Manufacturing
Case Study

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

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

Technology

hadoop   PostgreSQL

Algorithms

Principal Component Analysis, Mahalanobis Distance, Hotellings T2 Distance, t-SNE