SHAO-HENG KO

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RESEARCH INTERESTS

Approximate, Randomized, Distributed, Streaming, and Online Algorithms, Algorithmic Game Theory

EDUCATION

M.S., Computer Science Sep 2015 - Jun 2017
Graduate Institute of Electrical Engineering (GIEE), National Taiwan University *GPA: 4.20/4.3*

· Advisor: Prof. Ho-Lin Chen, Research topic: Algorithmic Game Theory and Mechanism Design
· Master Thesis: Encouraging Peer Grading in MOOCs

B.S., Electrical Engineering Sep 2011 - Jun 2015
Dept. of Electrical Engineering, National Taiwan University *CS-related GPA: 4.17/4.3*

EXPERIENCE

Research Assistant, Inst. of Information Science, Academia Sinica July 2017 - present

· Advisor: Dr. De-Nian Yang, Research topic: Approximation Algorithms, Social Network

Undergraduate RA, Inst. of Information Science, Academia Sinica 2013, 2014, 2015

· Designed and conducted user studies for social activity group formation and mental disorder detection

PUBLICATIONS

1. S.-H. Ko, Y.-C. Lin, H.-C. Lai, W.-C. Lee, and D.-N. Yang, "On VR Spatial Query for Dual Entangled Worlds," to appear in *Proceedings of ACM International Conference on Information and Knowledge Management (CIKM)*, Beijing, November 2019. (full research paper) [arXiv]
2. S.-H. Ko, H.-C. Lai, H.-H. Shuai, D.-N. Yang, W.-C. Lee, and P. S. Yu, "Optimizing Item and Subgroup Configurations for Social-Aware VR Shopping," submitted to *International Conference on Very Large Data Bases (VLDB) 2020*. [Manuscript]

RESEARCH EXPERIENCES

Finding Subgraphs with Customized Local Densities (ongoing)
joint work with Chih-Ya Shen, De-Nian Yang, Wang-Chien Lee

· Formulated a theoretical study on finding subgraphs with customized local densities in a social network
· Proved hardness of approximation and designed efficient approximation algorithms for special inputs

On Maximizing Influence Spread for Social Item Hypergraph (ongoing)
joint work with H.-J. Hung, H.-H. Shuai, D.-N. Yang, L.-H. Huang, W.-C. Lee, J. Pei, M.-S. Chen

· Following work of KDD'16 paper "When Social Influence Meets Item Inference"
· Proved hardness of approximation, enhanced and implemented the algorithm

Optimizing Item and Subgroup Configurations VR Group Shopping (submitted) [2]
joint work with Hsu-Chao Lai, Hong-Han Shuai, De-Nian Yang, Wang-Chien Lee, Philip S. Yu

· Formulated an optimization problem for configuring displayed items and partitioning user subgroups for social-aware VR shopping recommendation systems; proved hardness of approximation
· Devised approximation algorithms via dependent randomized rounding and derandomization
· Implemented the algorithm and conducted experiments on massive real datasets; conducted user studies

Spatial Queries for Dual Entangled Worlds in VR (CIKM '19 [1])
joint work with Ying-Chun Lin, Hsu-Chao Lai, Wang-Chien Lee, De-Nian Yang

- Formulated a multi-space spatial query problem for locomotion in virtual reality
- Devised an FPTAS combining techniques of network transformation, Lagrange relaxation, dynamic programming, and problem-specific pruning strategies
- Implemented the algorithm and conducted experiments on massive real datasets; built VR systems

Encouraging Peer Grading in MOOCs Master Thesis
Advisor: Ho-Lin Chen *Best Master Thesis, GIEE, NTU*

- Built a game theoretical model of Massive Open Online Courses (MOOCs) for a mechanism of incentivizing peer grading efforts by rewarding grading accuracy
- Found a set of sufficient conditions of existence/computability of pure-strategy equilibria
- Characterized properties of equilibria with mechanism designing insights

Interactive Secure Network Coding Undergraduate Study
Advisor: I-Hsiang Wang *College Student Research Scholarship, MOST, Taiwan*

- Studied key-distribution/recycling in secure network coding in wiretap flow networks.
- Devised a novel key-recycling protocol based on key-distributing and handshaking strategies

TEACHING/COORDINATING EXPERIENCES

Coordinator, Advanced Algorithms Study Group *IIS, Academia Sinica*, 2019 (ongoing)
TA, Advanced Algorithms *GIEE, NTU*, 2017
TA, The Design and Analysis of Algorithms *GIEE, NTU*, 2015 - 2016
Lead TA, Discrete Mathematics (lectured study group sessions) *Dept. EE, NTU*, 2016

AWARDS AND HONORS

Best Master Thesis *GIEE, NTU*, 2017
College Student Research Scholarship (103-2815-C-002-063-E) *MOST, Taiwan*, 2014
Bronze Medal, Asian Pacific Mathematics Olympiad (APMO) 2009

ACADEMIC SERVICES

Reviewer, IEEE Global Communications Conference (GLOBECOM), 2018

ONLINE LEARNING/TEACHING INNOVATION

Massive Open Online Courses Explorer, Lab. Teaching Innovation, NTU 2015 - 2017

- Studied publications on online learning; helped manufacturing NTU MOOCs on Coursera
- Designed and produced mini-MOOCs for exhibition in ZaShare 2017
- Wrote column pieces to promote online learning
- Co-organized and paneled the "Why MOOCs" workshop

Co-editer of *Benson's amazement in probability*, a bestseller collection of self-proposed peer-assessment problems in flipped-classroom undergraduate probability classes in Taiwan. ISBN: 9789861371832

LANGUAGE SKILLS

Mandarin Chinese(Native), **English**: Advanced(Reading,Writing)/Intermediate(Speaking)