Dr Ye Zhu, PhD, IEEE Senior Member

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Research Interests

- **Clustering**: Scalable Clustering, High-Dimensional/Subspace Clustering, Hierarchical Clustering
- **Similarity Learning**: Distance Scaling, Feature Transformation, Data-Dependent Similarity Measure
- **Anomaly Detection**: Streaming Anomaly Detection, Time Series Anomaly Detection

Education

- **Deakin University** — VIC, Australia
  Graduate Certificate of Higher Education Learning and Teaching — *Feb. 2018 – Nov 2021*
- **Monash University** — Clayton, Australia
  Doctor of Philosophy in Artificial Intelligence (Data Mining and Machine Learning) — *Nov. 2013 – May 2017*
- **Imperial College London** — London, United Kingdom
  Master of Science in Computing (Computational Management Science) — *Oct. 2011 – Oct. 2012*
- **Central China Normal University** — Wuhan, China
  Bachelor of Engineering in Computer Science — *Sep. 2006 – June 2010*

Working Experience

- **Deakin University** — Burwood, Australia
  Senior Lecturer of Computer Science (Level C Academic) — *May 2022 - Present*
  Lecturer in Information Technology (Level B Academic) — *Feb. 2019 - April 2022*
  Research Fellow in Complex System Data Analytics (Level B Academic) — *July 2017 - Feb. 2019*

  - **Research Activities (40% workload)**:
    - Focusing on inventing novel data mining and machine learning methods. Particular topics include clustering analysis, anomaly detection, similarity learning and their applications for pattern recognition and information retrieval. Conducting interdisciplinary and industrial projects with the developments of state-of-the-art data mining techniques, including mining natural gas data, telecare call centre data, AFL player data, aircraft battery data, and human sleep sensor data.
    - Supervising 6 PhD students and one Phd student has conferral the degree.
  - **Service Activities (25% workload)**:
    - *School HDR Coordinator*: encompass delegated authority for a range of candidature admission, progress and examination functions and also pay particular attention to the candidate and supervisor welfare, ensuring supervisor best practice and HDR resource allocation within the school, program improvement processes, improving candidate satisfaction and the deepening of the research culture for candidates.
    - *Data Science Course Deputy Director*: coordinate unit design, ongoing development and review for Master/Graduate Certificate of Data science to ensure that the requirements of the Higher Education Courses policy and associated procedures, and professional accreditation requirements are met.
    - *Master of Data Science Course CPL Officer*: provide credit for overseas qualifications, value students' working experience for recognition of prior learning.
  - **Teaching Activities (35% workload)**:
    Unit Chair of three units for Master of Data Science, Graduate Certificate of Data Analytics, and Graduate Certificate of Data Science (nominated for teaching award in 2020):
    - SIT718 – Real World Analytics (Unit Chair in T1 T2 2019, T1 T2 2020, T1 T2 2021, T1 2022 and T1 2023)
    - SIT741 – Statistical Data Analysis (Unit Chair in T2 2019)
    - SIT742 – Modern Data Science (Lecturer in T1 2019)

- **Monash University** — Clayton, Australia
  Teaching Associate — *Feb. 2016 - Feb. 2019*

- **Teaching Activities**:
  Tutoring five units for Master of Data Science and Graduate Diploma in Data Science:
  - FIT5145 – Introduction to data science (S1 2016, S1 2017, TP1 2018, TP1 2019)
  - FIT5147 – Data exploration and visualisation (TP2 2018)
  - FIT5196 – Data wrangling (TP6 2017, TP3 2018, TP1 2019)
  - FIT9133 – Programming foundations in python (TP5 2017)
  - FIT2017 – Computer models for business decision making (S1 2017)

- **Federation University Australia** — Churchill, Australia
  Research Assistant — *Apr. 2015 - May 2017*
  - **Mass Estimation Project**: Worked with my PhD supervisor Prof. Kai Ming Ting in several research projects about mass estimation funded by US Air Force Research Laboratory.

- **PricewaterhouseCoopers** — Beijing, China
  IT Business Consultant — *Feb. 2013 - Nov. 2013*
  - **Business Intelligence and Data Warehousing**: Provided advice on management of information, as a strategic business resource, to ensure that the information needs of the business are met for a large national bank in China. Encompassed development and promotion of enterprise data models, metadata design and implementation business intelligence repositories, master data management and the selection and implementation of tools to support data governance for the next generation data warehouse.

Funded Projects

I have secured eight research grants of around AUD$640,000 in total as a chief investigator since 2018.

