

Fan-Keng Sun

Machine Learning for Electronic Design Automation Researcher

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Education

National Taiwan University (NTU)

Taipei, Taiwan

B.S. Major in Electrical Engineering, Minor in Computer Science and Information Engineering

Sept. 2014 - PRESENT

- Average GPA: 4.17 / 4.3, top 5 %
- **Algorithm Courses:** Data Structures and Algorithms, Algorithm Design and Analysis, ACM-ICPC, Graph Theory
- **Machine Learning Courses:** Machine Learning, Machine Learning and Having It Deep and Structured, Advanced Deep Learning, Mathematical Principles of Machine Learning
- **Electronics Design Automation Courses:** Physical Design for Nanometer ICs, Switching Circuit and Logic Design

Experience

Speech Processing and Machine Learning Lab

Taipei, Taiwan

Research Assistant, supervised by Prof. Hung-yi Lee

Sept. 2016 - PRESENT

Multivariate Time Series Forecasting

- Proposed the temporal pattern attention for multivariate time series forecasting.
- Our model (LSTM + our attention) achieved state-of-the-art performance on various multivariate time series forecasting datasets and music notes prediction.

Natural Language Processing

- Trained a chat-bot with seq2seq model with deep reinforcement learning on the Cornell movie dialog corpus.
- Used the CycleGAN paradigm with LSTM to train unpaired machine translation.

Open-Set Multi-Speaker Speech Separation

- Ongoing.

Electronic Design Automation Lab

Taipei, Taiwan

Undergraduate Researcher, supervised by Prof. Yao-Wen Chang

Feb. 2016 - PRESENT

Gradient-based Wirelength Model

- Proposed a novel gradient-based wirelength model for global placement which combines the advantages of bivariate and multivariate wirelength models.
- Our wirelength model outperforms previous bivariate and multivariate wirelength models.

Bus Routing

- Implemented a topology-matching bus routing engine to compete in the 2018 ICCAD CAD contest, and won top 10.
- Our directed-acyclic-graph-based algorithm outperforms the winner of 2018 ICCAD CAD contest.

Initial Detailed Routing

- Implemented a detailed routing tools to compete in 2018 ISPD contest, and won 3rd place.
- Proposed a multithreaded detailed routing algorithm that considers global routing guides, which surpassed the winner of 2018 ISPD contest. [ICCAD 18]

Speech Processing Lab

Taipei, Taiwan

Undergraduate Researcher, supervised by Prof. Lin-shan Lee

Sept. 2017 - Sept. 2018

Reinforcement Learning on Real-Time Online Games

- Applied simple computer vision technique to guide a rule-based Slither.io agent.
- Trained another Slither.io agent by Asynchronous Advantage Actor Critic (A3C) which surpassed rule-based model.

Synopsys, Inc.

Hsinchu, Taiwan

Summer Internship

Jul. 2016 - Aug. 2016

Single Layer Global Routing

- Implemented a single layer global routing algorithm based on mixture of previous literature and own thoughts.
- The algorithm successfully routed many real industrial cases.

Publications

1. Shun-Yao Shih*, **Fan-Keng Sun***, Hung-yi Lee, "Anonymous Title", submitting to ECML/PKDD, 2019 (* indicates equal contribution)
2. **Fan-Keng Sun**, Yao-Wen Chang "Anonymous Title", submitting to DAC, 2019
3. Chen-Hao Hsu, Shao-Chun Hung, Hao Chen, **Fan-Keng Sun**, Yao-Wen Chang "Anonymous Title", submitting to DAC, 2019
4. **Fan-Keng Sun**, Hao Chen, Ching-Yu Chen, Chen-Hao Hsu, Yao-Wen Chang "A Multithreaded Initial Detailed Routing Algorithm Considering Global Routing Guides", ICCAD, 2018

Teaching

Algorithm Design and Analysis

Teaching Assistant, supervised by Prof. Yun-Nung Chen and Prof. Hsu-Chun Hsiao

Machine Learning and Having It Deep and Structured

Teaching Assistant, supervised by Prof. Hung-Yi Lee

Machine Learning

Teaching Assistant, supervised by Prof. Hung-Yi Lee

Taipei, Taiwan

Sept. 2018 - PRESENT

Taipei, Taiwan

Feb. 2018 - Jul. 2018

Taipei, Taiwan

Sept. 2017 - Jan. 2018

Honors & Awards

Ongoing **Semifinalist**, Formosa Speech Grand Challenge - Talk to AI

2018 **Top 3**, Problem A at ICCAD CAD contest

2018 **Top 10**, Problem B at ICCAD CAD contest

2018 **3rd Place (first pure-undergraduate team in top 3 in 14 years)**, ISPD Contest

2017 **Top 12**, Formosa Speech Grand Challenge - Talk to AI (Warm-Up Match)

2017 **National Technology and Science Scholarship**, CTCI

16,17 **3rd Place (2 times)**, NTU ACM ICPC Ranking

2017 **3rd Place**, National Collegiate Programming Contest

2017 **3rd Place**, ACM ICPC Regional Contest

2016 **2st Place**, ACM ICPC Regional Contest

2016 **Best Technique**, Hackathon at NTU

2016 **1st Place**, Calculus World Cup

2016 **6th Place**, Data Structure and Programming Final Project Contest

2016 **2nd Place**, Newcomers for ACM-ICPC Taiwan Online Programming Contest

2012 **Silver Medal**, International Geography Olympiad

Extracurricular Activity

NTU Electrical Engineering Student Association

Coordinator of Academic Affair

Taipei, Taiwan

Sept. 2016 - Jun. 2017

MakeNTU

- Co-organized the largest student Makathon in Taiwan with 200 participants and 10+ corporate sponsorship.
- Links: website, FB fansite, Video.

Provided Academic Service

- EExplore: an event where professors introduce every research area in EE department to freshman.
- Lab Intro: a week of continuous lab introduction by the corresponding professor to recruit interested undergraduate researchers.
- Others: online course selection, online textbook bookstore, makerspace, etc.

Skills

Natural Languages	Chinese (native), English (TOEFL 109, GRE 326/3.5)
Programming Languages	Python, C/C++, Shell, Javascript, Matlab, \LaTeX
Operating System	Linux (Arch Linux & Ubuntu), Windows
Deep Learning Libraries	Tensorflow, PyTorch, Keras