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Github: `https://github.com/luchaoqi`

Luchao Qi

Education

2018 – 2020 (Aug – May)
Master of Science in Engineering *Biomedical Engineering - Data Science*
Johns Hopkins University, Baltimore, MD, GPA: 3.61.
Thesis Topic: Associations between Body Mass Index (BMI) and Accelerometer Time Series Data: National Health and Nutritional Examination Survey (NHANES) 2005-2006
Advisor: Professor Brian Caffo, Professor Ciprian M. Crainiceanu, Dr. Jiawei Bai

2014 – 2018 (Aug – May)
Bachelor of Science *Biomedical Engineering*
Northeastern University, Shenyang, Liaoning, GPA: 3.82.
Thesis Topic: Calcium fluorescence response of human breast cancer cells by 50-MHz ultrasound microbeam stimulation
Advisors: Professor Kwok Ho Lam, Professor Ming Qian, Professor Kun Yu

Professional Experience

2020 – 2020 (Sep – Dec)
Data Scientist Intern *Ekohealth,* Oakland, CA / Remote.

- Assisted in developing the product EKO-CORE, an FDA-cleared digital stethoscope, saving around $900 monthly cost for hemodialysis patients
- Led research project to design machine learning algorithms detecting vascular stenosis in fistula, which resulted in 73.68% accuracy and 0.85 AUC
- Productionalized customer-facing analysis pipeline in Python using AWS cloud services (S3, EC2, SageMaker) to improve team communication
- Prepared regulatory submissions for FDA; successfully secured $295,881 in SBIR funding from the National Institutes of Health (NIH)

2019 – 2020 (Aug – May)
Research Assistant *The Johns Hopkins Data Science Lab,* Baltimore, MD.

- Led project to analyze associations between demographic patterns, physical activity, and body mass index (BMI)
- Extracted 30K+ time-series SAS data from Centers for Disease Control and Prevention (CDC) in R and manipulated data using dplyr and tidyverse item Developed convolutional neural networks (CNN) using Keras for BMI prediction with 25.45 mean squared error (MSE)
- Reduced data dimensionality using principal component analysis (PCA);improved prediction by 23% training a generalized linear model (GLM)
- Hosted R Shiny website performing cluster analysis; visualized clustering results (PCA, t-SNE, UMAP) using ggplot2 and plotly

Projects

2020 – 2020 Mar May **Reinforcement Learning: Super Mario Bros**.
AI that Learns to Play Super Mario Bros Using Deep Q-Network (DQN) in TensorFlow
Demo: `https://github.com/LuchaoQi/Reinforcement_Learning`

- Developed DQN-based convolutional neural network (CNN) model as an AI agent using TensorFlow
- Optimized and accelerated model training by 30% tuning learning rate and optimizer
- Achieved 2X faster than average of human players with the trained agent completing tasks successfully

2019 – 2019 Sep Dec **Natural Language Processing: Amazon Reviews**.
Use of Machine Learning to Detect Fake or Abusive Amazon Reviews
Demo: `https://www.kaggle.com/luchaoqi/amazon-review-rating-prediction`

- Processed Amazon Food Review data using Pandas, NumPy, and dfply
- Tokenized unstructured text of user reviews using NLTK; converted text to vector using bag-of-words models with scikit-learn
- Predicted customer ratings using logistic regression with 0.94 AUC
- Improved negative reviews detection by 3% using random forest

Publications

[1] **L. Qi**, A. Leroux, S. Marudheri, C. Crainiceanu, J. Bai, and B. Caffo. Associations between body mass index (BMI) and accelerometer time series data: National health and nutrition examination survey (NHANES) 2005-2006. Manuscript submitted.

[2] **L. Qi**, Q. Zhang, Y. Tan, K. H. Lam, H. Zheng, and M. Qian. Non-contact high-frequency ultrasound microbeam stimulation: A novel finding and potential causes of cell responses. *IEEE Transactions on Biomedical Engineering*, 67(4):1074–1082, 2020.

[3] **L. Qi**, Q. Zhang, K. H. Lam, R. Guo, R. Chen, J. Huang, R. Meng, Z. Wang, H. Zheng, and M. Qian. Calcium fluorescence response of human breast cancer cells by 50-mhz ultrasound microbeam stimulation. pages 1–3, 2017.

Software

R Packages

MRIPCA: Principal component analysis (PCA) on MRI data
`https://github.com/LuchaoQi/MRIPCA`.

MRIcloudT1volumetrics: T1 volumetric analysis of MRIcloud output
`https://github.com/bcaffo/MRIcloudT1volumetrics`.

R Shiny Web Applications

Clustering analysis using K-means, PCA, T-sne, and Umap
https://github.com/LuchaoQi/Shiny_clustering.

BMI Calculator
https://luchao-qi.shinyapps.io/BMI_Calculator/.

Skills

Programming: Python, R (Shiny), SQL, Shell scripting.

Packages: Pandas, NumPy, SciPy, NLTK, scikit-learn, dplr, Tidyverse.

Frameworks & Platforms: PyTorch, TensorFlow, Keras, Hadoop, AWS.

Machine Learning & Deep Learning: GLM, Random Forest, SVM, PCA, CNN, RNN, LSTM.

Honors and Awards

2019–2020 **JHU Full-Time Graduate Fellowships (Tuition Scholarship)**.

2014–2018 **Dean's List**.