Peizhi Shi

Lecturer in Applied Artificial Intelligence

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Summary of Qualifications

- Passionate researcher with 10 years of experience in the field of machine learning (July 2013 — Present).
- With 17 years of experience in computer science (September 2006 – Present).
- With 4 years of research experience in intelligent manufacturing and industry 4.0 (June 2019 – Present).
- Published several influential machine learning research papers in top-tire journals.
- Experienced in instructing computer science courses for both undergraduate and postgraduate students.
- With experience in supervising Ph.D. students' machine learning research.

Education

2013–2019 **Ph.D. in Computer Science (Machine Learning)**.
School of Computer Science, University of Manchester
Supervisor: Dr. Ke Chen

2010–2013 **Master in Software Engineering**.
School of Software Engineering, University of Science and Technology of China (94th in QS WUR 2023)
Grade: 89% (equivalent to distinction degree in the UK)

2006–2010 **Bachelor in Computer Science**.
School of Computer Science and Engineering, Guilin University of Electronic Technology
Grade: overall 83% (equivalent to 2.1 degree in the UK), major 87%

Work Experience

09/2023 **Incoming Lecturer in Applied Artificial Intelligence**, *Centre for Decision Research, University of Leeds*.

2019–2023 **Research Fellow in Machine Learning**, *Maths Group, EPSRC Future Advanced Metrology Hub*.

- Participation in EPSRC Project EP/P006930/1 (£10,813,543)
- Participation in EPSRC Project EP/S001328/1 (£482,941)
- Participation in EPSRC Project EP/S000453/1 (£252,962)

2013–2017 **Teaching Assistant**, *University of Manchester*.

- Algorithms and Data Structures (2nd year undergraduate)
- Machine Learning and Optimization (2nd year undergraduate)
- Modelling and Visualization of High Dimensional Data (postgraduate)

2011 **Teaching Assistant**, *University of Science and Technology of China*.

- 3rd Asian-Pacific Summer School on Formal Methods

2012 **Volunteer Teacher**, *Dalaba primary school*, Yunnan, China.

- Taught English, Mandarin, art, craft and physical education classes.

Selected Publications

- **P. Shi**, Q. Qi, Y. Qin, F. Meng, S. Lou, P. J. Scott, and X. Jiang, "Learn to rotate: Part orientation for reducing support volume via generalizable reinforcement learning," *IEEE Transactions on Industrial Informatics*, 2023. (**IF 12.3**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "A Novel Weighted Averaging Operator of Linguistic Interval-Valued Intuitionistic Fuzzy Numbers for Cognitively Inspired Decision-Making," *Cognitive Computation*, 2023. (**IF 5.4**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "Selection of materials in metal additive manufacturing via three-way decision-making," *The International Journal of Advanced Manufacturing Technology*, pp. 1–10, 2023. (**IF 3.4**)

- **P. Shi**, Q. Qi, Y. Qin, P. J. Scott, and X. Jiang, "Highly interacting machining feature recognition via small sample learning," *Robotics and Computer-Integrated Manufacturing*, vol. 73, p. 102260, 2022. (**IF 10.4**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "A multi-criterion three-way decision-making method under linguistic interval-valued intuitionistic fuzzy environment," *Journal of Ambient Intelligence and Humanized Computing*, pp. 1–15, 2022. (**IF 3.662**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "Status, issues, and future of computer-aided part orientation for additive manufacturing," *The International Journal of Advanced Manufacturing Technology*, vol. 115, no. 5-6, pp. 1295–1328, 2021. (**IF 3.4**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "Automatic determination of part build orientation for laser powder bed fusion," *Virtual and Physical Prototyping*, vol. 16, no. 1, pp. 29–49, 2021. (**IF 10.962**)
- **P. Shi**, Q. Qi, Y. Qin, P. J. Scott, and X. Jiang, "Intersecting machining feature localization and recognition via single shot multibox detector," *IEEE Transactions on Industrial Informatics*, vol. 17, no. 5, pp. 3292–3302, 2020. (**IF 12.3**)
- **P. Shi**, Q. Qi, Y. Qin, P. J. Scott, and X. Jiang, "A novel learning-based feature recognition method using multiple sectional view representation," *Journal of Intelligent Manufacturing*, vol. 31, pp. 1291–1309, 2020. (**IF 7.136**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "Novel operational laws and power muirhead mean operators of picture fuzzy values in the framework of dempster-shafer theory for multiple criteria decision making," *Computers & Industrial Engineering*, vol. 149, p. 106853, 2020. (**IF 7.18**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "Automatic generation of alternative build orientations for laser powder bed fusion based on facet clustering," *Virtual and Physical Prototyping*, vol. 15, no. 3, pp. 307–324, 2020. (**IF 10.962**)
- Y. Qin, Q. Qi, **P. Shi**, P. J. Scott, and X. Jiang, "Linguistic interval-valued intuitionistic fuzzy archimedean prioritised aggregation operators for multi-criteria decision making," *Journal of Intelligent & Fuzzy Systems*, vol. 38, no. 4, pp. 4643–4666, 2020. (**IF 1.737**)
- **P. Shi** and K. Chen, "Learning constructive primitives for real-time dynamic difficulty adjustment in super mario bros," *IEEE Transactions on Games*, vol. 10, no. 2, pp. 155–169, 2017. (**IF 2.3**)
- **P. Shi** and K. Chen, "Online level generation in super mario bros via learning constructive primitives," in *2016 IEEE Conference on Computational Intelligence and Games (CIG)*. IEEE, 2016, pp. 1–8.
- Y. Guo, X. Feng, Z. Shao, and **P. Shi**, "Modular verification of concurrent thread management," in *Programming Languages and Systems: 10th Asian Symposium, APLAS 2012, Kyoto, Japan, December 11-13, 2012. Proceedings 10*. Springer, 2012, pp. 315–331.

