Impacts, Potentials, and Trends of Machine Learning in Industry4.0: AnOverview

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Resume

Intelligent techniques has been required at the Industry 4.0 to integrate resources, data and technology. Many manufacturing problems can use machine learning to improve the service or product by analyzing, learning and correlating data stored in large databases. Thus, machine learning isessential to predict the process lead time, which is a fundamental parameter for the success of management and production planning and control. In addition, there is a range of machine learning applications in manufacturing problems that have not yet been fully investigated.

Introduction

In the current industrial scenario, there is a growing demand for the adoption of intelligent techniques, such as machine learning (ML) and artificial intelligence (IA) as an artifice for industries process to remain competitive in the era of Industry 4.0 and the emerging discussions of Industry 5.0 (Demir et al., 2019).

- Industry 4.0: provides the smarts manufacturing integrations of emerging digital inteligent technologies, productions systems, information, machines and peoples (Lins & Rabelo, 2019).
- Many industries have not yet migrated to Industry 4.0 at least adapted to all the technologies of the third revolution

Applications of ML in Industry

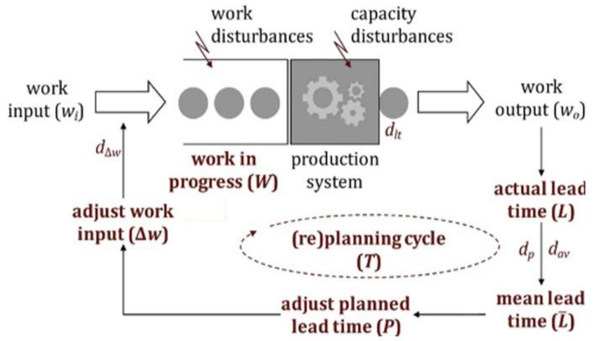
The technologies of Industry 4.0 are interconnected by platforms that permit flexible, customized and quick response to market needs (Liu & Wang, 2020). In this context, the decision making supported by IA is driven mainly by adoption and improvement in ML in the Industry 4.0 (Sachan etal., 2019).

- Machine lerning applications:
  Applied in sales, quality, logistic, customers and services systems
  Analyzing, lerning and interpreted knowledge of large databases
- Machine lerning helps to resolve challenges:
  In the Health care sector: treatment selection, selection and predict outcomes,
  Concrete defects, autonomous vechicle and traffic control, cybersecurity, mining patterns and anomalies.

ML to predict lead time process

Machine lerning: Data mining to predict the lead time process

Data mining: is the process of discovering and extract patterns in large data sets
Lead time: time between the order release and the product availability to the customer.



Conclusions

Industry 4.0 generates a lot of information and this needs to be a process, extract useful knowledge to help management in real-time into smart factories.

Lead time prediction is stilll a very challefing task and a classical control problems, requering new approches in Industry 4.0.

The main disadvantage of mathematical methods is considering the past trends will be happening in the future.

Data mining combining with machine learning algorithms can be effectively contribute to predict the lead time in the Industry 4.0

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