HUI WEI

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EDUCATION

Courant Institute of Mathematical Sciences, New York University (NYU) May 2019
Master of Science in Computer Science
Key Courses: Convex Optimization, Information Theory, Foundations of Machine Learning, Computer Vision, Vision Meets Machine Learning, Machine Learning for Healthcare, Deep Learning in Medicine

Beijing University of Posts and Telecommunications (BUPT) July 2017
Bachelor of Engineering in Telecommunication Engineering

SCHOLASTIC ACHIEVEMENTS

BUPT Second Class Merit Student Scholarship 2013 - 2014
BUPT Third Class Merit Student Scholarship 2014 - 2017

RESEARCH EXPERIENCE

Multitask Prediction of Disease Onset from EHR data Aug.2019 - Present
Job title: Project Associate, Department of Population Health, NYU Langone Health
Supervisor: Prof. Narges Razavian, NYU Langone Health

- Used 100 most common lab values of NYU EHR data to predict 283 diseases onset after one year.
- Grouped ICD-10 codes, defined qualified patients and reasonable labels within outcome windows.
- Built two innovative CNNs: one combined temporal information first using three resolutions, while the other combined lab values first.

Dementia Subtype Prediction at the First Visit of Early Stages Feb.2019 - Present
[Abstract][drafted paper][code]
Supervisor: Prof. Narges Razavian, NYU Langone Health

- Explored Multiclass Logistic Regression and Multilayer Perceptron for classifying four dementia subtypes at the first visit of early stages for demented patients using structured data in NACC dataset.
- LR outperforms clinicians on the Lewy body variant of Alzheimer's disease evaluated by F1 score (**0.283** vs. 0.062) and sensitivity (**0.215** vs. 0.033).
- Proposed four data augmentation methods and used L1 Regularization to avoid overfitting.
- Analyzed reasons of clinician errors and the best model improvements using top features obtained from the model weight matrix of each disease.

ID Card Detection and Information Extraction Sept.2015 - Feb.2016
Supervisor: Prof. Bo Xiao, BUPT

- Leveraged Gaussian filters to remove image noise for the preprocessing.
- Implemented a system using Hough Line and Circle Transforms to detect edges and round corners of ID cards, achieving accuracy mean IoU = 33%.
- Improved the detection accuracy to **mean IoU = 85%** compared to Hough Transforms using SIFT descriptors and matching algorithms.
- Extracted identity information contained in ID cards using OCR.

Automatic Door Locking and Lights off System Sept.2014 - May.2015
Undergraduate Innovation Experiment Project
Supervisor: Prof. Yunxiao Zu, BUPT

- Designed a control system with STC89C52 microcontroller unit (MCU), which can control a relay to lock the door and switch the light button.
- Utilized a HC-06 bluetooth module to detect signals from mobile phones and commuincate with MCU.
- Tested control, lock and light-off modules, and succeeded in installing the whole system in the dorm.

CLASS PROJECTS

CheXpertNet **[report][code]** Spring 2019
Course: Deep Learning in Medicine, Instructor: Narges Razavian, Cem Deniz

- Trained a DenseNet on both frontal and lateral views from CheXpert dataset for 3 epochs to classify 14 diseases for each patient, achieving mean AUC score of 0.8236.
- Visualized Class Activation Map to show which parts of the image were attended by the model when it made decisions for each disease.

Deep Segmentation for Mouse Embryo Brain Ventricles **[report][code]** Fall 2018
Course: Machine Learning for Healthcare, Instructor: Rajesh Ranganath

- Trained a 3D VGG Net to detect which parts of ultrasound images contain brain ventricles.
- Designed a V-Net-like 3D CNN model to segment the whole ventricle, improving Dice function from 0.7119 to **0.8956**, compared with the graph-cut baseline.
- Leveraged spatially separated / cross constrained filter structures to reduce parameters of the model from 15M to **2M**.

Learning to Generate Chairs with Convolutional Neural Networks **[report][code]** Fall 2018
Course: Computer Vision, Instructor: Rob Fergus

- Implemented an upside-down CNN model to generate 2D CAD chair images and segmentation masks, according to different chair types and view angles as inputs.
- Our work was **the only** available Python&PyTorch implementation of this paper.

Transfer Learning for Text Classification **[report][code]** Fall 2018
Course: Foundations of Machine Learning, Instructor: Mehryar Mohri

- Utilized CNN and SVM to solve text classification problem on Amazon and Yelp review dataset.
- Adopted transfer learning to improve the robustness and effectiveness of the classification model.

K-means: A Semidefinite Programming's Perspective **[report]** Spring 2017
Course: Convex Optimization, Instructor: Michael L. Overton

- Demonstrated a SDP relaxation method for K-means, and concluded that this relaxation is tight under the stochastic ball model.

CycleGAN for Autonomous Driving **[slides]** Fall 2017
Course: Vision Meets Machine Learning, Instructor: Davi Geiger

- Implemented CycleGAN to transfer styles of driving pictures and videos between game and real world.

TECHNICAL SKILLS

Programming Languages	C++, Python, MATLAB, LaTeX, Markdown
Tools & Libraries	PyTorch, Scikit-Learn, Numpy, Matplotlib, Pandas, Scipy, Regex, DGL, OpenCV, CVX