Biography
Shirui Pan is currently an ARC Future Fellow and a Senior Lecturer with the Faculty of Information Technology, Monash University, Australia. Shirui has made contributions to advance graph machine learning methods for solving hard AI problems for real-life applications, including graph classification, anomaly detection, recommender systems, and multivariate time series forecasting. His research has been published in top conferences and journals including NeurIPS, ICML, KDD, TPAMI, TNNLS, and TKDE. Shirui is recognised as one of the AI 2000 AAAI/IJCAI Most Influential Scholars in Australia (2021). He is an awardee of a prestigious Future Fellowship (2021-2025), one of the most competitive grants from the Australian Research Council (ARC).

Research interests
Dr Pan's research interests include
- data mining
- machine learning
- deep learning
- graph and network analytics
- NLP
To date, Dr Pan has published over 100 research papers in top-tier journals and conferences, including the IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), IEEE Transactions on Neural Networks and Learning Systems (TNNLS), IEEE Transactions on Knowledge and Data Engineering (TKDE), IEEE Transactions on Cybernetics (TCYB), NeurIPS, KDD, ICML, WWW, CVPR, ICDE, AAAI, IJCAI, ICDM, SDM, PAKDD. More information about his research can be found at https://shiruipan.github.io/.

Monash teaching commitment
Dr Pan is the Director of Master of AI at Monash since 2022. Dr Pan lectured the following unit(s) at Monash University
FIT5196 Data Wrangling
FIT5212 Data Analysis for Semi-structured Data

Community service
Dr Pan regularly serves as an Associate Editor, Session Chair, Invited Reviewer, Program Committee Member for a number of journals and conferences. His professional services include:
- Editorship
  - Guest Editor: IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
  - Guest Editor: Future Generation Computing Systems
  - Guest Editor: Complexity
  - Guest Editor: Neurocomputing
  - Conference Organisation
- Special Session Chair: Learning from Big Graph Data: Theory and Applications, IJCNN-2018 (CORE A)
- Special Session Chair: Advanced Data Analytics for Large-scale Complex Data Environment, IJCNN- 2017 (CORE A)
Research outputs

1. **Fire burns, sword cuts: commonsense inductive bias for exploration in text-based games**
   Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

2. **Task-adaptive neural process for user cold-start recommendation**
   Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

3. **Heterogeneous graph attention network for Small and Medium-sized enterprises bankruptcy prediction**
   Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review
4. Manifold APproximation and Projection by maximizINg Graph information
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

5. Multi-scale contrastive siamese networks for self-supervised graph representation learning
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

6. A self-supervised learning framework for sequential recommendation
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

7. iDARTS: Differentiable ARchitecture Search with stochastic implicit gradients
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

8. Unsupervised domain adaptive graph convolutional networks
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

9. Connecting the dots: multivariate time series forecasting with graph neural networks
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

10. Multivariate relations aggregation learning in social networks
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

11. Grounding visual concepts for zero-shot Event Detection and Event Captioning
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

12. One-Shot Neural architecture search via novelty driven sampling
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

13. Reasoning like human: hierarchical reinforcement learning for knowledge graph reasoning
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

14. A relation-specific attention network for joint entity and relation extraction
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

15. Going deep: Graph convolutional ladder-shape networks
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review
16. Reinforcement learning based meta-path discovery in large-scale heterogeneous information networks
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

17. GSSNN: Graph Smoothing Splines Neural Networks
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

18. Overcoming multi-model forgetting in One-Shot NAS with diversity maximization
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

19. OpenWGL: open-world graph learning
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

20. Cross-graph: robust and unsupervised embedding for attributed graphs with corrupted structure
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

21. Graph Stochastic Neural Networks for semi-supervised learning
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

22. Graph Geometry Interaction Learning
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

23. Differentiable neural architecture search in equivalent space with exploration enhancement
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

24. Detecting suicidal ideation with data protection in online communities
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

25. DAGCN: dual attention graph convolutional networks
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

26. Attentive dual embedding for understanding medical concepts in electronic health records
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review
37. **Learning private neural language modeling with attentive aggregation**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

