T.M. Harry **Hsu**

Tzu-Ming Harry Hsu, Dept. of Electrical Engineering and Dept. of Physics, National Taiwan University, Taipei, Taiwan

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Research Interests

1. Computer Vision
2. Deep Learning
3. Pattern Recognition
4. Machine Learning

Skills

Programming MATLAB, Python (TensorFlow), Caffe, C / C++, Java, HTML / CSS / JS, Verilog

Languages Mandarin Chinese (Native), Taiwanese (Native), English (Fluent), Spanish (Intermediate)

GRE Verbal (153 / 170), Quantitative (170 / 170), Analytical Writing (4.0 / 6.0)

Education

National Taiwan University (NTU) *Taipei, Taiwan*

B.S.E. in Electrical Engineering and B.S. in Physics *Sep. 2011 - Jun. 2016*

GPA Overall (3.99 / 4.00), Last 60 units (3.99 / 4.00)

Overall ranking 1 / 190

Relevant courses **Deep and Structured Machine Learning**, **Digital Visual Effects**, Design and Analysis of Algorithms, Data Structure and Programming, Probability and Statistics, Linear Algebra (**bold** denotes graduate level)

Publications

Conference Paper

[1] Wei-Yu Chen, **Tzu-Ming Harry Hsu**, Yao-Hung Hubert Tsai, and Yu-Chiang Frank Wang, "Transfer Neural Trees for Heterogeneous Domain Adaptation", in *ECCV* 2016. **[PDF Link]**

[2] **Tzu-Ming Harry Hsu**, Wei-Yu Chen, Cheng-An Hou, Yao-Hung Hubert Tsai, Yi-Ren Yeh, and Yu-Chiang Frank Wang, "Unsupervised Domain Adaptation With Imbalanced Cross-Domain Data", in *ICCV* 2015. **[PDF Link]**

[3] Wei-Yu Chen, **Tzu-Ming Harry Hsu**, Cheng-An Hou, Yi-Ren Yeh and Yu-Chiang Frank Wang, "Connecting the dots without clues: Unsupervised domain adaptation for cross-domain visual classification", in *ICIP* 2015. **[PDF Link]**

[4] **Tzu-Ming Harry Hsu**, Wei-Yu Chen, Kuan-Lin Chen, Mong-Chi Ko, You-Cheng Liu, An-Yeu Andy Wu, "Robust Motion Artifact Reduction of Photoplethysmographic Signal with Trajectory Space Circular Model", in *ICASSP Signal Processing Cup* 2015. **[PDF Link]**

Honors & Awards

Group

2015 **Silver Medal Award**, Altera Innovate Asia FPGA Design Competition **[Poster Link]** *Wu Han, China*

- Ranked 2nd among 20 teams with self-designed PCB integration

2015 **10th Place**, ICASSP Signal Processing Cup **[PDF Link]**

- Ranked 10th globally in sports heartbeat detection with an error of 4.89 beats per minute (BPM)

Individual

2011 - 14 **Presidential Award (5 times)**, Department of Electrical Engineering, NTU

- Awarded per semester to the top 5% students

2011 **World's 1st Place and Gold Medal Award**, International Physics Olympiad (IPhO) *Bangkok, Thailand*

- Ranked 1st in both theory section and experiment section among 500 national representatives from over 80 countries **[Winner List]**

2008 **Gold Medal Award**, International Junior Science Olympiad (IJSO) *Gyeong-Nam, South Korea*

Research Experiences

Multimedia and Machine Learning Lab — *CITI, Academia Sinica, Taiwan*
Intern student under the instruction of Dr. Yu-Chiang Frank Wang — *Apr. 2014 - Jun. 2016*

- **Deep Learning for Feature Transformation**
  - Build specific neural networks on target tasks to properly transform images to feature vectors, allowing recognition, neighbor querying, and possibly other tasks to be done.
- **Deep Learning for Heterogeneous Domain Adaptation**
  - Transfer knowledge across different feature domains and build classifiers above the transferred knowledges
  - An algorithm **[1]** is proposed to transfer classifiers to a different dimensional space with deep neural network
- **Unsupervised Domain Adaptation with Imbalanced Cross-domain Data**
  - Information of labeled source-domain data is transferred to the unlabeled target-domain, which may be a small set with imbalanced label counts
  - An algorithm **[2]** is proposed to combine sub-domain level classifiers to identify better source data applicability
- **Unsupervised Domain Adaptation with Balanced Cross-domain Data**
  - A set of labeled source-domain data is used to construct classifier for the unlabeled target-domain data
  - An algorithm **[3]** is proposed to address source-target mismatch and project them to a common space
- **External Review**
  - Review papers as external reviewer for *IEEE ICCV*, *IEEE ECCV*, *IEEE AAAI*, and *IEEE IJCAI*

Access IC Lab — *National Taiwan University*
Intern student under the instruction of Dr. An-Yeu Andy Wu — *Sep. 2014 - Jun. 2015*

- **Noise Removal of Photoplethysmographic (PPG) Signals**
  - Remove noises in PPG signals induced by motions by decorrelating the PPG with accelerometer signal
  - An algorithm is proposed to project the signal into a complex plane, in which a temporal filter will be performed, followed by ensemble voting for the optimal beat counts

Laboratory for Applied Logic and Computation in System Design (ALCom Lab) — *National Taiwan University*
Intern student under the instruction of Dr. Jie-Hong Roland Jiang — *Jul. 2013 - Jun. 2014*

- **Compressed Sensing**
  - Compress the data perceived by a sensor array using less data storage than what it used to consume
- **Mathematical Neural models**
  - Establish a time-continuous model of human neurons to simulate the biological effects at stimulus and message passing

Work & Teaching Experiences

Digital Drift Corporation — *Taipei, Taiwan*
Backend Engineer — *Mar. 2016 - Now*

- **Deep Neural Networks for Image Interpretation**
  - Build deep models for cuisine images using TensorFlow on multi-GPU machines, providing a backend with an API

Olympiad Tutoring Community — *Taipei, Taiwan*
Private Tutor — *Sep. 2011 - Jun. 2015*

- Offer tutoring for high school physics, competition physics, GRE subject test (physics), and SAT II subject test (physics)
- Two students became the national representatives for Taiwan for International Physics Olympiad (IPhO)

Selected Past Projects

Automatic Control	A robust inverted pendulum-balancing bot that navigate along a track **[YouTube Link]**
Communication System	A gesture-detecting system using Doppler effect on WiFi signal **[YouTube Link]**
Embedded System	**EzBud**, a music manipulation platform that synchronizes with user heart rate during sporting
Speech Processing	A complete system producing sentences from raw recordings using deep learning