Intelligent Monitoring and Diagnosis in Grinding Processes

Problem

Timely monitoring and diagnosis of manufacturing processes can reduce machine downtime and cost and increase production and efficiency. Even though grinding processes are old processes and have been extensively studied, they still remain the most challenging processes because of their innate nonlinear characteristics. Model based monitoring and control of grinding processes have been tried but did not give reasonable performance since the processes were not fully understood and comprehensive models were not available. As an alternative approach, condition based monitoring and diagnosis has been proposed and produced reasonable results in certain cases. However, their approaches are usually limited to process, sensor, case specific.

Research Objectives

The objective is to develop a generic algorithm for monitoring and diagnosis in grinding processes. The algorithm should not be limited to process, sensor, case applied.

Approaches

Artificial intelligence and inferencing mechanisms are applied to meet the research objectives. The algorithm automatically extracts the features for process condition monitoring from the measured signals from available sensors. Out of features the optimal feature set is selected and applied to monitor and diagnose any specific process condition we are interested in.