38. **Advadisarial action data augmentation for similar gesture action recognition**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

29. **Attributed Graph Clustering: a Deep Attentional Embedding approach**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

30. **Low-Bit Quantization for Attributed Network Representation Learning**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

31. **Graph WaveNet for deep spatial-temporal graph modeling**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

32. **An explainable deep fusion network for affect recognition using physiological signals**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

33. **Long-short distance aggregation networks for positive unlabeled graph learning**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

34. **Domain-adversarial graph neural networks for text classification**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

35. **Relation Structure-Aware Heterogeneous Graph Neural Network**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

36. **Label embedding with Partial Heterogeneous Contexts**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

37. **DISAN: directional self-attention network for RNN/CNN-free language understanding**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

38. **Adversarially regularized graph autencoder for graph embedding**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review
39. **Discrete network embedding**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

40. **Active discriminative network representation learning**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

41. **FraudNE: a joint embedding approach for fraud detection**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

42. **Binarized attributed network embedding**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

43. **Cost-sensitive hybrid neural networks for heterogeneous and imbalanced data**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

44. **Cross-domain deep learning approach for multiple financial market prediction**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

45. **Graph ladder networks for network classification**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

46. **MGAE: marginalized graph autoencoder for graph clustering**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

47. **Universal network representation for heterogeneous information networks**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

48. **Co-clustering enterprise social networks**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

49. **Iterative views agreement: an iterative low-rank based structured optimization method to multi-view spectral clustering**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

50. **Tri-party deep network representation**
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review
51. **Multi-graph-view learning for complicated object classification**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

52. **Mining top-k minimal redundancy frequent patterns over uncertain databases**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

53. **Multi-graph learning with positive and unlabeled bags**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

54. **Exploring features for complicated objects: cross-view feature selection for multi-instance learning**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

55. **Attribute weighting: how and when does it work for Bayesian Network Classification**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

56. **Multi-Graph-View learning for graph classification**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

57. **Dual instance and attribute weighting for Naive Bayes classification**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

58. **Graph classification with imbalanced class distributions and noise**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

59. **Graph stream classification using labeled and unlabeled graphs**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

60. **Continuous top-k query for graph streams**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

61. **CGStream: Continuous correlated graph query for data streams**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

62. **Top-k correlated subgraph query for data streams**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

63. **Classifier ensemble for uncertain data stream classification**  
Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review
64. **Ensemble of multiple descriptors for automatic image annotation**
   Research output: Chapter in Book/Report/Conference proceeding › Conference Paper › Research › peer-review

65. **Compact scheduling for task graph oriented mobile crowdsourcing**
   Research output: Contribution to journal › Article › Research › peer-review

66. **Anomaly detection on attributed networks via Contrastive self-supervised Learning**
   Research output: Contribution to journal › Article › Research › peer-review

67. **A survey on knowledge graphs: representation, acquisition, and applications**
   Research output: Contribution to journal › Article › Research › peer-review

68. **Deep neighbor-aware embedding for node clustering in attributed graphs**
   Research output: Contribution to journal › Article › Research › peer-review

69. **Reinforced, incremental and cross-lingual event detection from social messages**
   Research output: Contribution to journal › Article › Research › peer-review

70. **Predicting best-selling new products in a major promotion campaign through graph convolutional networks**
   Li, C., Jiang, W., Yang, Y., Pan, S., Huang, G. & Guo, L., 23 Mar 2022, (Accepted/In press) In: *IEEE Transactions on Neural Networks and Learning Systems*. 14 p.
   Research output: Contribution to journal › Article › Research › peer-review

71. **Attraction and repulsion: unsupervised domain adaptive Graph Contrastive Learning Network**
   Research output: Contribution to journal › Article › Research › peer-review

72. **Identify topic relations in scientific literature using topic modeling**
   Research output: Contribution to journal › Article › Research › peer-review

73. **Bayesian personalized ranking based on multiple-layer neighborhoods**
   Research output: Contribution to journal › Article › Research › peer-review

74. **A comprehensive survey on graph neural networks**
   Research output: Contribution to journal › Article › Research › peer-review

