Maintenance Analytics, Industrial Data Science and Virtual Commissioning

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ABSTRACT

Industrial systems are complex with respect to technology and operations with involvement in a wide range of human actors, organizations and technical solutions. For the operations and control of such complex environments, a viable solution is to apply intelligent computerized systems, such as computerized control systems, or advanced monitoring and diagnostic systems. Moreover, assets cannot compromise the safety of the users by applying operation and maintenance activities. Industry 4.0 is a term that describes the fourth generation of industrial activity which is enabled by smart systems and Internet-based solutions. Two of the characteristic features of Industry 4.0 are computerization by utilizing cyber-physical systems and intelligent factories that are based on the concept of "internet of things". Maintenance is one of the application areas, referred to as maintenance 4.0, in form of self-learning and smart systems that predicts failure, makes diagnosis and triggers maintenance by making use of "internet of things".

Thus, for complex assets, much information needs to be captured and mined to assess the overall condition of the whole system including the one from design and manufacturing which obviously contains the physical knowledge. Therefore the integration of asset information during the entire lifecycle is required to get an accurate health assessment of the whole system, and determine the probability of a shutdown or slowdown avoiding black swans and other unexpected or unknown asset behaviors.

Moreover, the asset data are not only huge but often dispersed across independent systems that are difficult to access, fuse and mine due to disparate nature and granularity. If the data from these independent systems are combined into a common correlated data source, these new sets of information will add value to the individual data sources.

This talk will discuss the possibilities that lie within applying the maintenance analytics concept by the means of virtualization i.e virtual commissioning of the assets through data fusion and integration from a systems perspective.