

# Ying Wei

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RESEARCH INTERESTS      Machine learning algorithms for knowledge transfer  
Transfer learning  
Meta-learning  
Applications on domains with scarce labeled data  
Multi-modal data fusion  
Sentiment analysis  
Urban computing  
Hyperparameter optimization  
Medical diagnosis

EDUCATION      **Ph.D. in Computer Science and Engineering**      August 2017  
EXPERIENCE      Hong Kong University of Science and Technology, Hong Kong  
Supervisor: New Bright Professor Qiang Yang  
Thesis: [Heterogeneous Transfer Learning](#)

**Bachelor of Engineering in Automation**      June 2012  
Huazhong University of Science and Technology, China  
GPA: 94.64/100 (top 1 among 241)

WORK      **Senior Researcher**      Since November 2017  
EXPERIENCE      [Tencent AI Lab](#), Shenzhen, China

**Graduate Student Researcher**      August 2012 - August 2017  
Hong Kong University of Science and Technology, Hong Kong  
Supervisor: New Bright Professor Qiang Yang

**Intern**      September 2014 - February 2015  
Microsoft Research Asia, Beijing, China  
Supervisor: Professor Yu Zheng

**Intern**      February 2012 - May 2012  
Microsoft Research Asia, Beijing, China  
Supervisor: Professor Yu Zheng

**Research Assistant**      May 2011 - February 2012  
Huazhong University of Science and Technology, Wuhan, China  
Supervisor: Professor Housheng Su

CONFERENCE PUBLICATIONS

1. **Ying Wei**, Peilin Zhao, Huaxiu Yao, Junzhou Huang. "Transferable Neural Processes for Hyperparameter Optimization", *Meta-learning Workshop at NeurIPS (**NeurIPS**)*, 2019.
  - Conventional hyperparameter optimization (HPO) algorithms require considerable hyperparameter evaluation trials, which impedes their success in wider applications where a single trial on a huge dataset is often costly. Thereon, we are inspired to speed up HPO by transferring knowledge from historical HPO trials on other datasets.
  - The proposed meta-learning algorithm innovates the dataset-aware attention to identify the most similar datasets, and first transfers trial observations, neural processes parameters, and initial hyperparameter configurations collectively from these datasets.
2. Huaxiu Yao, Chuxu Zhang, **Ying Wei\***, Meng Jiang, Suhang Wang, Junzhou Huang, Nitesh Chawla, Zhenhui (Jessie) Li. "Graph Few-shot Learning via Knowledge Transfer", *Graph Representation Learning Workshop at NeurIPS (**NeurIPS**)*, 2019. (\*: corresponding author)