75. **Hyperspectral image classification with context-aware dynamic graph convolutional networks**
   Research output: Contribution to journal › Article › Research › peer-review

76. **Influence spread in geo-social networks: a multi-objective optimization perspective**
   Research output: Contribution to journal › Article › Research › peer-review

77. **Suicidal ideation detection: a review of machine learning methods and applications**
   Research output: Contribution to journal › Article › Research › peer-review

78. **Convolutional neural networks based lung nodule classification: a surrogate-assisted evolutionary algorithm for hyperparameter optimization**
   Research output: Contribution to journal › Article › Research › peer-review
79. **GADTI: graph autoencoder approach for DTI prediction from heterogeneous network**
   Research output: Contribution to journal › Article › Research › peer-review

80. **Dual interactive graph convolutional networks for hyperspectral image classification**
   Research output: Contribution to journal › Article › Research › peer-review

81. **PUMPNET: a deep learning approach to pump operation detection**
   Research output: Contribution to journal › Article › Research › peer-review

82. **Gated relational stacked denoising autoencoder with localized author embedding for global citation recommendation**
   Research output: Contribution to journal › Article › Research › peer-review

83. **Temporal network embedding for link prediction via VAE joint attention mechanism**
   Research output: Contribution to journal › Article › Research › peer-review

84. **OpenWGL: open-world graph learning for unseen class node classification**
   Research output: Contribution to journal › Article › Research › peer-review

85. **Network-based methods for gene function prediction**
   Research output: Contribution to journal › Article › Research › peer-review

86. **IGNSCDA: predicting CircRNA-Disease Associations based on Improved Graph convolutional network and negative sampling**
   Research output: Contribution to journal › Article › Research › peer-review

87. **Learning graph representations with maximal cliques**
   Research output: Contribution to journal › Article › Research › peer-review

88. **Prediction of circRNA-miRNA associations based on network embedding**
   Research output: Contribution to journal › Article › Research › peer-review

89. **Anomaly Detection in DYnamic graphs via Transformer**
   Research output: Contribution to journal › Article › Research › peer-review

90. **One-shot Learning-based Animal Video Segmentation**
   Research output: Contribution to journal › Article › Research › peer-review

91. **Gated graph convolutional network with enhanced representation and joint attention for distant supervised heterogeneous relation extraction**
   Research output: Contribution to journal › Article › Research › peer-review

92. **Clustering social audiences in business information networks**
   Research output: Contribution to journal › Article › Research › peer-review

93. **Classification of lung nodules based on Deep residual networks and migration learning**
   Research output: Contribution to journal › Article › Research › peer-review
94. Learning graph embedding with adversarial training methods
Research output: Contribution to journal › Article › Research › peer-review

95. Distributed feature selection for big data using fuzzy rough sets
Research output: Contribution to journal › Article › Research › peer-review

96. Exploiting implicit influence from information propagation for social recommendation
Research output: Contribution to journal › Article › Research › peer-review

97. Familial clustering For weakly-labeled Android malware using Hybrid REpresentation Learning
Research output: Contribution to journal › Article › Research › peer-review

98. One-shot neural architecture search: maximising diversity to overcome catastrophic forgetting
Research output: Contribution to journal › Article › Research › peer-review

99. Time series feature learning with labeled and unlabeled data
Research output: Contribution to journal › Article › Research › peer-review

100. CFOND: consensus factorization for co-clustering networked data
Guo, T., Pan, S., Zhu, X. & Zhang, C., 1 Apr 2019, In: IEEE Transactions on Knowledge and Data Engineering. 31, 4, p. 706-719 14 p.
Research output: Contribution to journal › Article › Research › peer-review

101. Social recommendation with evolutionary opinion dynamics
Research output: Contribution to journal › Article › Research › peer-review

102. Cost-sensitive parallel learning framework for insurance intelligence operation
Research output: Contribution to journal › Article › Research › peer-review

103. Adaptive knowledge subgraph ensemble for robust and trustworthy knowledge graph completion
Research output: Contribution to journal › Article › Research › peer-review

