

Kuan-Hao Huang

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Education

National Taiwan University, Taipei, Taiwan

M.S. in Computer Science and Information Engineering

Sep. 2014 - Jun. 2016

GPA: 4.11/4.3; Advisor: Prof. Hsuan-Tien Lin

B.S. in Computer Science and Information Engineering

Sep. 2010 - Jun. 2014

GPA: 4.10/4.3 (major); 3.96/4.3 (overall)

Research Interests

Machine Learning Algorithm and Theory

– Designing machine learning algorithms with theoretical foundations

Machine Learning Application

– Designing practical machine learning approaches to specific applications

Publications and Preprints

Conference Papers

- [1] **Kuan-Hao Huang** and Hsuan-Tien Lin. “A Novel Uncertainty Sampling Algorithm for Cost-Sensitive Multiclass Active Learning.” In *Proceedings of the IEEE International Conference on Data Mining (ICDM)*. 2016.
- [2] **Kuan-Hao Huang** and Hsuan-Tien Lin. “Linear Upper Confidence Bound Algorithm for Contextual Bandit Problem with Piled Rewards.” In *Proceedings of the Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD)*. 2016.

Journal Papers

- [3] **Kuan-Hao Huang** and Hsuan-Tien Lin. “Cost-Sensitive Label Embedding for Multi-Label Classification.” *Machine Learning*, 2017. (*ECML PKDD 2017 Journal Track*).
- [4] Chun-Liang Li, Yu-Chuan Su, Ting-Wei Lin, Cheng-Hao Tsai, Wei-Cheng Chang, **Kuan-Hao Huang**, Tzu-Ming Kuo, Shan-Wei Lin, Young-San Lin, Yu-Chen Lu, Chun-Pai Yang, Cheng-Xia Chang, Wei-Sheng Chin, Yu-Chin Juan, Hsiao-Yu Tung, Jui-Pin Wang, Cheng-Kuang Wei, Felix Wu, Tu-Chun Yin, Tong Yu, Yong Zhuang, Shou-De Lin, Hsuan-Tien Lin, and Chih-Jen Lin. “Combination of Feature Engineering and Ranking Models for Paper-Author Identification in KDD Cup 2013.” *Journal of Machine Learning Research*, 2015. (Extended first-place winner report of KDD Cup 2013 track 1).
- [5] Wei-Sheng Chin, Yong Zhuang, Yu-Chin Juan, Felix Wu, Hsiao-Yu Tung, Tong Yu, Jui-Pin Wang, Cheng-Xia Chang, Chun-Pai Yang, Wei-Cheng Chang, **Kuan-Hao Huang**, Tzu-Ming Kuo, Shan-Wei Lin, Young-San Lin, Yu-Chen Lu, Yu-Chuan Su, Cheng-Kuang Wei, Tu-Chun Yin, Chun-Liang Li, Ting-Wei Lin, Cheng-Hao Tsai, Shou-De Lin, Hsuan-Tien Lin, and Chih-Jen Lin. “Effective String Processing and Matching for Author Disambiguation.” *Journal of Machine Learning Research*, 2014. (Extended first-place winner report of KDD Cup 2013 track 2).

Preprints

- [6] Hong-Min Chu, **Kuan-Hao Huang**, and Hsuan-Tien Lin. “Dynamic Principal Projection for Cost-Sensitive Online Multi-Label Classification.” *Preprint arXiv:1711.05060*, 2017. (under review of *ECML PKDD 2018 Journal Track*).
- [7] Yao-Yuan Yang, **Kuan-Hao Huang**, Chih-Wei Chang, and Hsuan-Tien Lin. “Cost-Sensitive Reference Pair Encoding for Multi-Label Learning.” *Preprint arXiv:1611.09461*, 2017. (under review of *PAKDD 2018*).

Research Experience

Machine Discovery & Social Network Mining Lab, National Taiwan University *Sep. 2017 - Present*
Research Assistant to Prof. Shou-De Lin

Deep Generative Models for Images

- Design a novel framework of generative adversarial networks to generate images associated with multiple classes from images associated with only a single class

Memory-Augmented Neural Networks on One-Shot Learning

- Focus on new memory read and write mechanism for memory-augmented neural networks to improve performance on one-shot learning tasks

Computational Learning Lab, National Taiwan University *Jun. 2012 - Jun. 2016*
Research Assistant to Prof. Hsuan-Tien Lin

Cost-Sensitive Multi-Label Classification

- The first work that studies the connection between cost-sensitive multi-label classification and non-linear embedding techniques
- Proposed a novel embedding that can represent the information of any given cost function to train a cost-sensitive multi-label classifier with better performance than state-of-the-art algorithms
- Derived the cost upper-bound and provided the theoretical explanation for the proposed algorithm

Active Learning for Cost-Sensitive Multi-Class Classification

- Proposed an embedding view of multi-class classification that can consider all the boundaries from the *one-versus-all* view in the same time; adopted manifold learning to preserve the cost information in the distance measure of the embedding space
- Developed a method that can estimate the uncertainty of instance via the embedding to formulate a new querying strategy that can query different instances according to different given costs

Contextual Bandit Problem under Piled-Reward Setting

- Converted the famous *linear upper confidence bound* algorithm to a more realistic algorithm under the piled-reward setting
- Designed the *pseudo rewards* to make the proposed algorithm achieve strategic exploration before receiving piled-rewards and have 5% improvement of cumulative reward in the early rounds
- Analyzed the regret upper-bound under the piled-reward setting for the proposed algorithm

KDD Cup 2013 and 2015

- Designed features and built models to predict whether a student will drop out a course on MOOC in 10 days; proposed an ensemble method to enhance 3% *area under curve*
- Performed feature engineering and trained a classifier to detect incorrect author-paper pairs and duplicated author accounts in Microsoft Academic Search; designed a post-processing procedure to correct bad predictions and make 4% improvement in *mean average precision*

Selected Awards

Thesis Honorable Mention Award, Taiwanese Association for Artificial Intelligence *2016*

- Only 4 places for master theses related to artificial intelligence in Taiwan

Fourth Place, KDD Cup 2015 *2015*

Second Place, ICASSP Signal Processing Cup *2014*

First Place, Track 1 and Track 2 of KDD Cup 2013 *2013*

Presidential Award, National Taiwan University *2011*

- For students with top 5% GPA in the class

Teaching Experience

Teaching Assistant, National Taiwan University

- *CSIE 5043: Machine Learning* *Fall 2013, Fall 2014, Fall 2015*
- *CSIE 1212: Data Structure and Algorithm* *Spring 2013, Spring 2015*
- Held 1 hour TA session weekly to discuss course materials with students
- Graded homework sets and designed projects for over 150 students

Work Experience

Substitute Military Service, National Audit Office, Taipei, Taiwan *Jul. 2016 - Jul. 2017*

- Mandatory military service in Taiwan
- Wrote programs to assist in administrative works; delivered and archived official documents

Software Engineering Intern, MixerBox, Taipei, Taiwan *Mar. 2016 - Jun. 2016*

- Built a system that can automatically find popular singers based on recent search strings
- Improved the quality of auto-complete searching system by data cleaning

Software Engineering Intern, Appier, Taipei, Taiwan *Apr. 2015 - Jan. 2016*

- Established a system that can automatically select attractive images of products for advertisement
- Used bandit algorithms to determine which ads should be displayed to improve *click-through rate*

Software Engineering Intern, MediaTek, Hsinchu, Taiwan *Jul. 2014 - Aug. 2014*

- Trained an online multi-class classifier that can dynamically decide the best transmitting parameters of 4G LTE system to enhance 4% transmission quality