKINS UNIVERSITY, Baltimore, MD |  |  |
| **M.S.E. Degree in Biomedical Data Science / Biomedical Engineering:** | May, 2020 | **GPA: 3.7** |
| NORTHEASTERN UNIVERSITY, Liaoning, CHINA |  |  |
| **B.Eng. Degree in Biomedical Engineering:** | August, 2018 | **GPA: 3.9** |

# WORK EXPERIENCE

THE JOHNS HOPKINS UNIVERSITY, Data Science Lab, Baltimore, MD

**Research Data Scientist** May, 2019 – Apr, 2020

***Association Analysis Between Lifestyle Patterns & Body Mass Index (BMI)***

* Used DPLYR and TIDYVERSE to clean data from National Health & Nutrition Examination Survey.
* Performed principal component analysis (PCA)to reduce data dimensionality.
* Trained a generalized linear model (GLM) to predict user BMI with 46.07 mean squared error (MSE).
* Reduced prediction error by 13% using nested ANOVA (F-tests) on principal component groupings through 10-fold cross validation.
* Identified statistically significant (p-value < 0.5) associations between BMI, age, race and physical activity level to encourage multiple healthy behaviors.

THE JOHNS HOPKINS UNIVERSITY, Bloomberg School of Public Health

**Data Analyst Intern** Jun – Aug, 2019

***Survival Analysis of Accelerometer Time-Series Data***

* Wrangled time-series data for 32971 subjects & built a pipeline to front-end dashboard using MySQL.
* Explored user distribution on Hadoop with MapReduce to maximize data value.
* Constructed a spectral-based convolutional neural network (CNN) on subjects 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; visualized clustering results using ggplot2 and plotly. (demo: <https://luchaoqi.github.io/Shiny_clustering/#1>)

SIAT, PAUL C. LAUTERBUR LAB, Shenzhen, CHINA

**Senior Researcher** Nov, 2016 – May, 2017

***EMG Signal Pattern Recognition for Hand Gestures Using Spectral Analysis***

* Designed, constructed and assembled EMG data acquisition system for recognition of arm activities.
* Converted time domain data of 200 gestures into frequency domain using Fast Fourier Transform to help denoise signal.
* Classified different hand movements using support vector machines (SVMs) with 82% accuracy.
* Improved accuracy by 3% in training a neural network, providing insight for medical rehabilitation systems.

**LUCHAO QI**

# PROJECTS

**REINFORCEMENT LEARNING:** Super Mario Bros (NES) Mar – Apr, 2020

**Developed AI that Learns to Play Super Mario Bros Using Deep Q-Network (DQN) in TensorFlow**

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

* Built a reinforcement learning environment using OpenAI Gym and emulated Nintendo Entertainment System using Nes-Py.
* Designed a convolutional neural network (CNN) model with 5 hidden layers as an agent in TensorFlow.
* Trained the agent using deep Q-learning and reduced training time by 20% using Adam optimizer.
* Completed various levels of Super Mario Bros successfully without “death,” achieving twice the speed of averaged human players.

**NATURAL LANGUAGE PROCESSING:** Amazon Rating Prediction Sep – Dec, 2019

**Use of Machine Learning to Detect Fake or Abusive Amazon Product Reviews**

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

* Extracted Amazon Food Review data from Kaggle; cleaned data using pandas, NumPy and dfply in Python.
* Tokenized unstructured text of user reviews using NLTK for feature construction.
* Converted text to vector using bag-of-words model (unigram/bigram) with scikit-learn.
* Predicted customer ratings using logistic regression with 0.94 AUC.
* Improved bad review detection by 3% to find abusive entities (sellers & reviewers) via random forest.

**INVESTIGATION OF YELP user funnels, Key Performance Indicators (KPIs)** Jan – Mar, 2019

**Developed Yelp User & Restaurant Performance Analysis Through SQL**

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

* Programmed a web crawler to scrape / parse unstructured data from Yelp using Xpaths & BeautifulSoup.
* Created a database using MySQL Workbench and imported ~10 GB data file into the database.
* Visualized geographical distribution of restaurants with average ratings using Tableau.
* Created metrics (bracket retention, DAU/MAU) to measure customer engagement; suggested methods to improve upon KPIs via A/B testing.

# PUBLICATIONS

**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.

**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.