A Review of Predictive Maintenance Systems in Industry 4.0

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Abstract— **Today we live in fourth industrial revolution, called Industry 4.0 where cyber physical systems (CPS), Internet of Things (IoT), Cloud Computing (CC), and Artificial Intelligence (AI) are integrating for advanced manufacturing. Many production systems, manufacturing processes and their state, equipment, and tools need to be monitored all the time. As equipment begins to fail, it causes stops in manufacturing process which is not efficient. Monitoring of manufacturing systems for maintenance helps to identify equipment condition and failures before equipment brakes-down. Intelligent data analysis of historical data and knowledge of the specific domain can improve decisions on maintenance.**

In this paper overview of Predictive Maintenance (PdM) in Industry 4.0 is analysed. Maintenance strategies can be corrective maintenance (occurs after a fault detection), improvement maintenance (occurs on demand) and preventive maintenance (occurs before a fault detection). Preventive maintenance (PM) is divided into Condition Based Maintenance (CBM) which covers Equipment-driven and Time-driven maintenance, and can be scheduled, continuous, or on request; and Predetermined Maintenance which defines the goals of Predictive-maintenance. Preventive Maintenance and spare parts of equipment replacement schedule can be defined using multi-objective evolutionary algorithms. To create real-time monitoring system or predictive maintenance system of manufacturing equipment it is important to have appropriate sensors for data capturing, effective intelligent data analysis methods, Key Performance Index (KPI) for evaluation and perform decisions under supervision plan.

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