Chin-Cheng (Andrew) Chan

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Research Interests

- Biomedical image processing and biomedical imaging
- Computational imaging with a focus on the joint design of software and hardware
- Signal processing algorithms and their applications in the biomedical field
- Image processing and computer vision

Education

Sept. 2014 – Jun. 2018

National Taiwan University—Taipei, Taiwan
Bachelor of Science in Electrical Engineering

- Cumulative GPA: 4.18/4.3; major GPA: 4.18/4.3; last-60 GPA: 4.25/4.3
- Ranking: 12/184 (top 6.5%)

Research Experiences

Aug. 2018 – Present

Full-time Research Assistant (with Prof. Homer Chen)—Taipei, Taiwan
Multimedia Processing and Communications Lab, National Taiwan University

Project title: Deep Learning for Analysis of Optical Coherence Tomography (OCT) Images

- Demo: https://andrewccchan.github.io/research/dl_for_biomed/
- Reduced the detection error of the dermis-epidermis junction of human skin by 40%
- Achieved an 80% accuracy in automatic classification of skin cancer
- Collaborated interdisciplinarily with Prof. Sheng-Lung Huang, an expert in OCT

Aug. 2015 – Jul. 2018

Undergraduate Research Assistant (with Prof. Homer Chen)—Taipei, Taiwan
Multimedia Processing and Communications Lab, National Taiwan University

Project title: Improving the Reliability of Phase-detection Autofocus (PDAF)

- Demo: https://andrewccchan.github.io/research/pdaf/
- Mitigated the impact of noise on phase correlation by applying a Gaussian filter. This work was published in IEEE International Conference on Image Processing (ICIP) 2017.
- Further improved the reliability of PDAF by modeling the noise of phase information. This work was published in Electronic Imaging (EI) 2018.
- Achieved even better performance by reinforcement learning and published our work in EI 2019. This is one of the first data-driven approaches to autofocus and may serve as a foundation for future research.
- Mentored another undergraduate student on the autofocus team

Project title: Applications of the Robust Principal Component Analysis (RPCA)

- Demo: https://andrewccchan.github.io/research/rpca/
- Proposed to use RPCA to extract blood vessels from OCT images
- Proposed the short-time RPCA algorithm to reduce the false-positive rate of extraction
- Published our work in ICIP 2016 and IEEE Transactions on Medical Imaging

Jul. 2016 – Aug. 2016

Summer Intern—Hsinchu, Taiwan
Multimedia Department, MediaTek

- Gave an introductory talk on RPCA to the managers of the department
- Successfully designed a lane-detection algorithm for autonomous vehicles

Publications

2019 | **C. Chan** and H. H. Chen. "Autofocus by Deep Reinforcement Learning," accepted by Electronic Imaging 2019. Link.

2018 | P. Lee, **C. Chan**, S. Huang, A. Chen, and H. H. Chen, "Extracting Blood Vessels From Full-Field OCT Data of Human Skin by Short-Time RPCA," in *IEEE Transactions on Medical Imaging*, vol. 37, no. 8, pp. 1899-1909, Aug. 2018. Link.

2018 | **C. Chan** and H. H. Chen, "Improving the Reliability of Phase Detection Autofocus," *Electronic Imaging*, vol. 2018, no. 5, pp. 1-5, 2018. Link.

2017 | **C. Chan**, S. Huang, and H. H. Chen, "Enhancement of Phase Detection for Autofocus," *2017 IEEE International Conference on Image Processing (ICIP)*, Beijing, 2017, pp. 41-45. Link.

2016 | P. Lee, **C. Chan**, S. Huang, A. Chen, and H. H. Chen, "Blood Vessel Extraction from OCT Data by Short-time RPCA," *2016 IEEE International Conference on Image Processing (ICIP)*, Phoenix, AZ, 2016, pp. 394-398. Link.

Awards

Sep. 2017 | **Travel grant for attending ICIP 2017**
- Funded by the department of electrical engineering, National Taiwan University

Jan. 2017 | **4th place in the final project contest of the Machine Learning course**
- Trained classifiers for detecting cyberattacks
- Greatly improved the accuracy by replacing a fully-connected neural network with a random forest

Jan. 2016 | **1st place in the final project contest of the Data Structure and Programming course**
- Designed algorithms for circuit (and-inverter graph) optimization
- Achieved significant improvement in performance by replacing depth first search with breadth first search in the gate-merging algorithm
- It was the only program that outperformed the teacher's reference program

Dec. 2014 | **Committee's award in MEI-CHU Hackathon**
- Designed an algorithm for predicting the usage pattern of air conditioners in smart homes

Selected Courses Taken (all A+)

Mathematics	Linear Algebra I&II (department of mathematics*) and Advanced Statistics I&II†
Signal processing	Advanced Digital Signal Processing†, Digital Speech Processing, and Principles of Communications
Machine learning	Deep and Structured Machine Learning† (Applied Deep Learning), Machine Learning†, and Special Topics in Data Analytics and Modeling†

* jointly offered the courses with the graduate institute of economics. † denotes graduate-level courses.

Test Scores

GRE	Verbal: 158; quantitative: 170; analytical writing: 3.5
TOEFL	Total: 108 (reading: 30; listening: 29; speaking: 24; writing: 25)

Voluntary Work

Sep. 2016 – Jun. 2017 | **Teaching assistant and website manager of the Green Tree club (weekly voluntary tutoring service for disadvantaged junior high school students)—Taipei, Taiwan**
- Trained new volunteers for tutoring services
- Built a website that allows volunteers to exchange their tutoring experiences
- Participated in weekly tutoring services from 2015 to 2018