

Predictive Maintenance & Outlier Detection



Client Overview

- A semiconductor manufacturer providing value added services to wafer fabrication equipment supply & service

Business Challenges

- Client's application gathers critical data points in the process chain in continuous, time series fashion
- Data needed to be processed to derive business insights for real time monitoring and reporting defects in the process
- Implement a Data analytics solution to realize the following objectives and visualize them for business use
 - Measure efficiency of the wafer productions
 - Monitor production line of wafers
 - Identify outliers process modules
 - Prediction of defects in process modules
 - Predictive maintenance

Implementation Approach

- Hadoop implementation to handle the continuous flux of data
- Data modelling for achieve the objectives – Identify outliers in regular production, report defects and monitor production guidelines
- Data insights were visualized in interactive charts using Visualization tools deliberated for quick response time, feature interactions like zoom-in/ brush & deselect/ simulations/ pop ups/ drill-downs
- End-to-end analytics from data navigation to model building for displaying results and recommendations in a single snapshot

Technology

- Hadoop, PostgreSQL
- Algorithms
- Principal Component Analysis, Mahalanobis Distance, Hotellings T2 Distance, t-SNE

Business Impact

- Data science solution layered with visualization to handle data volumes in real time and provide actionable insights for business users
- 3x reduction in repair and maintenance costs in the process modules
- 20% increase in efficiency of the process, resulting in 5x production of wafer units per unit time



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