ParisTech

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RESEARCH TOPIC FOR THE PARISTECH/CSC PHD PROGRAM
(one page maximum)

Field: Design, Industrialization

Subfield: Industrial Engineering

Title: Risk management of engineering products driven by artificial intelligence

ParisTech School: Arts et Métiers Sciences et Technologies

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Lab location: Metz, France
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Short description of possible research topics for a PhD:
With the pace of technological development, the complexity of industrial products is increasing. As a result, its risk management is becoming demanding and data-driven risk models are needed. However, the adoption of these approaches is still slow as risk management is highly dependent on experts whose knowledge is often captured in textual and descriptive form (e.g. FMEA and risk register) including at the same time the source of risk, interaction and effect. Building the model based on this form requires understanding of human perception and communication.
The aim of this thesis is to bridge the gap between the conventional way in which risks are represented and the desired model-based risk management. More specifically, the research involves risk identification and analysis with the use of artificial intelligence conducted in two phases. Beginning with text-based risk knowledge, the objective is to apply deep learning techniques (e.g. natural language processing) to the identification of risk drivers. Based on this step, the risk model of the engineering product is to be developed. The thesis therefore leads towards automated risk management, which minimizes the costs and time required for this process.

Required background of the student: Industrial engineering, Computer science

A list of 5 (max.) representative publications of the group: (Related to the research topic)

1. Azarian, A., Siadat, A., & Martin, P. (2011). A new strategy for automotive off-board diagnosis based on a meta-heuristic engine. Engineering Applications of Artificial Intelligence, 24(5), 733-747.
2. Mili, A., Bassetto, S., Siadat, A., & Tollenaere, M. (2009). Dynamic risk management unveil productivity improvements. Journal of Loss Prevention in the Process Industries, 22(1), 25-34.
3. Petronijevic, J., Etienne, A., Siadat, A., & Bassetto, S. (2019, September). Operational Framework for Managing Risk Interactions in Product Development Projects. In 2019 International Conference on Industrial Engineering and Systems Management (IESM) (pp. 1-6). IEEE.
4. Shah, L. A., Etienne, A., Siadat, A., & Vernadat, F. (2016). Decision-making in the manufacturing environment using a value-risk graph. Journal of Intelligent Manufacturing, 27(3), 617-630.
5. ???