- For the first time, we attack the problem of semi-supervised node classification by transferring the knowledge learned from historical graphs.
  - We propose a novel meta-learning algorithm on graphs instead of i.i.d. data. We learn a transferable metric space for node similarity, where two embedding functions encrypting both local and global structures are learned from previous graphs.
3. Yifan Zhang, **Ying Wei\***, Peilin Zhao, Shuaicheng Niu, Qingyao Wu, Mingkui Tan, Junzhou Huang. “Collaborative Unsupervised Domain Adaptation for Medical Image Diagnosis”, *Medical Imaging Meets NeurIPS Workshop at NeurIPS (NeurIPS)*, 2019. (\*: corresponding author)
    - We are strongly motivated to improve unsupervised domain adaptation for medical image diagnosis, from the perspectives of denoising noisy annotations due to limited expertise and differentiating the adaptation difficulty of images that have significant discrepancies.
    - The proposed, harnessing the collective intelligence of two peer networks, achieves the goals via a noise co-adaptation layer and a transferability-aware weight for each image.
  4. Zheng Li, Xin Li, **Ying Wei**, Lidong Bing, Yu Zhang, Qiang Yang. “Transferable End-to-End Aspect-based Sentiment Analysis with Selective Adversarial Learning”, *2019 Conference on Empirical Methods in Natural Language Processing (EMNLP)*, 2019. (acceptance rate: 23.8%)
    - Jointly extracting aspects and sentiments for sentiment classification requires considerable labeled sentences which are highly labor-intensive. We innovatively alleviate the problem via unsupervised domain adaptation from a sufficiently labeled domain.
    - We propose a novel selective adversarial learning method to learn correlation vectors between aspects and sentiments and attentively transfer them across domains.
  5. Yifan Zhang\*, Hanbo Chen\*, **Ying Wei\***, Peilin Zhao, Jiezhong Cao, Xinjuan Fan, Xiaoying Lou, Hailing Liu, Jinlong Hou, Xiao Han, Jianhua Yao, Qingyao Wu, Mingkui Tan, and Junzhou Huang. “From Whole Slide Imaging to Microscopy: Deep Microscopy Adaptation Network for Histopathology Cancer Image Classification”, *Twenty-second International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2019. (acceptance rate: 30%, \*: co-first author)
    - This work is the first to empower digital pathology image classification directly based on microscopy images. Specifically, we resort to unsupervised domain adaptation from whole slide images to remedy the lack of annotated microscopy images.
    - The proposed resolves intra-domain discrepancy and class imbalance via entropy minimization and sample re-weighting, respectively, besides inter-domain discrepancy.
  6. Huaxiu Yao, **Ying Wei\***, Junzhou Huang, Zhenhui (Jessie) Li. “Hierarchically Structured Meta-learning”, *Thirty-sixth International Conference on Machine Learning (ICML)*, 2019. (acceptance rate: 22.6%, \*: corresponding author)
    - We devote to conquering a critical challenge in meta-learning, namely task uncertainty and heterogeneity, where tasks may be originated from wildly different distributions.
    - We propose a highly-motivated meta-learning algorithm with hierarchical task clustering. It not only alleviates task heterogeneity via knowledge customization to different clusters of tasks, but also preserves knowledge generalization among a cluster of similar tasks.
  7. Huaxiu Yao, Yiding Liu, **Ying Wei**, Xianfeng Tang, Zhenhui (Jessie) Li. “Learning from Multiple Cities: A Meta-Learning Approach for Spatial-Temporal Prediction”, *The Web Conference (WWW)*, 2019. (acceptance rate: 18%)
    - This work improves spatial-temporal prediction tasks like traffic prediction for those cities with only limited training data in a short period. The improvement is attributed to the knowledge transferred from other cities with sufficient data covering long periods.
    - We first introduce the meta-learning paradigm into spatial-temporal prediction, and formulate the transferable knowledge as both short-term and long-term spatial-temporal patterns which are represented as model parameters and an explicit memory, respectively.

