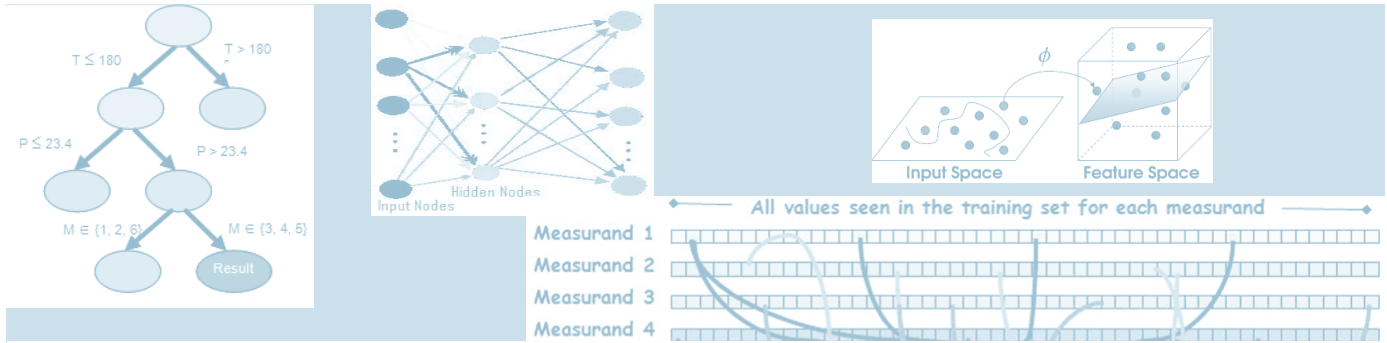


PREDICTIVE ANALYTICS FOR WIND ENERGY



Opto Atmospherics



REAL-TIME PREDICTIVE ANALYSIS OF TURBINE PERFORMANCE

REPAIR EVENTS PREDICTED IN TIME TO ALLOW REPAIR/REPLACEMENT
BEFORE CATASTROPHIC FAILURE

EXPLAINS **WHY** DECISIONS WERE MADE AND ALLOWS TRACEABILITY
DOWN TO INDIVIDUAL SENSORS

CAN BE ADDED AS A LAYER ON TOP OF EXISTING MONITORING SOFTWARE TO
OPTIMIZE PREVENTIVE MAINTENANCE SCHEDULING & TO AVOID SYSTEM FAILURES

PREDICTIVE ANALYTICS FOR WIND ENERGY

Continuous Measurement & Feedback of Turbine Performance

OptoAtmospherics' Predictive Analytics (PA) software enables real-time predictive analysis of maintenance and performance data that can lead to significant reductions in turbine downtime and therefore maximize revenue per turbine

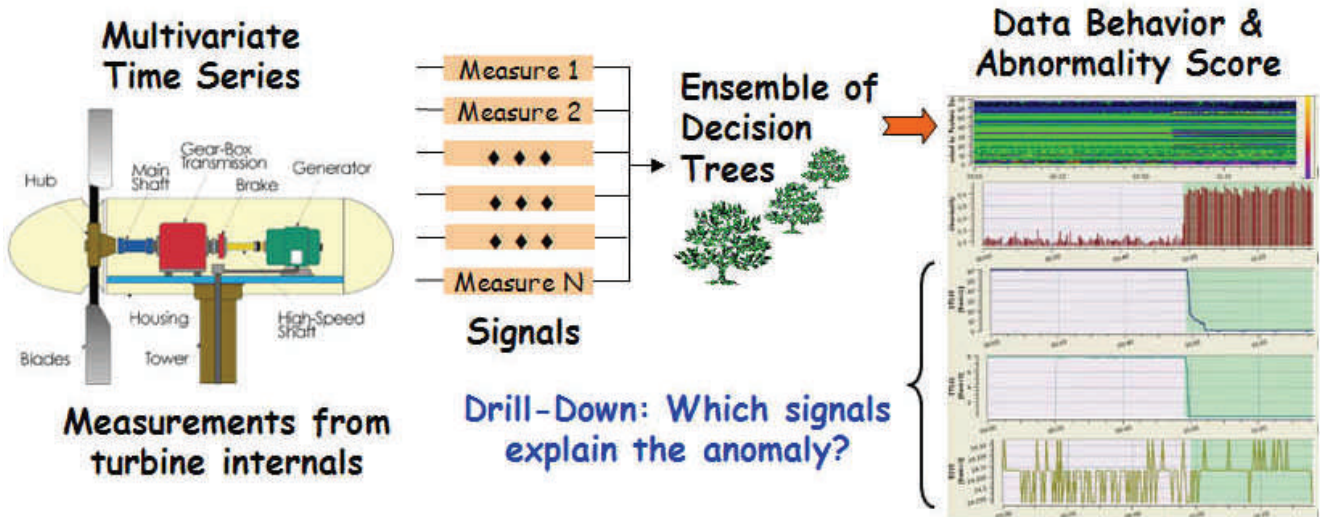
Repair events can be predicted well in advance, allowing measures to be taken to perform the repair/replacement before a catastrophic failure occurs

By providing advanced forecasting, maintenance can even be scheduled during non-peak wind capture periods, reducing the revenue lost caused by downtime of the turbine

OptoAtmospherics utilizes powerful pattern recognition technology, based on Ensembles of Decision Trees (EDTs), to drive our software for anomaly discovery

EDT-based technology has many advantages over existing techniques, including the scalability to handle data with any dimensions, automatic drill-down facilities to explain why an event is categorized as novel or anomalous, and extremely rapid evaluation

The approach is also amenable to deployment on FPGA devices, Graphical Processing Units, parallel processors and other accelerated platforms



Pattern Recognition, Machine Learning & Optimization Techniques

Neural Networks	Decision Trees & Ensembles	Support Vector Machines
K Nearest Neighbors (KD-Trees)	Cerebral Model Arithmetic Computer (CMAC)	Adaptive Logic Networks
Sliding Neural Nets	Time-Delay Neural Nets	Self Organizing Maps (SOMs)
Naïve Bayes	Bayesian Nets	Dynamic Programming
Clustering techniques	Genetic Algorithms/Genetic Programming / Gene Expression programming	Hidden Markov Models
Hash-based Learning	Sparse Distributed Memory	Simulated Annealing

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