

SHIYU LUO

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EDUCATION

Northwestern University, Evanston, IL 09/2017-Present
Master of Science (expected in 12/2018) in Computer Science GPA 4.0/4.0
Northeastern University, Boston, MA 01/2017-06/2017
Graduate courses in Computer Science GPA: 4.0/4.0
Southern Medical University, Guangzhou, China 09/2011-06/2016
Bachelor of Medicine in Clinical Medicine GPA: 3.42/4, Rank: 16/245

MACHINE LEARNING & PROJECTS

Stock Price Predictor with Recursive Neural Network (RNN) git.io/vbukG

- Implemented RNN from scratch in Python without 3rd-party deep learning framework
- Trained the RNN with preprocessed stock price (time series data) of Alphabet Inc.
- Produced reasonable stock price predictions

Large Scale Face/Iris Recognition with Eigenface/Edge Detection git.io/vbukC

- Implemented an 'Eigenface' face recognition system in Python
- Processed 10,000+ face images with OpenCV
- Tuned distance metrics and eigenvalue cutoffs with performance evaluations in ROC/CMC
- Achieved rank 1 recognition rate 29.58% (random guess < 0.70%)
- Implemented an iris recognition system based on canny edge detection and hough transform

Movie Recommender with KNN git.io/vbukz

- Designed and implemented a KNN-based collaborative filter for movie rating prediction
- Optimized filtering strategy (user-based/item-based), distance metrics, data imputation, via statistical tests and cross-validations

Handwritten Digits Classification with KNN & SVM git.io/vbukw

- Trained a KNN and a SVM classifier for handwritten digits in MNIST dataset
- Achieved error rate of 1.9% with RBF kernel SVM, and 2.0% with KNN

Naive Bayesian Email Spam Filter git.io/vbuk6

- Trained a filter on spam and ham (non-spam) samples collected by SpamAssassin
- Achieved error rate 7.4% on a test set with "spammish" signatures
- Achieved error rate 10.07% on a challenging test set without obvious "spammish" clues

Housing Forecast with Linear Regression git.io/vbukM

- Cleaned and preprocessed house price data of King county, WA
- Visualized correlations between features and price with *seaborn.pairplots* in Python
- Implemented a linear regressor with both batch gradient descent and Newton's method

Image Compressor from Scratch in JAVA git.io/vbukS

- Reimplemented JPEG 2000 image compression in Java with wavelet transform (CWT)

Frogger Game without For-Loop git.io/vbuk9

- Reimplemented 1981 arcade game *Frogger* in Racket (a Lisp variant)
- A game written without For-loop, every iteration is implemented in recursion

MAJOR COURSES

Machine Learning 2017 Fall

Decision trees, nearest neighbors, linear regression, linear discriminants, support vector machines, collaborative filtering, Naive Bayesian classifiers, Gaussian mixture models, reinforcement learning, Adaboost, active learning

Deep Learning Foundations from Scratch 2017 Fall

Deep neural networks, time series models and recursive neural network (RNN), convolutional neural network (CNN)

Optimization Techniques for Machine Learning and Deep Learning	2017 Fall
Gradient descent, coordinate descent, Newton's method, quasi-Newton's method; Principal Component Analysis; Boosting	
Biometrics	2017 Fall
Fundamentals of iris/face/fingerprint recognition, computer vision and pattern recognition basics, 2D/3D image processing, scientific evaluation methodologies of biometrics systems	
Object-Oriented Design in Java	2017 Summer
Object, class, metaclass, message, method, inheritance, and genericity; polymorphism; software reuse with inheritance and composition; graphical design notation (UML)	
Discrete and Data Structures	2017 Spring
Set/list/tree/graph, array/stack/queue, recursions, space-time complexity	
Intensive Foundations of CS	2017 Spring
Purely functional programming in Racket, structural/generative/tail recursion, systematic approach to world problems, test suite creation, data-oriented program organization (atomic data, self-referential data, functions as data)	

HONORS & SKILLS

- 4× Outstanding Student Scholarships, Southern Medical University, '16,'15,'13,'12
- Programming Skills: Python, Java, Racket, C, MATLAB
- Math Skills: Statistical Inference and hypothesis testing, Linear Algebra