Machine-learning based wind turbine operating state detection and diagnosis

Angela Meyer
Zurich University of Applied Sciences, Switzerland (angela.meyer@zhaw.ch)

The operation cost for wind parks make up a major fraction of the park's overall lifetime cost. To facilitate an optimal wind park operation and maintenance, we present a decision support system that automatically scans the stream of telemetry sensor data generated from the turbines. By learning decision boundaries and normal reference operating states using machine learning algorithms, the decision support system can detect anomalous operating behaviour in individual wind turbines and diagnose the involved turbine sub-systems. Operating personal can be alerted if a normal operating state boundary is exceeded. We demonstrate the successful detection and diagnosis of anomalous power production for a case study of a German onshore wind park for turbines of 3 MW rated power.