- **AUD$100,000** - AI-empowered photovoltaic systems for sustainable buildings - *Australian Government Department of Industry, Science and Resources* - 2023
- **AUD$60,000** - Socrates: Software Security with a focus on critical technologies - *Cyber Security Cooperative Research Centre, Australia* - 2022, 2023
- **AUD$390,000** - Augmenting Cyber Defence Capability - *Cyber Security Cooperative Research Centre, Australia* - 2022, 2023
- **AUD$24,000** - Modelling and forecasting US natural gas price in dynamic environments - *MITA Capital Management LLC, USA* - 2021
- **AUD$30,000** - Modelling networked combat, adversarial C2 and information operations - *Australian Government Department of Defence* - 2020
- **AUD$30,000** - Adversarial decision making networks and directed fires with non-combatant populations - *Australian Government Department of Defence* - 2019
- **AUD$50,000** - Intelligent sensor processing for enhancing defence decision support - *Australian Government Department of Defence* - 2019
- **AUD$12,778** - Multiple networks in dynamical combat modelling and critical phenomena - *Australian Government Department of Defence* - 2018

Honors and Awards

- **School of IT Leadership Award** — Deakin University, Australia
  Awarded for initiating and setting up Master of Data Science (Global) — *Dec 2022*
- **School of IT Teaching and Learning Award** — Deakin University, Australia
  Awarded for incorporating authentic assessment to challenge students — *Dec 2021*
- **School of IT Research Award** — Deakin University, Australia
  Awarded to excellence in early career research performance — *Dec 2020*
- **Mollie Holman Medal** — Monash University, Australia
  Awarded to the best PhD thesis of the year — *May 2018*

Conference Tutorial

- **How to Select Shallow and Deep Methods for Anomaly Detection**: International Conference on Advanced Data Mining and Applications (ADMA) in November 2022
- **Moving Beyond Traditional Anomaly Detection**: the Pacific Asia Conference on Knowledge Discovery and Data Mining (PAKDD) in May 2023
- **Moving Beyond Traditional Anomaly Detection**: 32nd International Joint Conference on Artificial Intelligence (IJCAI) in Aug 2023
- **Revolutionizing Anomaly Detection: Approaches and Guidelines**: the European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML-PKDD) in Sep 2023

Publications

Since 2016, I have published over 40 papers. More than 90% research outcomes have been published in top-tier (CORE A*/A or Q1) conferences and journals including ICML, KDD, IJCAI, VLDB, AAAI, ICDM, TKDE, AIJ, ISJ, PRJ, JAIR and MLJ.

- **Journal papers**:
  - **Ye Zhu** and Kai Ming Ting ."Kernel-based Clustering via Isolation Distributional Kernel". Information Systems (2023). *CORE A**
  - Xin Han, **Ye Zhu**, Kai Ming Ting, De-chuan Zhan and Gang Li."The impact of isolation kernel on agglomerative hierarchical clustering algorithms". Pattern Recognition (2023). *CORE A**
  - Mathew Zuparic, Sergiy Shelyag, Maia Angelova, **Ye Zhu**, and Alexander Kalloniatis."Modelling host population support for combat adversaries". Journal of the Operational Research Society (2023). *Q1*
  - Moting Su, Wenjie Zhao, **Ye Zhu**, Donglan Zha, Yushu Zhang, and Peng Xu ."Anomaly detection of vectorised time series on aircraft battery data". Expert Systems with Applications (2023). *Q1*
  - Junhao Xiao, Chenquan Gan, Qingyi Zhu, **Ye Zhu**, and Gang Liu."CFNet: Facial expression recognition via constraint fusion under multi-task joint learning network". Applied Soft Computing (2023). *Q1*
  - Lu Zhou, **Ye Zhu** and Yong Xiang. "A novel feature-based framework enabling multi-type DDoS attacks detection". World Wide Web (2023). *CORE A*
  - Man Li, **Ye Zhu**, Yuxin Shen, and Maia Angelova. "Clustering-enhanced stock price prediction with deep learning approach". World Wide Web (2023). *CORE A*
  - Kai Ming Ting, Takashi Washio, Jonathan Wells, Hang Zhang and **Ye Zhu**. "Isolation Kernel Estimators". In press by Knowledge and Information Systems (2022). *CORE A*
  - Mathew Zuparic, Sergiy Shelyag, Maia Angelova, **Ye Zhu** and Alexander Kalloniatis. "Modelling host population support for combat adversaries". In press by Journal of the Operational Research Society (2022). *Q1*
  - Kai Ming Ting, Jonathan R. Wells, and **Ye Zhu**. "Point-Set Kernel Clustering". IEEE Transactions on Knowledge and Data Engineering (2022). *CORE A**
  - Man Li, **Ye Zhu**, Taige Zhao, and Maia Angelova. "Weighted dynamic time warping for traffic flow clustering". Neurocomputing 472 (2022): 266-279. *Q1*
  - Lu Zhou, **Ye Zhu**, Tianrui Zong, Yong Xiang "A Feature Selection-based Method for DDoS Attack Flow Classification". Future Generation Computer Systems (2022) *CORE A*
  - **Ye Zhu** and Kai Ming Ting. "Improving the Effectiveness and Efficiency of Stochastic Neighbour Embedding with Isolation Kernel." Journal of Artificial Intelligence Research 71 (2021): 667-695. *CORE A*
  - **Ye Zhu**, Kai Ming Ting, Yuan Jin, and Maia Angelova."Hierarchical clustering that takes advantage of both density-peak and density-connectivity". Information Systems, 2021. *CORE A**
  - **Ye Zhu**, Kai Ting, Mark Carman, Maia Angelova Turkedjieva. "CDF Transform-and-Shift: An effective way to deal with datasets of inhomogeneous cluster densities". Pattern Recognition, 2021. *CORE A**
  - Wenjie Zhao, Yushu Zhang, **Ye Zhu**, Peng Xu. "Anomaly detection of aircraft lead-acid battery". Quality and reliability engineering international, 2021. *Q1*
  - Mathew Zuparic, Maia Angelova Turkedjieva, **Ye Zhu**, Alexander Kalloniatis. "Adversarial decision strategies in multiple network phased oscillators: the Blue-Green-Red Kuramoto-Sakaguchi model". Communications in Nonlinear Science and Numerical Simulation, 2021. *Q1*