8. Zheng Li, **Ying Wei**, Yu Zhang, Xiang Zhang, Xin Li. “Exploiting Coarse-to-Fine Task Transfer for Aspect-Level Sentiment Classification”, *Thirty-Third AAAI Conference on Artificial Intelligence (AAAI)*, 2019. (**acceptance rate:** 14.9%)
  - We aim at identifying sentiment towards aspect terms in a sentence, while annotating sentences in this case is prohibitively expensive. Innovatively, we leverage knowledge from more easily accessible sentences whose sentiment is annotated to aspect categories.
  - We propose a multi-granularity alignment network to achieve domain adaptation, which resolves both aspect granularity inconsistency and feature discrepancy between domains.
9. Zhang Yu, **Ying Wei**, Qiang Yang. “Learning to Multitask”, *Thirty-Second Annual Conference on Neural Information Processing Systems (NeurIPS)*, 2018. (**acceptance rate:** 20.81%)
  - This work is the pioneer in automatically identifying an effective multitask model for a multitask problem, empowered by a groundbreaking learning to multitask framework.
10. **Ying Wei**, Yu Zhang, Junzhou Huang, Qiang Yang. “Transfer Learning via Learning to Transfer”, *Thirty-fifth International Conference on Machine Learning (ICML)*, 2018. (**acceptance rate:** 25%)
  - This work opens a new door to improve transfer learning effectiveness. We propose a groundbreaking learning to transfer framework to automatically optimize what and how to transfer across domains, by taking advantage of previous transfer learning experiences.
11. Zheng Li, **Ying Wei**, Yu Zhang, Qiang Yang. “Hierarchical Attention Transfer Network for Cross-domain Sentiment Classification”, *Thirty-Second AAAI Conference on Artificial Intelligence (AAAI)*, 2018. (**acceptance rate:** 25%)
  - We are dedicated to improve cross-domain sentiment classification, from the perspectives of discovering domain-invariant emotion words of higher quality for knowledge transfer as well as capturing domain-specific emotion words for sentiment classification.
  - The proposed hierarchical attention transfer network achieves the two goals with a hierarchical attention mechanism and a non-pivots network, respectively.
12. Bo Liu, **Ying Wei**, Yu Zhang, Qiang Yang. “Transferable Contextual Bandit for Cross-Domain Recommendation”, *Thirty-Second AAAI Conference on Artificial Intelligence (AAAI)*, 2018. (**acceptance rate:** 25%)
  - Though contextual bandit effectively solves the exploitation-exploration dilemma in recommendation systems, it suffers from over-exploration in the cold-start scenario. This work is the first to alleviate the problem by transferring knowledge from other domains.
  - We propose a transferable contextual bandit policy which transfers observations to improve user interests estimation for exploitation and thus accelerates the exploration.
13. **Ying Wei**, Yu Zhang, Qiang Yang. “Learning to Transfer”, *arXiv preprint arXiv:1708.05629*, 2017.
  - Highly motivated by human beings’ capabilities to reflect on transfer learning experiences, we propose a novel transfer learning framework to learn meta-knowledge from historical transfer learning experiences and apply the meta-knowledge to automatically optimize what to transfer in the future.
14. Zheng Li, Yu Zhang, **Ying Wei**, Qiang Yang. “End-to-End Adversarial Memory Network for Cross-domain Sentiment Classification”, *Twenty-sixth International Joint Conference on Artificial Intelligence (IJCAI)*, 2017. (**acceptance rate:** 25.98%)
  - This work focuses on cross-domain sentiment classification, e.g., sentiment classification of book reviews by transferring knowledge from electronics product reviews. The key here is to identify domain-invariant emotion words as the transferable knowledge.
  - We are the first to automatically learn domain-invariant emotion words by introducing an end-to-end adversarial memory network and offer a direct visualization of them.
15. Bo Liu, **Ying Wei**, Yu Zhang, Qiang Yang. “Deep Neural Networks for High Dimension, Low Sample Size Data”, *Twenty-sixth International Joint Conference on Artificial Intelligence (IJCAI)*, 2017. (**acceptance rate:** 25.98%)

- We devote to address the problems of overfitting and high-variance gradients, when training deep neural networks on high dimension but low sample size data such as genetic data for phenotype prediction in bioinformatics.
  - We propose a deep neural pursuit network which alleviates overfitting by selecting a subset of features and reduces variance by averaging the gradients over multiple dropouts.
16. **Ying Wei**, Yu Zheng, Qiang Yang. “Transfer Knowledge between Cities”, *Twenty-second ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2016. (**acceptance rate:** 18.11%)
    - We propose the first principled approach to transfer knowledge between domains, each of which comprises multiple modalities of datasets. We conduct a case study of air quality prediction – borrowing knowledge from the cities with sufficient annotations and data to the cities with either scarce annotations or insufficient data in any modality.
    - The proposed method formulates the transferable knowledge as semantically related dictionaries for multiple modalities learned from a source domain and labeled examples.
  17. **Ying Wei**, Yin Zhu, Cane Wing-ki Leung, Yangqiu Song, Qiang Yang. “Instilling Social to Physical: Co-Regularized Heterogeneous Transfer Learning”, *Thirtieth AAAI Conference on Artificial Intelligence (AAAI)*, 2016. (**acceptance rate:** 25.75%)
    - This work first transfers knowledge from posts in the social media side to sensors in the physical world to improve ubiquitous computing tasks such as activity recognition.
    - We propose a co-regularized heterogeneous transfer learning model to discover the transferable feature representations that bridge two domains in heterogeneous representation structures, co-regularized by both correspondence and labels.
  18. **Ying Wei**, Yangqiu Song, Yi Zhen, Bo Liu, and Qiang Yang. “Scalable Heterogeneous Translated Hashing”, *20th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD)*, 2014. (**Best paper finalist: top 9/151, acceptance rate:** 14.6%)
    - Knowledge transfer between domains that lie in heterogeneous feature spaces but have no access to explicit correspondence is almost impossible. This work is the pioneer in using hashing to build the correspondence between such domains.
    - The proposed method simultaneously learns hash functions embedding heterogeneous domains into different Hamming spaces, and a translator aligning these spaces.