104. Measuring distance-based semantic similarity using meronymy and hyponymy relations
Research output: Contribution to journal › Article › Research › peer-review

105. Hashing for adaptive real-time graph stream classification with concept drifts
Research output: Contribution to journal › Article › Research › peer-review
109. Explore semantic topics and author communities for citation recommendation in bipartite bibliographic network
Research output: Contribution to journal › Article › Research › peer-review

110. Supervised learning for suicidal ideation detection in online user content
Research output: Contribution to journal › Article › Research › peer-review

111. Query-oriented citation recommendation based on network correlation
Research output: Contribution to journal › Article › Research › peer-review

112. A hybrid user experience evaluation method for mobile games
Research output: Contribution to journal › Article › Research › peer-review

113. Heterogeneous information network embedding based personalized query-focused astronomy reference paper recommendation
Research output: Contribution to journal › Article › Research › peer-review

114. Low-rank and sparse matrix factorization for scientific paper recommendation in heterogeneous network
Research output: Contribution to journal › Article › Research › peer-review

115. Task sensitive feature exploration and learning for multitask graph classification
Research output: Contribution to journal › Article › Research › peer-review

116. Towards large-scale social networks with online diffusion provenance detection
Research output: Contribution to journal › Article › Research › peer-review

117. Positive and unlabeled multi-graph learning
Research output: Contribution to journal › Article › Research › peer-review

118. Boosting for graph classification with universum
Research output: Contribution to journal › Article › Research › peer-review

119. Multi-document summarization based on sentence cluster using Non-negative Matrix Factorization
Research output: Contribution to journal › Article › Research › peer-review

120. Exploiting attribute correlations: a novel trace lasso-based weakly supervised dictionary learning method
Research output: Contribution to journal › Article › Research › peer-review

121. Joint structure feature exploration and regularization for multi-task graph classification
Research output: Contribution to journal › Article › Research › peer-review

122. Multi-graph-view subgraph mining for graph classification
Research output: Contribution to journal › Article › Research › peer-review

123. Classifying networked text data with positive and unlabeled examples
Research output: Contribution to journal › Article › Research › peer-review

124. SODE: Self-adaptive one-dependence estimators for classification
Research output: Contribution to journal › Article › Research › peer-review

125. Finding the best not the most: regularized loss minimization subgraph selection for graph classification
Research output: Contribution to journal › Article › Research › peer-review
126. **Boosting for multi-graph classification**  
Research output: Contribution to journal › Article › Research › peer-review

127. **CogBoost: boosting for fast cost-sensitive graph classification**  
Research output: Contribution to journal › Article › Research › peer-review

128. **Graph ensemble boosting for imbalanced noisy graph stream classification**  
Research output: Contribution to journal › Article › Research › peer-review

129. **Self-adaptive attribute weighting for Naive Bayes classification**  
Research output: Contribution to journal › Article › Research › peer-review

130. **Locally weighted learning: how and when does it work in Bayesian networks?**  
Research output: Contribution to journal › Article › Research › peer-review

131. **Dynamic classifier ensemble for positive unlabeled text stream classification**  
Research output: Contribution to journal › Article › Research › peer-review

Projects

1. **Catch.com.au Forecasting Project**  
Bergmeir, C. & Pan, S.  
10/09/21 → 3/12/21

2. **Intelligent process control based on large-scale data mining and deep reinforcement learning**  
Pan, S. & Chang, X.  
Metso Outotec Oy, Outotec Pty Ltd  
1/07/20 → 30/06/23

3. **Reasoning under Uncertainty with Natural Language**  
Li, Y., Haffari, R., Chang, X., Wang, T. & Pan, S.  
Defence Science and Technology Group (DST) (Australia)  
4/12/19 → 28/08/20

4. **Reasoning under Uncertainty with Natural Language (2)**  
Li, Y., Haffari, R., Chang, X., Wang, T. & Pan, S.  
1/06/20 → 30/06/22

5. **RACE for 2030: Reliable Affordable Clean Energy for 2030 Cooperative Research Centre (RACE for 2030 CRC)**  
1/07/20 → 30/06/31