- Yuan Jin, Mark Carman, **Ye Zhu**, and Yong Xiang. "A Technical Survey on Statistical Modelling and Design Methods for Crowdsourcing Quality Control.". Artificial Intelligence, 2020. *CORE A**
- Yushu Zhang, Jin Jiang, Yong Xiang, **Ye Zhu**, Liangtian Wan, Xiyuan Xie. "Cloud-Assisted Privacy-Conscious Large-Scale Markowitz Portfolio". Information Sciences, 2020. *CORE A*
- Maia Angelova, Gleb Beliakov, Sergiy Shelyag, **Ye Zhu**. "Density estimates on the unit simplex and calculation of the mode of a sample". International Journal of Intelligent Systems, 2020. *Q1*
- Maia Angelova, Gleb Beliakov, **Ye Zhu**. "Density-based clustering using approximate natural neighbours". Applied Soft Computing, 2019. *Q1*
- Ming Li, Di Xiao, **Ye Zhu**, Yushu Zhang, Lin Sun. "Commutative fragile zero-watermarking and encryption for image integrity protectio". Multimedia Tools and Applications, 2019. *Q1*
- Moting Su, Zongyi Zhang, **Ye Zhu**, Donglan Zha."Data-driven natural gas spot price forecasting with least squares regression boosting algorithm". Energies, 2019. *Q1*
- Bo Chen, Kai Ming Ting, Takashi Washio, and **Ye Zhu**. "Local contrast as an effective means to robust clustering against varying densities". Machine Learning, 2019. *CORE A* before 2020*
- Kai Ming Ting, **Ye Zhu**, Mark Carman, Yue Zhu, Takashi Washio, and Zhi-Hua Zhou. "Lowest Probability Mass Neighbour Algorithms: Relaxing the metric constraint in distance-based neighbourhood algorithms". Machine Learning, 2019. *CORE A* before 2020*
- Moting Su, Zongyi Zhang, **Ye Zhu**, Donglan Zha, Wenying Wen."Data Driven Natural Gas Spot Price Prediction Models Using Machine Learning Methods". Energies, 2019. *Q1*
- **Ye Zhu**, Kai Ming Ting, and Mark J. Carman."Grouping Points by Shared Subspaces for Effective Subspace Clustering". Pattern Recognition, 2018. *CORE A**
- Tharindu R. Bandaragoda, Kai Ming Ting, David Albrecht, Fei Tony Liu, **Ye Zhu**, and Jonathan R. Wells. "Isolationbased anomaly detection using nearestneighbor ensembles". Computational Intelligence, 2018. *CORE A before 2020*
- **Ye Zhu**, Kai Ming Ting, and Mark J. Carman. "Density-ratio based clustering for discovering clusters with varying densities". Pattern Recognition, 2016. *CORE A**
- **Ye Zhu**, and Kai Ming Ting. "Commentary: a decomposition of the outlier detection problem into a set of supervised learning problems". Machine Learning, 2016. *CORE A* before 2020*

