Ming-Chang (Eric) Chiu

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INTERESTS

My research interests are in the understanding and modeling of human dynamics and the development of math tools to help interpretability of models and for decision-making.

EDUCATION

University of Southern California (USC) — Los Angeles, CA

Master (M.S.) in Electrical Engineering — Aug 2016 – May 2018 (Expected)
- Advisors: Professor Stefan Scherer and Dr. Chris Mattmann
- Areas of Specialty: Data Science, Digital Signal Processing
- GPA: 3.78 / 4.0

National Tsing Hua University (NTHU) — Hsinchu, Taiwan

Bachelor of Science (B.S.) in Computer Science & Electrical Engineering — Sep 2011 – Jun 2015
- Advisors: Professor Min Sun and Jerry Chou
- Last 60 GPA: 4.05 / 4.30, Cumulative GPA: 3.82 / 4.30

University of Minnesota — Twin-Cities, MN

Exchange Student in Computer Science and Engineering — Fall 2014
- GPA: 4.0 / 4.0, 15 credits

Tsinghua University — Beijing, China

Summer Exchange Student in Computer Science — Summer 2012

WORK EXPERIENCES

Information Retrieval and Data Science Group, USC Link Github — Los Angeles, CA

Researcher [Project: TensorFlow trained Byte Histograms for Better MIME Detection] — Sep 2017 – Present
- Drafting a paper for KDD 2018
- Developing Tensorflow models to extract fingerprints of file types for network security in TREC-DD data and evaluating neural network models with Apache Tika default
- Generating byte frequency analysis signatures for particular MIME types and accumulating this signature for near 90 file types in the TREC-DD polar dataset
- Integrating a command-line interface that can be run on the TREC-DD-Polar data

Institute for Creative Technologies — Los Angeles, CA

Researcher [Project: Conversation Quality Assessment] — Jan 2017 – Present
- One paper submitted to NAACL 2018
- Trained Long Short Term Memory (LSTM) deep learning model and word embeddings for behavioral modeling based on Fisher and alcoholism treatment data
- Predicted new conversation and treatment session quality reaching 75% accuracy
- Generated conversation snapshots on top of Fisher dataset and created Amazon Mechanical Turk jobs to collect objective assessments from people

Illumina, Inc. — San Diego, CA

DevOps Applications Intern — May 2017 – Aug 2017
- Built a machine learning Cron for analyzing jobs in the High Performance Computing cluster to identify "destined to fail" jobs using Sci-kit learn, reaching 95% accuracy
- Developed a deep learning Daemon that constantly loads new samples from database (Hive) to train a classification model using Mini-batch update technique with TensorFlow, achieving 78% accuracy
- Maintained enterprise Atlassian Jira and Confluence; created customer workspaces for internal clients

Vision Science Lab, NTHU Github — Hsinchu, Taiwan

Research Assistant [Project: The World is Changing: Finding Changes on the Street] — Feb 2015 – Sep 2015
- Constructed image change detection model in MATLAB, successfully detected street view mismatches in Dash camera images with respect to preprocessed Google Street View (GFV) to provide updated information
- Applied RANSAC to re-outline the areas of mismatches in the original GFV images with accuracy outperforming baseline by 46%
- Devised a reusable manual labeling software and data types that recorded ground truth mismatch areas to help data collection

Large-scale System Architecture Lab, NTHU — Hsinchu, Taiwan

Research Assistant [Project: Re-scheduling Computing Job on Large-Scale System] — Jul 2013 – Aug 2014
- Automated Hadoop benchmark (HiBench) to test performance of processing 8 types of computing job on 2 heterogeneous clusters using Perl
- Designed testing environment settings using Linux BASH shell scripts and analytically found suitable disk for certain computing job types
- Applied machine learning algorithm on Linux resource usage to discern types of computing and then moved the data to either Hard Disk or Solid-State Disk to proceed and so reduce power consumption

SELECTED PROJECTS

Kaggle Competition: Porto Seguro's Safe Driver Prediction GitHub — Nov 2017
- Won Silver medal (top 4% out of 5,332 teams) in this biggest Kaggle competition in history as of December 2017
- Implemented XGBoost, Neural Network, lightGBM algorithms for predicting the probability that a driver will initiate an auto insurance claim in the next year
- Incorporated hierarchical interpolation, and boosting techniques to combine then produce better models

