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4th LPMPS ZOOM Meeting:

"Anomaly detection and root cause finding in semiconductor manufacturing"

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Abstract

Data generated in semiconductor wafer fabrication can be classified into two categories: baseline and outliers. Baseline is the data that is originated from a process that meets the manufacturing specifications. Outliers are data points that deviate significantly from the baseline. In this presentation, we provide a brief review of univariate and multivariate methods for outlier detection and root cause finding. We cover a sample case of anomaly detection. We show that when the data is modeled to the correct distribution, the outlier threshold relative to the baseline can be identified. A visualization tool has been developed and used for exploratory and plotting purposes. Additional methods such as q-q plot, density plot and histograms were included in the tool. Open source R programming language has been used for all the exploratory, modeling and reporting phases.The study shows that our method outperforms techniques with normality assumption and those with robust estimation of the standard deviation. The developed visual tool allows the exploration of the data and testing of different scenarios. Normality assumption and robust estimation of standard deviation showed poor performance when using data with significant under or over-dispersion.

Speaker Bio

Dr. Mohamed Boumerzoug is a senior principal data scientist with a leading role in adopting advanced analytics, big data, and machine learning solutions for NXP semiconductor manufacturing at the global level. He has more than 20 years career in semiconductor manufacturing and has been awarded several technical excellences and patents. He Co-authored forty technical papers. NXP is a ~250 billion assets American-Dutch company that is leading in secure connectivity solutions for embedded applications, automotive, industrial & IoT, mobile, and communication infrastructure markets.The company employs approximately 29,000 employees, including 11,000 engineers in more than 30 countries.

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