- **Conference papers**:
  - Zijing Wang, **Ye Zhu** and Kai Ming Ting. "TDistribution-Based Trajectory Clustering". In Proceedings of the 23rd IEEE International Conference on Data Mining (ICDM-23), 2023. *CORE A**
  - Hang Zhang, Kaifeng Zhang, Kai Ming Ting and **Ye Zhu**. "Towards a Persistence Diagram that is Robust to Noise and Varied Densities". In Proceedings of the 40th International Conference on Machine Learning (ICML-23), 2023. *CORE A**
  - Baojie Zhang, Yang Cao, **Ye Zhu**, Sutharshan Rajasegarar, Gang Liu, Hong Xian Li, Maia Angelova, and Gang Li. "An Improved Visual Assessment With Data-Dependent Kernel for Stream Clustering". In Proceedings of the 27th Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-23), 2023. *CORE A*
  - **Ye Zhu** and Kai Ming Ting. "Improving the Effectiveness and Efficiency of Stochastic Neighbour Embedding with Isolation Kernel (Extended Abstract)." In Proceedings of the Thirty-First International Joint Conference on Artificial Intelligence (IJCAI-22). *CORE A**
  - Xin Han, **Ye Zhu**, Kai Ming Ting, and Gang Li."Streaming Hierarchical Clustering based on Point-set Kernel". In Proceedings of 28th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD-22). *CORE A**
  - Kai Ming Ting, Zongyou Liu, Hang Zhang and **Ye Zhu**."A New Distributional Treatment for Time Series and An Anomaly Detection Investigation". In proceedings of 48th International Conference on Very Large Data Bases (VLDB-22). *CORE A**
  - Jillian Tallboys, **Ye Zhu** and Sutharshan Rajasegarar. "Identification of Stock Market Manipulation with Deep Learning". In Proceedings of International Conference on Advanced Data Mining and Applications (ADMA-22).
  - Lu Zhou, **Ye Zhu** and Yong Xiang. "A Comprehensive Feature Importance Evaluation for DDoS Attacks Detection". In Proceedings of International Conference on Advanced Data Mining and Applications, (ADMA-22).
  - Xichen Tang, Jinlong Wang, **Ye Zhu**, Robin Doss and Xin Han. "Systematic evaluation of abnormal detection methods on gas well sensor data." In Proceedings of 2021 IEEE Symposium on Computers and Communications (ISCC-21), pp. 1-6. IEEE, 2021.

- Xiaoyu Qin, Kai Ming Ting, **Ye Zhu**, and Vincent Lee. "Nearest-Neighbour-Induced Isolation Similarity and Its Impact on Density-Based Clustering". In Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence (AAAI-19). *CORE A**
- Yuan Jin, Mark Carman, **Ye Zhu**, and Wray Buntine. "Distinguishing Question Subjectivity from Difficulty for Improved Crowdsourcing". In Proceedings of the 10th Asian Conference on Machine Learning (ACML-18), 2018.
- **Ye Zhu**, Kai Ming Ting, and Maia Angelova. "A Distance Scaling Method to Improve Density-based Clustering". In Proceedings of the 22nd Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-18), 2018. *CORE A*
- Yuan Jin, Lan Du, **Ye Zhu**, and Mark Carman. "Leveraging Label Category Relationships in Multi-class Crowdsourcing". In Proceedings of the 22nd Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD-18). *CORE A*
- Kai Ming Ting, **Ye Zhu**, Mark Carman, Yue Zhu, and Zhi-Hua Zhou. "Overcoming key weaknesses of distance-based neighbourhood methods using a data dependent dissimilarity measure". In Proceedings of the 22nd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD-16). *CORE A**

Professional service

- **Journal/Conference Reviewer**:
  Journal Reviewing:
  - Data Mining and Knowledge Discovery (2023, 2022, 2021, 2020, 2019)
  - IEEE Transactions on Pattern Analysis and Machine Intelligence (2022, 2021)
  - IEEE Intelligent system (2020)
  - IEEE Transactions on Image Processing (2020)
  - IEEE Transactions on Neural Networks and Learning Systems (2023, 2020, 2019)
  - Machine Learning (2023, 2022, 2020, 2019, 2017)
  - Pattern Recognition (2023, 2022, 2020, 2016)
  - Knowledge and Information Systems (2018)
  - IEEE Transactions on Computational Social Systems (2018)

  Conference Reviewing/Programme Committee:
  - AAAI Conference on Artificial Intelligence (2023, 2022, 2021, 2020)
  - International Joint Conference on Artificial Intelligence (2023, 2022, 2021)
  - ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (2023, 2022, 2021, 2016)
  - European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (2023, 2022, 2021, 2020, 2019)
  - Pacific-Asia Conference on Knowledge Discovery and Data Mining (2023, 2022, 2021, 2020, 2019)
  - IEEE International Conference on Data Mining (2023, 2021, 2016)
- **Conference Organiser**:
  - International Conference on Knowledge Science, Engineering and Management (Guangzhou, China – 2023)
  - IEEE Symposium on Computers and Communications (2023, 2022, 2021)
  - Pacific-Asia Conference on Knowledge Discovery and Data Mining (Melbourne, Australia – 2018)
  - ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (San Francisco, California, USA – 2016)