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Special session: Intelligent and learning algorithms for scheduling problems in Industry 4.0

Session Co-Organizers:

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Motivations:

In the last decade, there has arisen the so-called fourth industrial revolution, known as Industry 4.0 (Zheng et al., 2020). The concept of Industry 4.0 covers the Internet of Things, big data analytics, cloud technology, artificial intelligence, robots, transportation, etc. (Sawik, 2020), and provides a new scheduling paradigm. It leads to the emergence of new scheduling models as well as intelligent and learning algorithms. For example, the charging scheduling problem of battery electric buses and electric vehicles have attracted more attention in recent years (Deng et al., 2021; Wu et al., 2021). Many related scheduling models together with intelligent and learning algorithms are applied to solve the problems.

There may occur unpredictable events which lead to inevitable uncertainties during real-time decision-making of manufacturing in Industry 4.0. The uncertain information may be fully or partially known (owing to inadequate historical data). Therefore, different methods to cope with these uncertainties are also an interesting topic and fall in the domain of this special session.

Main purposes:

We hope to bring together experts in this field to introduce novel scheduling paradigms, and develop new formulations and solution methods for them. We greatly encourage the insights of new technologies and theories on modern scheduling in industry 4.0 from different aspects.

Submission:

The authors can refer to <http://icnsc2021.com> for the guidelines. All papers must be submitted electronically through the website: <https://easychair.org/conferences/?conf=icnsc2021>. Submitted manuscripts should be within six (6) pages. If there are more than 6 pages, additional pages (max 2) are allowed by paying 90\$ per page.

Main topics:

This proposal supposes to give a state-of-the-art of stochastic production scheduling management methods under industry 4.0 environments in manufacturing systems. Scholar or engineer who is interested in this proposal can contribute related research papers including but not limited to the following topics:

- Introduce new scheduling or production paradigms and solve the relevant problems.
- Develop efficient and effective algorithms for solving the considered problems.
- Consider different types of uncertainties during manufacturing processes.
- Develop different effective intelligent and learning algorithms to cope with the uncertainties, and compare with the state of the art.
- Consider the problem under new environmental regulations, such as green-oriented perspectives, energy consumption limitation and sustainable development requirements, and etc.

Important dates:

Session proposals by May 20, 2021

Full paper submissions by June 1, 2021

Paper submissions (only for special session) by June 15, 2021

For more information, please refer to <http://icnsc2021.com>.

References:

- [1] Deng, R.L., Liu, Y., Chen, W.Z., Liang, H. (2021). A survey on electric buses-energy storage, power management, and charging scheduling. *IEEE Transactions on Intelligent Transportation Systems*, 22(1): 9-22.
- [2] Sawik, T. (2020). A linear model for optimal cybersecurity investment in Industry 4.0 supply chains. *International Journal of Production Research*, DOI: 10.1080/00207543.2020.1856442.
- [3] Wu, F.Z., Yang, J., Zhan, X.P., Liao, S.Y., Xu, J. (2021). The Online Charging and Discharging Scheduling Potential of Electric Vehicles Considering the Uncertain Responses of Users. *IEEE Transactions on Power Systems*, 36(3): 1794-1806.
- [4] Zheng, T., Ardolino, M., Bacchetti, A., Perona, M. (2021). The applications of Industry 4.0 technologies in manufacturing context: a systematic literature review. *International Journal of Production Research*, DOI: 10.1080/00207543.2020.1824085.