



Predictive maintenance modelling and optimization for manufacturing systems

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Abstract:

In manufacturing systems, maintenance is a key driver of operational costs, and optimizing maintenance strategies can greatly enhance both competitiveness and productivity. However, the predictive maintenance implementation presents significant challenges due to the complexity of manufacturing systems operating in dynamic environments, as well the diverse and often conflicting requirements of both the operational system – such as productivity, availability, sustainability - and the supporting system, which includes spare parts, tools, maintenance resources and cost.



This presentation will delve into the predictive maintenance implementation, focusing on overcoming these challenges. We will explore state-of-the-art techniques leveraging the systems modelling, prognostics, and advanced optimization models to predict equipment failures and optimize maintenance interventions. Several industrial applications will be also presented to illustrate the impact of these approaches. Finally, we will discuss future perspectives and potential developments in predictive maintenance.

Bio:

Phuc Do is currently Associate Professor at Lorraine University. He received his PhD in systems optimization and dependability in 2008 from Troyes University of Technology (France). He defended his HDR (Habilitation à diriger des recherches) in 2019 on the subject of “towards a prescriptive maintenance for cyber physical production system”. His research interests focus on the development of innovative approaches for reliability and maintenance engineering. He has published more than 100 journal and conference papers. He is involved as actor but also as project leader in contracts with industry, international projects, or European projects (e.g., H2020 AI-PROFICIENT, Horizon MODAPTO). He is the principal supervisor of 9 PhD candidates and co-supervisor of 5 other PhD candidates. He is also associated editor of several international journals such as International Journal of Prognostics & Health Management, Safety and reliability journal, Autonomous Intelligent Systems, and Co-guest editor of several special issues for different international journal including *Reliability Engineering & System Safety*, *Journal of Risk and Reliability*, *Autonomous Intelligent Systems*. In addition, he is actively involved in different scientific communities such as MIMAR (Modelling in Industrial Maintenance and Reliability, co-chair/chair of the 9th - 13th International MIMAR Conferences), PHM society (PHME-European Prognostics and Health Management, proceedings chair since 2018).

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1310 Yeh Student Center