

JIAYANG REN

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EDUCATION BACKGROUND

Zhejiang University		<i>Sep 2018 – June 2021</i>
M.S. in Control Engineering	GPA:88.9/100	<i>Hangzhou, China</i>
Thesis: <i>Process Monitoring Methods for Wafer Fabrication Processes</i>		
Zhejiang University		<i>Sep 2014 – June 2018</i>
B.A. in Automation	GPA:3.80/4.0	<i>Hangzhou, China</i>
Courses: <i>Automatic Control Theory, Probability and Mathematical Statistics, Linear Algebra, Discrete Mathematics, Signals & Systems, Numerical Methods, Data Structure, Mathematical Modeling & Simulating</i>		

RESEARCH EXPERIENCE

Real-time data-driven fault detection and diagnosis system for batch processes		
<i>Laboratory of Industrial Analytics & Control, Prof. Dong Ni, Zhejiang University</i>		<i>Sep 2018 – June 2021</i>
<ul style="list-style-type: none">• Deployed multivariate statistical analysis methods like PCA and time series analysis methods like SARIMA, LSTM in the system to capture the correlations among multiple variances.• Proposed a differential weighted distance based phase aligning method to solve the uneven phase duration problem in the multi-phase batch process.• Proposed a SARIMA based state drift forecast-compensation framework for batch process monitoring to solve the batch-to-batch state drifting problem in the continuous batch process.• Proposed a LSTM-Encoder Decoder network and the corresponding monitoring method to solve the non-linear problem in the batch process.		
Dynamic spectral feature extraction and process modeling method for plasma etch process		
<i>Laboratory of Industrial Analytics & Control, Prof. Dong Ni, Zhejiang University</i>		<i>Oct 2017 – Jun 2018</i>
<ul style="list-style-type: none">• Employed PCA to extract dynamic information, wavelet composition to extract spectral peaks.• Combined dynamic information and spectral peaks to extract dynamic spectral feature.• Applied the method to optical emission spectral flow of plasma etch process, effectively obtained ma state in real-time and was proved to be consistent with the reaction mechanism.		

PUBLICATIONS

1.	Ren J, Ni D. A batch-wise LSTM-encoder decoder network for batch process monitoring[J]. Chemical Engineering Research and Design, 2020, 164: 102-112, doi: 10.1016/j.cherd.2020.09.019.
2.	Ren J, Ni D. Real-time Fault Detection System for Multiphase Plasma Etching Process using OES, Two-Step Division and Change Stage Alignment Method[C]. 2019 Chinese Automation Congress (CAC). IEEE, 2019: 599-604, doi: 10.1109/CAC48633.2019.8996940.
3.	Ren J, Ni D. A Monitoring Framework for Wafer Fabrication Processes with Wafer-to-Wafer Variations[J], IEEE Transactions on Semiconductor Manufacturing, submitted.

RESEARCH INTERESTS

<ul style="list-style-type: none">• Machine learning, Optimization, Control theory and application; Model predictive control.• Exploring the abilities of data-driven models in process control and optimization.
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