Wei-Ying Wang, Ph.D.

wei-ying_wang@brown.edu wayinone.github.io +1-401-556-9066
Providence, RI (willing to relocate)

SUMMARY

- Seeking a data scientist position in which I would contribute to the success of a business
- Applied Mathematics Ph.D. with 10+ years experience in programming
- Specialized in data classification and statistical image analysis
- Analyzing large dataset to develop an image compression algorithm with the optimal compression rate

TECHNICAL SKILLS

Statistics	Mathematical statistics, regression, Baysian analysis, MCMC, information theory
Machine Learning	Classification, decision tree, random forest, deep learning, SVM, graphical model
Image analysis	Compression, denoising, 3D reconstruction, pattern recognition
Programming	Proficient with: Python(numpy, keras, ctypes, jupyter notebook), Matlab, Latex Experienced with: SQL(MySQL), C/C++, Amazon EC2, Mathematica, R
Operating system	Windows, Linux

EDUCATION

Brown University, Providence, RI Sep 2010 - May 2017
Ph.D. Applied Mathematics (GPA: 3.9/4.0)

· Dissertation: Image Compression and Data Clustering: New Takes on Some Old Problems
· Advisor: Stuart Geman

National Taiwan University, Taiwan Sep 2004 - May 2006
M.Sc. Mathematics/Track of Statistics (GPA: 3.8/4.0)

National Taiwan University, Taiwan Sep 2000 - May 2004
B.A. Economics (GPA: 3.8/4.0)

PAPERS

- **W.-Y. Wang** and S. Geman, "Comparison Based Image Compression." In progress.
  - A novel lossless image compression scheme with analytic performance guarantees
  - Outperforming state-of-the-art algorithms in bit-per-pixel results
  - Implemented with Amazon cloud (EC2) parallel computing (in C and Python) on 80 million image patches (∼3.6GB)
- **W.-Y. Wang** and S. Geman, "Robust Generalized Clustering." In progress.
  - A highly robust unsupervised data clustering algorithm which fits multiple structures (even when data is 70% corrupted)
  - Approximating an NP-hard problem with a modified backward selection procedure
  - Implemented in C and Python (by ctypes module)
- **W.-Y. Wang** and S. Geman, "Clustering to shapes" In progress.
  - An iterative PCA method for clustering high dimensional data into descriptive manifolds
  - Capable of obtaining complicated structures, like spiral-shaped data, in a short amount of time

– A novel dimension reduction tool, capable of obtaining complicated structures, like spiral-shaped data, in a short amount of time

PROJECTS

Kaggle Competition: Digit Recognizer

· Applying convolution neural network to build a digit classifier from MNIST data (37,800 training data)
· Achieving 99.21% correction rate on 28,000 test data

Text Generator with Recurrent Neural Network

· Using LSTM on Python (Keras on Tensorflow backend) to build a predictive context model
· Generating Shakespeare-like article by analyzing Shakespeare's work

Improving 3D Stereo Data with Markov Random Field

· Reducing the mismatching problem when reconstructing 3D images from stereo data
· Applying conjugate gradient to speed up the procedure and obtaining a smooth reconstruction

Parts-Based Object Detector

· Image recognition with with a hierarchical generative parts model
· 95% accuracy with 10% type I error when data is extremely corrupted (by adding Gaussian noise with variance equals the maximum pixel intensity).
· Implemented with a C++ mex file in Matlab

3D Reconstruction with Structured Light

· Reconstructing a 3D image with a camera and structured light from a projector
· Obtaining a high resolution 3D image in a split second

ACADEMIC EXPERIENCE

Brown university Sep 2016
Teaching Assistant on: Probabilities in Quantum Mechanics

· Topics: tensor representation, observable, entanglement, and quantum teleportation

Brown university 2011 - 2012
Teaching Assistant on: Statistical Inference

· Topics: statistical models, point estimator, ANOVA, hypothesis test, and regression

EMPLOYMENT

Academia Sinica, Institute of Mathematics, Taiwan 2008 - 2010
Research Assistant

· Utilizing PCA to build an image prior for denoising. Implemented with convolution operations on CUDA (speed up by 300%) in Matlab, made it possible to estimate parameters
· Instructing 20+ lectures on topics of signal analysis: wavelets and multi resolution

Military Service, Taiwan 2007 - 2008
Coastal Patrol Corporal

· Leading about 50 troopers patrolling coastal areas

HONORS AND AWARDS

- Sigma Xi National Nomination, Brown University, 2016-2017
- University Fellowship, Brown University, 2010-2017