Kaggle: German Credit Risk Github — May 2017
- Used Python Pandas library to implement a reproducible pre-processing function for raw text data
- Designed Python Scikit learn pipeline to automate the machine learning grid search and model selection on 15+ variables
- Applied SVMs, Neural Network, Random Forrest, Dimension Reduction, etc. algorithms and achieved 75% accuracy, outperforming baseline by 5%

Markov Chain Monte Carlo (MCMC) for optimization Github — Nov 2016 – Dec 2016
- Implemented MCMC Simulated Annealing procedure and 3 cooling schedules to find global minimum of Schwefel function; found best cooling schedule, achieving performance at least 10% better than the others
- Improved variance of estimation by applying 3 variance reduction methods, with each at least 5 times outperforming pure MC and best variance close to 0 (nearly perfect)
- Utilized Metropolis-Hastings Algorithm to sample from arbitrary tricky spaces and reduce corresponding variances

Movie Recommender — Mar 2015 – Jun 2015
- Implemented and tested 3 collaborative filtering algorithms in Python and utilized MovieLens dataset to recommend movies
- Back-end analysis system deployed on AWS EC2, enabling the recommender to regularly update recommendations by checking new user preferences
- Created front-end webpage using jQuery, AJAX and Bootstrap for visual effect

Dictionary Search Engine Github — Feb 2015 – Apr 2015
- Implemented PageRank algorithm for Apache Hadoop in JAVA and constructed a search engine which prioritizes relevant links
- Coded under scalable MapReduce framework on 8-node distributed computers allowing massive dataset to be processed
- Devised file system database for dictionary content retrieval by applying Apache Hbase and Hive

Autonomous Robotic Convoy System Design Github — Oct 2014 – Dec 2014
- Proposed an algorithm that allows rovers to move toward one and only one target even when doing sharp turns using C++
- Utilized ultrasonic sensor to detect object distances and translated information into 2D surface using gnuplot as human computer interface
- Devised a paradigm to discern the original moving object while multiple static and moving objects are present

PUBLICATIONS

"Learning Dyadic Attention Networks to Predict Outcomes of Motivational Interviewing" X. Huang, L. Liu, M.-C. Chiu, J. Woolley, S. Scherer and B. Borsari. Submitted to NAACL 2018

SKILLS

Languages: Python, C/C++, MATLAB, Ocaml, Java, HTML/CSS, PHP, SQL, BASH, Javascript
Technologies: Hadoop, Docker, TensorFlow, Keras, AWS, Git, jQuery, Linux, Spark

RELATED COURSEWORK

Natural Language Processing, Machine Learning, Analysis of Algorithms, Pattern Recognition, Probability Theory, Simulation Methods for Stochastic Systems, Digital Signal Processing

HONORS & AWARDS

Silver Medal (top 4% out of 5,332 teams), Porto Seguro's Safe Driver Prediction, Kaggle	2017
Attending Award, Celebrating the Viterbi Algorithm Through Art	2017
Attended Citadel SC The Data Open Datathon (80 out of 600 contestants)	2017
Honorary Member of Phi Tau Phi Scholastic Society (only 1 in each department a year)	2015
Awarded Excellent Study Group Award, NTHU	2015
Awarded National Tsing Hua University International Exchange Scholarship; Amount: $10K	2014

LEADERSHIP & CAMPUS ACTIVITIES

SC Ballroom & Latin Dance Team, USC
Member — Aug 2017 – Present

NTHU Orchestra, National Tsing Hua University
Vice President — Jul 2012 – Jun 2013

NTHU Student Council, National Tsing Hua University
Counselor — Jul 2012 – Jun 2013

MILITARY SERVICE

Infantry Battalion, Dongyin Area Branch, Republic Of China (Taiwan) Army — Dongyin, Matsu
Soldier — Sep 2015 – Aug 2016

REFERENCES

Professor Stefan Scherer
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Institute for Creative Technologies
Email: scherer@ict.usc.edu

Dr. Chris Mattmann
NASA Jet Propulsion Labratory
Principal Data Scientist
Email: chris.a.mattmann@jpl.nasa.gov

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Associate Director, Scientific Computing
Email: rsuarez@illumina.com

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National Tsing Hua University
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Professor Jerry Chou
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University of Minnesota, Twin Cities
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