Publications in Preparation

- **P. Shi**, Q. Qi, Y. Qin, F. Meng, P. J. Scott, and X. Jiang, "Learning-based machining feature recognition in intelligent manufacturing: a taxonomy and survey," *Target journal: Computers in Industry*, 2023. (Manuscript in Writing)
- **P. Shi**, S. Lou, W. Zeng, Q. Qi, Y. Qin, P. J. Scott, and X. Jiang, "Metrological defect segmentation via small sample multi-task learning," *Target journal: IEEE Transactions on Systems, Man, and Cybernetics: Systems*, 2023. (Manuscript in Preparation)
- **P. Shi**, Q. Qi, Y. Qin, F. Meng, P. J. Scott, and X. Jiang, "Learning generalisable representation for part orientation in intelligent manufacturing," *Target journal: IEEE Transactions on Cybernetics*, 2023. (Planned)

Supervision

2022–present **Ph.D. in Engineering (Year 2)**, *EPSRC Future Advanced Metrology Hub*.

2016 **Undergraduate project of BSc Computer Science**, *University of Manchester*.

Academic Service

- **Guest Editor**: Special Issue "Application of Artificial Intelligence Techniques in Additive Manufacturing" of Processes.

- **Organising Committee Member**: 18th CIRP Conference on Computer Aided Tolerancing, Huddersfield, UK, June, 2024.
- **Reviewer**: IEEE Transactions on Industrial Informatics, Robotics and Computer-integrated Manufacturing, CIRP Annals - Manufacturing Technology, Artificial Intelligence Review, Complexity, Mathematics, Sustainability, Sensors, Journal of Intelligent Manufacturing, and IEEE Transactions on Games.

Awards & Scholarships

2013 **Overseas Fee Waiver Award**, *School of Computer Science, University of Manchester*.
2011 **First class Scholarship**, *University of Science and Technology of China*.
2011 **Dushu Lake Scholarship**, *University of Science and Technology of China*.
2009 **Wiston Scholarship**, *Guilin University of Electronic Technology*.
2008 **The 1st prize of program design competition**, *Guilin University of Electronic Technology*.
2008 **The 2nd prize of "ITAT cup" national program design competition**.

Developed Tools & Passion Projects

2022 **RotNet**, *Python*, part orientation system via generalizable reinforcement learning.
2022 **Part Orientation Benchmark**, *Python & C++*, benchmark for testing different part orientation methods.
2019–2021 **MsvNet, SsdNet, and RDetNet**, *Python*, machining feature recognition systems.
2019–2021 **CatLab**, *C# & C++*, category theory-based tool for knowledge representation and reasoning.
2013–2018 **Game Generator**, *Jave, C++, Matlab*, tool for automatic game generation and adaptation.
2012 **Hand Gesture Recognition**, *C++*, tool for recognising four types of hand gestures.
2009 **Chat Tool**, *C*, tool for server-client communication.
2008 **Chinese Chess**, *C++*, chess game with AI.
2008 **OS Kernel**, *C & Assembly Languages*, tiny OS kernel.
2007 **Compiler**, *C*, tiny compiler for C-like language.

Expertises

- **Machine Learning**: Deep learning, computer vision, small sample learning, object detection, semantic segmentation, active learning, decision tree, random forests, support vector machine, neural network, hidden markov model, naive bayes, cost-sensitive learning, reinforcement learning, representation learning, unsupervised learning, data and text mining
- **Computer Science**: Data structure, algorithm, programming (i.e. C, C++, Python, Matlab, Java)
- **Tools & Libraries**: Latex, Pytorch, Tensorflow