

Proposal for Special Session at IEEE CASE 2021

Goal:

- Manufacturing is characterized by capital/labor-intensive, the short product life cycle, rapid technology migration, long production lead-time, and complex production networks. These characteristics bring more challenges and difficulties to the manufacturing management. This session focuses on how the data science or machine learning techniques support problem-solving and enhance the core competence in manufacturing industry. The special session focuses on data science in manufacturing. Theoretical research or empirical study are all welcome. The topics in this session include equipment failure classification, predictive maintenance, health diagnosis and maintenance, and defect inspection, etc.
- This session would like to provide a platform that offers opportunities to discuss, debate, and exchange ideas, in particular, in a world-side view of manufacturing system. We invite all the researchers, scholars, and graduates when they would like to develop the mathematical/empirical models and benefit the automation and data science field.
- The topics include but are not limited to: Intelligent and Flexible Manufacturing, AI-Based Methods, Factory Automation, Adaptive automation systems; Agent-based collaborative automation systems; Automated fault detection, diagnostics, and prognostics; Big data, data mining, and machine learning; Cloud-based automation; Cyber physical production systems and industry 4.0; Cybersecurity in automation systems; Modeling, simulation, and optimization of automation systems; Sensor-fusion for intelligent automation systems; Smart factories, smart logistics and supply chains; Smart products with embedded intelligence; Smart automation in construction and manufacturing; Sustainability and green automation, etc.

Session Title: [Manufacturing Data Science]

Organizers:

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Contributions: (Please list at least 6 potential contributing papers)

1. “Semi-supervised Learning Framework for Defect Classification and Empirical Study”
by Yi-Wei Lu/ Chia-Yu Hsu
[This paper has been submitted to RA-L](#)
2. “Integration Model by Temporal Convolutional Network and Long-Short Term Memory Network with Attention Mechanism for Remaining Useful Life Prediction” by

by Chia-Yu Hsu/ Jia-Hong Yen
[This paper has been submitted to RA-L](#)

3. “Kernel-Based Dynamic Ensemble Technique for Predictive Maintenance”
by Hsuan-Wen Lu/ Chia-Yen Lee
[This paper has been submitted to RA-L](#)
4. “Wafer Bin Map Recognition with Data Augmentation in High-Yield Semiconductor Assembly Process” by Po-Cheng Shen/ Chia-Yen Lee
[This paper has been submitted to RA-L](#)
5. “Defect Inspection with Self-training and Data Augmentation by Empirical Study in Printed Circuit Board Manufacturing” by Kun-Lin Wu/ Chia-Yu Hsu
6. “Two-stage Object Detection and Classification Framework for Small Defect Inspection and Empirical Study”, by Yen-Lin Jiang/ Chia-Yu Hsu