GUIHONG WAN

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EDUCATION

The University of Texas at Dallas, Richardson, TX
Ph.D. in Computer Science — Jan. 2019 - Present

The University of Texas at Dallas, Richardson, TX
M.S. in Computer Science — Aug. 2017 - Dec. 2018

South-Central University For Nationalities, Wuhan, China
B.S. in Electronics and Information Engineering — Sep. 2006 - May. 2000

Stanford University, Stanford, CA
Data Mining and Applications Graduate Certificate — May. 2018 - Jun. 2019

RESEARCH INTERESTS

My research interests are in large-scale data mining, graph mining, and machine learning, with specific focus on anomalous pattern detection, feature selection/extraction and efficient algorithms for eigenvalue decomposition and deep learning.

RESEARCH & TEACHING EXPERIENCE

Computer Vision and Data Lab (Supervised by Prof. Haim Schweitzer) — Aug. 2018 - Present

- **Outlier detection for principal component analysis**
  Ideas: combinatorial search (weighted A*), centered rank-one update for eigenvalue decomposition, and the bias method (which unifies the centered PCA and uncentered PCA).
  Papers are accepted by AAAI 2021. Two papers are under review by TKDD and ICDE 2021.
- **Unsupervised/Supervised feature selection and extraction**
  The main idea is to use the combinatorial search. Heuristic functions and efficient implementation methods are introduced. The first non-trial optimal algorithm for supervised feature selection for multi-target prediction is proposed. The idea can also be used to do unsupervised representative selection for efficient deep learning.
  One paper was published by AAAI 2019. Another one is in preparation.
- **Edge sparsification and feature selection for graphs**
  The main idea is to use meta-gradients to rank and eliminate the edges while maintain the classification accuracy.
  One paper is accepted by DLG-AAAI 2021. Another one is in preparation.
- **Accurate distance metrics in low-dimensional space**
  The main idea is to use the maximum entropy method to model the uncertainty in dimension reduction techniques.
  Paper is accepted by ICDM 2020.

Teaching Assistant — Jan. 2019 - Present

- Assist in the teaching of following graduate level courses: Machine Learning, Computer Vision, Artificial Intelligence, Data Representation.
- Help students to understand the underlying math, algorithms and projects.
- Grade projects and exams.

Technical Reviewer

- **Reviewer** The Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI 2021)
- **Reviewer** International Conference on Tools with Artificial Intelligence (ICTAI 2018, 2019)
- **Reviewer** International Conference on Pattern Recognition (ICPR 2020)

PUBLICATIONS

Guihong Wan and Haim Schweitzer. "Accelerated Combinatorial Search for Outlier Detection with Provable Bound on Sub-Optimality". Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence, **AAAI 2021**.
Guihong Wan and Haim Schweitzer. "A New Robust Subspace Recovery Algorithm (Student Abstract)". Proceedings of the Thirty-Fifth AAAI Conference on Artificial Intelligence, **AAAI 2021**.
Guihong Wan and Harsha Kokel. "Graph Sparsification via Meta-Learning". The AAAI'21 Workshop on Deep Learning on Graphs: Methods and Applications, **DLG-AAAI 2021**.
Guihong Wan; Crystal Maung; Chenxu Zhang and Haim Schweitzer. "Fast Distance Metrics in Low-dimensional Space for Neighbor Search Problems". 20th IEEE International Conference on Data Mining, **ICDM 2020**.
Guihong Wan; Crystal Maung and Haim Schweitzer. "Improving the Accuracy of Principal Component Analysis by the Maximum Entropy Method". 31st IEEE International Conference on Tools with Artificial Intelligence, **ICTAI 2019**.
Baokun He; **Guihong Wan** and Haim Schweitzer. "A Bias Trick for Centered Robust Principal Component Analysis (Student Abstract)". Proceedings of the Thirty-Fourth AAAI Conference on Artificial Intelligence, **AAAI 2020**.
Baokun He; Swair Shah; Crystal Maung; Gordon Arnold; **Guihong Wan** and Haim Schweitzer. "Heuristic Search Algorithm for Dimensionality Reduction Optimally Combining Feature Selection and Feature Extraction". Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence, **AAAI 2019**.
Guihong Wan and Haim Schweitzer. "A Lookahead Algorithm for Robust Subspace Recovery When Irrelevant Data Abound". 37th IEEE International Conference on Data Engineering, ICDE 2021 (under review).
Baokun He; **Guihong Wan**; Rong Jin and Haim Schweitzer. "The Bias Method for Robust Centered Principal Component Analysis". The ACM Transactions on Knowledge Discovery from Data, TKDD (under review, co-first author).

WORK EXPERIENCE

Android Software Engineer Jul. 2010 - Mar. 2016
Actions Semiconductor Co., Ltd (NASDAQ-ACTS) Zhuhai, China

- Android Software Engineer in R&D Department.
- Director of the Application Team, in Production Development Department.

AWARDS

- Betty and Gifford Johnson Scholarship: 2020
- ICDM Travel Award: 2020
- AAAI Student Scholarship: 2019