KAI LIU

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EDUCATION

Ph.D. in Computational Biology ◇ *The University of Texas at Austin, Austin, TX* Expected May 2019
M.S. in Microbiology ◇ *Huazhong Agricultural University, Wuhan, China* Grad. June 2013
B.S. in Biotechnology ◇ *Huazhong Agricultural University, Wuhan, China* Grad. June 2011

WORK EXPERIENCE

Machine Learning Intern ◇ *QuintilesIMS, Plymouth Meeting, PA* June 2017 - August 2017

Predicted Quality of Investigators in Future Clinical Trials | **Python, Spark**

· Predicted outliers of investigators per Key Risk Indicator using distribution based approach;
· Built multiple machine learning models (Lasso Regression, Neural Network, Random Forests) to predict the quality of investigators in a future study, which is one of the core projects in the investigator recommender system.

Graduate Research Assistant ◇ *The University of Texas at Austin, Austin, TX* December 2014 - Present

Developed Infectious Diseases Surveillance App | **Python**

· Developed a regression model and a Multivariate Exponentially Weighted Moving Average (MEWMA) model to detect emerging outbreaks with an accuracy of 0.9;
· Combined above models with stepwise variable selection algorithms to select best data sources for infectious diseases surveillance (more than 400 data sources in total);
· Built up data pipeline to automate the process of retrieving and cleaning data from CDC, RSS feed, Google Trends, Wikipedia, Twitter etc; integrated the App into Cloud Ecosystem.

PUBLICATIONS

· **Liu K**, Miller JC, Meyers LA. Effects of Directed and Clustered Contact Patterns on Infectious Disease Dynamics. *In preparation*.
· **Liu K**, Srinivasan R, Ertem Z, Meyers LA. Optimizing Early Detection of Emerging Outbreaks. *Submitted*.
· Castro LC*, Fox SJ*, Chen X, **Liu K**, Bellan SE, Dimitrov NB, Galvani AP, Meyers LA. Assessing Real-time Zika Risk in the United States. *BMC Infectious Diseases*. DOI: 10.1186/s12879-017-2394-9.

PERSONAL PROJECTS

Being Involved in Building an Open Source Software to Detect Lung Cancer | **Python, TensorFlow** August 2017 - Present

· Contributing to improving the 3D Convolutional Neural Network that identifies locations of nodules in scans;
· Contributing to improving the 3D Convolutional Neural Network to find the boundaries of nodules in scans.

Developing a R Package for Big Data Analysis | **R & Rcpp** December 2016 - Present

· Implementing following algorithms in the package: Stochastic gradient descent using line search and quasi-Newton methods to determine step size · The lasso · The proximal gradient method · Laplacian smoothing solved by sparse Cholesky/LU, the Gauss-Seidel method, the Jacobi iterative method, and conjugate gradient method · Graph fused lasso solved by Alternating Direction Method of Multipliers (ADMM) · Sparse matrix factorization.

Predicted the Direction of Exchange-Traded Fund (ETF) movement | **Python** April 2017 - May 2017

· Retrieved nine historical ETF sector datasets from Yahoo Finance;
· Implemented Logistic regression, Ridge & Lasso regression, and Artificial Neural Network to predict the direction of ETF movement;
· Achieved an accuracy of 55% ~ 60% for predicting nine ETF sectors movement; and the trading strategy based on my prediction outperforms baseline strategies.

Predicted Yelp Rating Based on User Review Enhanced Collaborative Filtering | **R** September 2015 - December 2015

· Extracted user opinions from restaurants dataset from Yelp (~10GB) using Stanford coreNLP tool;
· Developed a new Collaborative Filtering-based method to improve the accuracy of user's rating prediction and solve the sparseness of dataset by combining item's features and user opinions from all reviews;
· Improved the prediction accuracy by 4.23% compared to the traditional KNN method, and the coverage is 100%.

SKILLS

Programming	Fluency in Python(NumPy, SciPy, pandas, scikit-learn), R, Git · Familiar with MATLAB, Linux, LaTex · Experience in SQL, Hadoop, Spark, TensorFlow, C++
Machine Learning	Deep Neural Network · Regression with regularization · Support Vector Machine · Random Forests · Hidden Markov Model · Clustering · Time series and dynamic models · Frequent Pattern Mining · Natural Language Processing · Image Processing