CAI, XIAO

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RESEARCH INTERESTS Big-data era remaining useful life prediction of machinery

EDUCATION

City University of Hong Kong 2022.09-Now
- Ph.D. in Data Science Hong Kong

Xi'an Jiaotong University **GPA: 3.7/4.0** **Rank: 20/285** 2019.09-2022.06
- M.S. degree in mechanical engineering Xi'an

Xi'an Jiaotong University **GPA: 3.8/4.3** **Rank: 12/212** 2015.09-2019.06
- B.S. degree in mechanical engineering Xi'an

RESEARCH EXPERIENCE

Outlier detection and data recovery in the Drivetrain Diagnostics Simulator
- Improve the local-outlier-factor-based and tacker-decomposition-based methods
- Clean abnormal data and recover missing data for condition-monitoring data quality assurance

Cutting tool remaining useful life prediction
- Propose an optimal sensor group selection algorithm
- Integrate online monitoring multi-sensor signals and offline state observations to predict RUL

Wind turbine condition monitoring and remaining useful life prediction
- Established a model-data-fusion remaining useful life prediction method with multi-sensor fusion
- Monitored 1000 wind turbines and accurately predicted 3 wind turbines failure

Software development for axle fault diagnosis and remaining useful life prediction
- Established a self-data-driven remaining useful life prediction method for axle gears and bearings
- Responsible for algorithm optimization and software development

Condition monitoring and fault diagnosis algorithm development for gearbox bench test
- Responsible for data decryption and analysis of a closed analyzer
- Enabled the secondary development of the closed analyzer

PATENTS & PUBLICATIONS

Patents
- Li N, **Cai X**, Lei Y, Han T, Wang B. A Remaining Useful Life Prediction Method for Machine Tools Based on Informative Sensors Selection and Fusion Algorithm[P]. CN111143990A, 2020-05-12.
- Lei Y, **Cai X**, Li N, Xu P, Liu X, Zhao J. A Baseline-speed Transformation Algorithm for Wind Turbine[P]. CN112855467A, 2021-05-28.
- Lei Y, Xu P, Li N, **Cai X**, Liu X, Zhao J. A Self-Data-Driven Remaining Useful Life Prediction Method for Rolling Bearing[P]. CN112949204A, 2021-06-11.

Publications
- **Cai X**, Li N, Lei Y, Liu X. An Integrated System for Remaining Useful Life Prediction of Gear[C]. National Annual Conference on Reliability Technology of Machinery Industry.

- Li N, **Cai X**, Lei Y, Xu P, Wang W, Wang B. A Model-Data-Fusion Remaining Useful Life Prediction Method with Multi-Sensor Fusion for Machinery[J]. Journal of Mechanical Engineering, 2021,57(20): 29-37+46. (https://doi.org/10.3901/jme.2021.20.029)
- Lei Y, Xu X, **Cai X**, Li N, Kong D, Zhang Y. Research on Data Quality Assurance for Health Condition Monitoring of Machinery[J]. Journal of Mechanical Engineering, 2021,57(4): 1-9. (https://doi.org/10.3901/jme.2021.04.001)
- Li N, Xu P, Lei Y, **Cai X**, Kong D. A self-data-driven method for remaining useful life prediction of wind turbines considering continuously varying speeds[J]. Mechanical Systems and Signal Processing, 2022, 165: 108315. (https://doi.org/10.1016/j.ymssp.2021.108315)
- Li N, Gebraeel N, Lei Y, Fang X, **Cai X**, Yan T. Remaining useful life prediction based on a multi-sensor data fusion model[J]. Reliability Engineering & System Safety, 2021, 208: 107249. (https://doi.org/10.1016/j.ress.2020.107249)
- Li N, Lei Y, Gebraeel N, Wang Z, **Cai X**, Xu P, Wang B. Multi-sensor data-driven remaining useful life prediction of semi-observable systems[J]. IEEE Transactions on Industrial Electronics, 2020, 68(11): 11482-11491. (https://doi.org/10.1109/tie.2020.3038069)

HONORS & AWARDS

Contest

- 2017 China Undergraduate Mathematical Contest in Modeling: First-grade award in Shaanxi venue
- 2020 China Postgraduate Mathematical Contest in Modeling: Second-grade award nationally

Scholarship

- National Scholarship (Top 0.2%)
- National Encouragement Scholarship
- Special Prize Scholarship (2 times)
- Outstanding Freshman Scholarship (Grade 1)
- The SiYuan Scholarship (placed first)
- SKF Scholarship

Award

- Excellent Graduation Thesis (Top 1%)
- Excellent Student Award (2 times)
- Excellent Student Cadre Award
- Outstanding Graduates Award
- Excellent Postgraduate Award
- Excellent Postgraduate Cadre Award
- Outstanding Postgraduates Award
- Advanced Class Award (as monitor)

SKILLS

Language

- IELTS: 7.0 (Listening: 6.5 / Reading: 7.5 / Writing: 7.0 / Speaking: 6.0)
- College English Test Band 4 (CET-4) Certificate
- College English Test Band 6 (CET-6) Certificate

Software

- MATLAB, Python, C, Markdown
- Autodesk CAD, Autodesk Inventor, SolidWorks
- Arduino IDE
- Word, Excel, PowerPoint, Visio