MyLeaf: a predictive maintenance tool for the performance optimization of a CEM system.

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Abstract

Remote data control of emission monitoring systems represents an important goal in order to perform predictive maintenance actions or prompt interventions in case of system failure. In this paper are shown experimental results from real application of a multivariate analysis performed on data collected by a Continuous Emission Monitoring System (CEMS) that *Loccioni* has engineered and installed for a cement industry in Italy. The core of the CEMS is GIGAS 10M FT-IR Spectrometer (TÜV certified) aimed to measure HCl, HF, NO_x, SO_2, CO and CO_2, equipped with a FID (Flame ionization detector) and ZrO_2 analyzer for TOC (Total Organic Carbon) and O_2 measurements respectively. All data have been collected for a period of 12 months through the Meter Data Management System (MDMS) myLeaf, developed by *Loccioni*: 29 parameters were considered in total, including stack and cabinet sensors. Analysis was performed using principal components analysis (PCA), in order to identify those parameters that – during the time period analyzed - have the greatest impact on the CEM system performances. Among these, the most important variables were identified in some FT-IR analyzer parameters, as interferometer peak and laser signal, and in the sample conditions, such as flue gas temperature. For each of these parameters it was then performed a univariate analysis, whereby it was possible to monitor their signals over time: on the basis of the collected data has been developed an algorithm able to extrapolate the trendline into the future in order to predict when there will be a possible system failure, so that it is possible to intervene in a targeted and timely manner before failure occurs.