IEEE International Workshop on Predictive Maintenance

Co-located with QRS 2020 (https://qrs20.techconf.org/) - The 20th International Conference onSoftware Quality, Reliability, and Security, December 11-14, 2020, Macau, China.

Professor Zhenglin Liang and Professor Yan-Fu Li

Description:

Nowadays, the study of predictive algorithms pervades all fields. With the fast development of machine learning, many sophisticated algorithms are developed based on systems with rich datasets. However, in the realm of reliability engineering, adopting the predictive algorithm for maintenance is still a challenging problem. It is mainly because of the following five complications:

1. ***Scarcity***: the failure data is scarce in practice. As a result, the operational data and failure data are imbalanced.
2. ***Diversity***: the deterioration is often stochastic and may cause by the interplaying of different deteriorating mechanisms.
3. ***Uncertainty***: the influence of aperiodic inspection, and uncertainty of imperfect maintenance, may result in further difficulty for estimating the condition of the system and predicting the remaining useful life.
4. ***Inconsistency***: the operating environment may deviate from the rated conditions, especially for systems that have with long life and expose to the natural environment, such risk is non-negligible.
5. ***Incompleteness***: the lifetime of information of the system is often incomplete and censored.

Facing the five challenges, can existing success in the predictive algorithm and machine learning algorithm be transferred, customized, and sharpened for resolving the abovementioned complications and bring formidable value for practical systems? Is predictive maintenance a silver bullet that solves all reliability problems, or it is beneficial for limited cases. If so, under which scenarios should we upgrade our sensing system and employ predictive maintenance. Could the initial investment on the enabling ICT technique, be offset by applying the predicting algorithm?

This workshop aims to build up a platform for bringing together researchers and practitioners to synthesize the answer to these questions. All papers that are related is welcomed.

Topic of interests

The interests of the workshop include but not limited to:

1. Prediction with sparse data
2. Prediction with the imbalanced data set
3. Prediction under changing environment
4. Inference with aperiodic inspection data
5. Value of sensing

6. Practical application of predictive maintenance
7. Bayesian analysis
8. Transfer learning
9. Collaborative learning
10. Maintenance decision making

Submission

Authors are invited to submit original unpublished research papers as well as industrial practice papers. Simultaneous submissions to other conferences are not permitted. Detailed instructions for electronic paper submission, panel proposals, and review process can be found at https://qrs20.techconf.org/submission.

The length of a camera ready paper will be limited to eight pages, including the title of the paper, the name and affiliation of each author, a 150-word abstract, and up to 6 keywords. Shorter version papers (up to four pages) are also allowed.

Authors must follow the IEEE Computer Society Press Proceedings Author Guidelines to prepare their papers. At least one of the authors of each accepted paper is required to pay full registration fee and present the paper at the workshop. Arrangements are being made to publish selected accepted papers in reputable journals. Submissions must be in PDF format and uploaded to the conference submission site:

http://banana.utdallas.edu/qrs2020/start/www/PM/

Important Dates

- June 15, 2020: Workshop papers due
- July 10, 2020: Authors notification

General Inquiries

- Professor Zhenglin Liang (zhenglinliang@tsinghua.edu.cn)
- Professor Yan-Fu Li (liyanfu@tsinghua.edu.cn)