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data science for predictive maintenance of noble gas systems within the IMS

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Analysis of state of health (SOH) data from radionuclide systems can provide information beyond alerts and system diagnostics. Careful analysis of the data can help detect degradation of sensors that may help predict when a failure may occur or the remaining useful life (RUL) of components. In some early work performed by Pacific Northwest National Laboratory (PNNL; US), high-resolution SOH data from the Swedish Automatic Unit for Noble gas Acquisition (SAUNA) and Système de Prélèvement Atmosphérique en Ligne avec l'Analyse du Xénon (SPALAX) was analyzed using data-driven approaches with a goal of developing predictive maintenance techniques. This work investigates a hybrid methodology that combines both data-driven and physics-based approaches to more accurately predict system failures. This work also investigates the feasibility of using current available IMS SOH data for predictive analytics as well identification of possible gaps in the data.

Promotional text

The predictive maintenance techniques outlined in this effort will seek to improve sustainability of the IMS network. This aligns with the conference goals of identifying methods to improve monitoring and verification as well as community scientific knowledge exchange of ideas.

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