REFEREED  
JOURNAL  
PUBLICATIONS

1. **Ying Wei**, Yangqiu Song, Yi Zhen, Bo Liu, and Qiang Yang. “Heterogeneous Translated Hashing: A Scalable Solution towards Multi-modal Similarity Search.” *ACM Transactions on Knowledge Discovery from Data*, 10(4):36, 2016.
  - This work provides a theoretical analysis and guarantee for the scalable heterogeneous translated hashing method which is proposed to build the correspondence between heterogeneous domains.

HONORS AND  
AWARDS

Hong Kong PhD Fellowship (top 5% in Hong Kong)	2012 - 2016
AAAI Scholarship	2016
AAAI Student Travel Grant	2016
Award of Excellence in Microsoft Research Asia Internship Program	2015
KDD Best Paper Finalist	2014
SIGKDD Student Travel Grant	2014
Best Bachelor Thesis in Hubei Province	2012
Outstanding Undergraduate	2012
National Scholarship	2009, 2010, 2011
National Undergraduate Innovation Award	2011

TEACHING  
EXPERIENCE

Teaching Assistant	2017
MSBD 5001 - Foundations of Data Analytics	
Department of Computer Science and Engineering,	
Hong Kong University of Science and Technology	

PROFESSIONAL  
SERVICE

**Conference Senior Program Committee**

2020 Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI)

**Conference Program Committee**

2020 Eighth International Conference on Learning Representations (ICLR)

2019 Thirty-third Conference on Neural Information Processing Systems (NeurIPS)

The Conference on Uncertainty in Artificial Intelligence (UAI)

Twenty-Eighth International Joint Conference on Artificial Intelligence (IJCAI)

Thirty-sixth International Conference on Machine Learning (ICML)

Seventh International Conference on Learning Representations (ICLR)

Thirty-Third AAAI Conference on Artificial Intelligence (AAAI)

2018 Thirty-second Conference on Neural Information Processing Systems (NeurIPS)

Twenty-Seventh International Joint Conference on Artificial Intelligence (IJCAI)

Thirty-Second AAAI Conference on Artificial Intelligence (AAAI)

2015 Twenty-Fourth International Joint Conference on Artificial Intelligence (IJCAI)

**Journal Reviewing**

IEEE Transactions on Pattern Analysis and Machine Intelligence

Machine Learning

IEEE Transactions on Circuits and Systems for Video Technology

**Conference External Reviewing**

2016 Thirtieth Annual Conference on Neural Information Processing Systems (NeurIPS)

2015 IEEE International Conference on Data Mining (ICDM)

2014 SIAM International Conference on Data Mining (SDM)

INVITED TALKS

1. “Self-improving Transfer Learning via Learning to Transfer”, at Nanyang Technological University, 2019
2. “Transferring the What from Experiences”, at JD Data Science Lab, 2017
3. “From Big Data to Small Data”, at Tsinghua-Berkeley Shenzhen Institute, 2016,
4. “Heterogeneous Transfer Learning”, at Tsinghua-Berkeley Shenzhen Institute, 2016
5. “Heterogeneous Transfer Learning and Its Applications”, at Microsoft Research Asia, 2016