Postdoctoral Research Scientist

Applied Data Science Methodologies for Machining Process Quality Estimation and Robust Fault Detection

Context:

The proposed work aims to establish a *data processing ecosystem* to be used in conjunction to the highly instrumented machining devices (toolholders) developed in the USICONNECT project (2017-2021). This on-going project will be able to produce big amount of data issued from machining process monitoring devices (mid 2019). Several passed studies regarding data processing techniques for process monitoring in the field of machining have been conducted by our laboratory in collaboration with several industrials (AIRBUS, CETIM, SECOTOOLS). We seek a postdoctoral research scientist to join us for a minimum 18 months period. The candidate should be able to apply modern data science, machine-learning, and statistical techniques to a wide-range of data sources in order to measure process quality and/or perform fault detection.

Required actions / work:

We are looking for a highly motivated postdoctoral fellow in the area of Big Data and Data Science with a focus on machining processes. (S)he should be able to:

- Design and conduct experimental work, in collaboration with our R&D engineers, in order to collect data using USICONNECT devices
- Develop and apply advanced data processing methodology for analyzing high-dimensional process data obtained from machining operations (milling, drilling, turning)
- Develop robust monitoring approaches, based on preliminary univariate data analysis, dataset reduction methods and multivariate data-mining/machine-learning theory in order to automatically predict faults occurrences, process quality indicators and tool wear estimators
- Develop methods for handling incomplete and uncertain data
- Discover hidden patterns and robust features in big data obtained from variate machining operations

Required skills & key qualifications:

The ideal candidate shall pursue research related to the areas of machine learning, Big Data, data analytics, deep learning. He should be able to:

- Assist our engineers in designing experiments using appropriate lab or computational techniques with proficiency, evaluate results, and determine the next steps to complete project and present data
- Show extensive experience working with data and considerable knowledge of numerical techniques common to mathematical and statistical analyses
- Show proficiency in current machine-learning and data science methodologies
- Be proficient in at minimum one data processing-oriented software (e.g., R, Python, Mathematica, MATLAB, etc.)
- Think independently and problem solve
- Stay on top of the literature and build skills to maximize the projects potential

Candidates with a Data Science related background (PhD) and the will to use their skills in an industry-driven project in a stimulating and interdisciplinary environment are encouraged to apply.

Contact

- The work will be done at the lispen laboratory (http://lispen.ensam.eu/) at ENSAM – Campus of Aix en Provence (France).
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