

# GUIHONG WAN

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## EDUCATION

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### The University of Texas at Dallas, Richardson, TX

Ph.D. candidate, Computer Science (Supervised by Prof. Haim Schweitzer)

Jan. 2019 - Present

M.S., Computer Science || GPA: 3.92/4.0

Aug. 2017 - Dec. 2018

### South-Central University for Nationalities, Wuhan, China

B.S., Electronics and Information Engineering

Sep. 2006 - May. 2010

### Stanford University, Stanford, CA

Data Mining and Applications Graduate Certificate || GPA: 4.0/4.0

May. 2018 - Jun. 2019

## RESEARCH INTERESTS

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

## RESEARCH & TEACHING EXPERIENCE

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### Computer Vision and Data Lab

Aug. 2018 - Present

- **Outlier Detection for Principal Component Analysis**

The main idea is to formulate the optimization task as graph search problem and use combinatorial search (weighted  $A^*$ ) to solve it. The centered rank-one modification for eigenvalue decomposition is proposed for efficient implementation. Papers are accepted by AAAI 2021.

- **Unsupervised/Supervised Subset Selection**

The main idea is to use the combinatorial search on subset graph. Heuristic functions based on eigenvalues, and efficient implementation methods are introduced. The first non-trivial optimal algorithm for supervised feature selection for multi-target prediction is proposed.

One paper was published by AAAI 2019. Another one is in preparation.

- **Edge sparsification and feature selection for graphs**

The main idea is to formulate the task as a bi-level optimization problem and 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 principle to model the uncertainty in dimensionality 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.
- Design and grade course projects.

### 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

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**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, “Detecting Outliers in High Dimensional Data”, IEEE International Conference on Multimedia and Expo, ICME 2021 (under review).

**Guihong Wan** and Haim Schweitzer, “A Fast Algorithm for Simultaneous Sparse Approximation”, The 25th Pacific-Asian Conference on Knowledge Discovery and Data Mining, PAKDD 2021 (under review).

**Guihong Wan**; Crystal Maung and Haim Schweitzer. “Improved Dimensionality Reduction by Maximum Entropy.” IEEE Transactions on Knowledge and Data Engineering, TKDE (under review).

## WORK EXPERIENCE

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### 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.
- GIT server administrator.

## AWARDS

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- Betty and Gifford Johnson Scholarship, 2020
- ICDM Registration Award, 2020
- AAAI Student Scholarship, 2019
- Outstanding Undergraduate Thesis, South-Central University for Nationalities, 2010

## REFERENCES

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- DR. Haim Schweitzer. Professor of Computer Science Department at The University of Texas at Dallas. Director of Computer Vision and Data Lab. Email: HSchweitzer@utdallas.edu
- DR. Ovidiu Daescu. Professor and associate head of Computer Science Department at The University of Texas at Dallas. Email: ovidiu.daescu@utdallas.edu