Ying-Yu (Christine) Chen

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PROFILE

- Software engineer (**C++**) with 2.5 years industry experience **seeking full-time software engineering positions on machine-learning and/or data science**.
- Ph.D. in electrical and computer engineering with a focus on **data modeling** and **algorithms** and with 14 publications in top conferences and journals including *ICDM* and *DAC*.
- Worked on a wide variety of projects including **machine learning**, **optimization**, data science, data modeling, data mining, cloud computing, simulation, compilers, embedded systems, signal processing, design automation, etc.

SKILLS

- **C/C++, Python, Keras, Tensorflow**, **scikit-learn**, Perl, MATLAB, Visual C++/C#, SQL, Tcl, LaTeX

WORK EXPERIENCE

R&D Engineer (C++ Software), Sr. II, Synopsys, Inc., Mountain View, CA November 2015 – February 2018

Implemented a mixed-language (SystemVerilog/VHDL) compiler for the ZeBu FPGA emulation system, including:

- Optimization and transformation on computation graphs and circuit data structures, achieving 27% running time improvement, 11% peak memory usage reduction, 35% emulation resource reduction. **(C++)**
- Automatic test data generation for time-series simulation and correctness validation, creating a seamless testing and debugging workflow, greatly reducing the iteration time for R&D and application engineers. **(C++/Tcl)**

Research Intern (Software), Intel Corporation, Hillsboro, OR August – December 2011

- Performed numerical simulation and mathematical analysis of the most probable point theory. **(C++/MATLAB)**
- Performed experiments on discrete gate-sizing optimization. **(Perl/Tcl)**

EDUCATION

M.S./Ph.D., Electrical and Computer Engineering 2008 – 2015
University of Illinois at Urbana-Champaign, Urbana, IL, USA GPA: 3.71/4
Data Mining Principles (A+), *Random Processes* (A), *Fundamental Algorithms* (A-), *Engr. Software Systems* (A), *Cloud Computing Infrastructure* (A), *Graph Theory* (A-)

B.S., Electrical Engineering 2004 – 2008
National Taiwan University, Taipei, Taiwan GPA: 3.79/4
Algorithms (97/100), *Data Structures and Programming* (97/100), *Digital Speech Processing* (95/100), *Networking and Multimedia Lab* (91/100), *Computer Programming* (100/100)

SELECTED PROJECTS

F-RankClass (🔗 https://steggie3.github.io/projects/f-rankclass.html) **(C++/MATLAB)** Spring 2013

- Proposed and implemented a novel heterogeneous information network mining algorithm and experimented on Wikipedia documents for joint text-image classification. Text/image classification accuracy improved up to 27.3% and 26.4%, respectively, from baseline SVM. **Published in *International Conference on Data Mining (ICDM)***.

Object Detection (🔗 https://steggie3.github.io/projects/object-detection.html) **(Python/Tensorflow)** July 2018 -

- Built and deployed a real-time object detection system with the You-Only-Look-Once deep learning model.

GANder Project (🔗 https://steggie3.github.io/projects/gander.html) (**Python/Keras/Tensorflow**) July 2018 -

- Applied various Generative Adversarial Network (GAN) architectures, e.g. GAN, Wasserstein GAN, Variational Autoencoder (VAE) GAN to generate artificial Canada goose faces.

Loan Default Prediction (🔗 https://steggie3.github.io/projects/loan-default.html) **(Python/Keras)** May 2018 -

- Applied logistic regression, random forests, gradient-boosted decision trees (XGBoost), SVM, nearest neighbors, neural networks on a Kaggle dataset of real-world loan application data.
- Applied techniques: one-hot encoding, imputation, normalization, feature expansion, feature hashing, feature selection,

PCA, feature discretization with XGBoost and random forests.

Algorithmic Stock Trading System (C++/Python/Tensorflow/MATLAB) 2011 - 2016

- Applied SVM, logistic regression, CNN, LSTM on real-world stock market data to predict buy events and achieved 60-80% of precision at 10% of recall on a subset of stock symbols.

Social Network Graph Partitioning (C++) Fall 2010

- Designed and implemented an algorithm to solve the large-scale social network graph partitioning problem and implemented algorithms based on group migration and simulated annealing for comparison.

More projects: 🔗 https://steggie3.github.io/pages/projects.html

RESEARCH EXPERIENCE

Modeling and simulation of emerging devices 2010 – 2015

- Developed low-computational-complexity models of 3 families of emerging non-silicon-based transistors.
- Monte Carlo simulation based on the model above to explore advantages over traditional transistors.
- Released 3 open-source transistor models on nanohub.org. (1200+ users since 2014.)

Joint text-image document classification and mining 2013 – 2014

- Proposed F-RankClass, extending a well-known ranking-based classification algorithm to support multiple modalities by including feature information in heterogeneous information networks.
- Experimented on Wikipedia, a real-world and user-generated dataset.

Clock tree routing algorithm based on delay and slew modeling 2008 – 2011

- Developed polynomial regression models of clock buffer delay and slew to predict circuit behavior.
- Proposed and implemented an algorithm using the models above to control clock accuracy under extreme conditions.
- Performed statistical timing analysis on the clock network with Principal Component Analysis (PCA).

Distributed speech recognition 2007 – 2008

- Improved a histogram-based quantization method for distributed speech recognition on edge devices.

SELECED PUBLICATIONS

- **Y.-Y. Chen**, A. Sangai, A. Rogachev, M. Gholipour, and D. Chen, "A SPICE-compatible model of graphene nano-ribbon field-effect transistors with circuit-level delay and power analysis of process variation," *IEEE Transactions on Nanotechnology (TNANO)*, November 2015.
- **Y.-Y. Chen**, Z. Sun, and D. Chen, "A SPICE model of flexible transition metal dichalcogenide field-effect transistors," *IEEE/ACM Design Automation Conference (DAC)*, June 2015.
- S. Chen, **Y.-Y. Chen**, J. Han, and P. Moulin, "A feature-enhanced ranking-based classifier for multimodal data and heterogeneous information networks," *IEEE* ***International Conference on Data Mining (ICDM)***, December 2013.
- **Y.-Y. Chen**, C. Dong, and D. Chen, "Clock tree synthesis under aggressive buffer insertion," *IEEE/ACM Design Automation Conference (DAC)*, June 2010.
- **More at Google Scholar:** 🔗 https://scholar.google.com/citations?user=_TA5iKMAAAAJ

CERTIFIED ONLINE COURSES AND TRAINING PROGRAMS

AI Certificate for Machine Learning Engineers, deeplearning.ai Completed July 2018

- See the Object Detection project.

CSMM.102x: Machine Learning, edX/Columbia University Completed May 2018

- Projects: ridge regression, active learning, Bayes classifier with Gaussian mixture models, K-means and EM algorithm on Gaussian mixture models, recommendation with probabilistic matrix factorization (PMF). **(Python)**

Deep Learning Specialization, Coursera/deeplearning.ai Completed March 2018

- Projects: object detection, word embedding, sentiment analysis, music synthesis. **(Python/Keras/Tensorflow)**

ACADEMIC EXPERIENCE

Research Assistant (Advisor: Prof. Deming Chen of University of Illinois at Urbana-Champaign) 2008 – 2015

Teaching Assistant, University of Illinois at Urbana-Champaign 2009 – 2014

ECE 527 System-on-Chip Design, ECE 412 Microcomputer Laboratory, ECE 385 Digital Systems Laboratory

- Developed two labs on system-on-a-chip and embedded systems, including a USB (Universal Serial Bus) driver and an AES (Advanced Encryption Standard) decryption system. **(C/SystemVerilog)**