Automatic Failure Detection and Monitoring of Ventilation and Cooling Systems

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Abstract

We were asked by a ventilation and cooling service firm to develop a software solution which is capable to detect certain types of machinery failure based on regularly collected sensor data. As an additional task, we also conducted a research in pursuit of finding a minimal set of monitoring devices, that still provides the necessary amount of information to identify the real state of the monitored system with an acceptable error rate. This was a sample classification problem in an industrial environment, thus the applied techniques were engineering and artificial intelligence related accordingly. We will present the structure and operation of the developed classifier and the basic theoretical background of frequency analysis and neural networks in order to provide a better comprehension for those who are not familiar with them. The test results of the MATLAB implementation of this method will be also discussed including several remarks about the main difficulties and probable challenges of future use.

Keywords: failure detection, ventilation systems, cooling systems, monitoring