Incorporating predictive maintenance algorithms to anticipate maintenance needs based on sensor data.

**Introduction:**

Industry 4.0 introduces several changes to the original approach of industrial automation. Internet of Things (IoT) and Cyberphysical System (CPS) technologies play roles in this context introducing cognitive automation and consequently implementing the concept of intelligent production, leading to smart products and services [1]. This novel approach leads companies to face challenges of a much more dynamic environment.

based on sensor data.

**Abstruct:**

Several concepts were born in conjunction with this new revolution, such as predictive maintenance. This study aims to investigate academic advances in failure prediction. The prediction of failures takes into account concepts as a predictive In recent years, the fourth industrial revolution has attracted attention worldwide. maintenance decision support system and a design support system. We focus on frameworks that use machine learning and reasoning for predictive maintenance in [Industry 4.0](https://www.sciencedirect.com/topics/computer-science/industry-4-0). More specifically, we consider the challenges in the application of machine learning techniques and ontologies in the context of predictive maintenance.

m one of Industry 4.0 principles, which transforms traditional manufacturing into intelligent sensor-equipped factories where technology is ubiquitous.

**Section snippets**

**Business challenges involving PMPin Industry 4.0**

The previous industrial revolution focused mainly on improving the physical manufacturing processes, expanding human power with additional power sources (machinery, steam power), establishing a process for mass production through the introduction of assembly lines, and introducing electronics and automation.

**Research methodology:**

An SLR is an approach used to identify, evaluate, and interpret the papers published in a given field of research. This approach enables the identification of existing gaps and points out new research opportunities [28]. In this article, we follow the SLR approach proposed by Kitchenham et al. [27]. We applied the methodological steps as follows.

**1.Definition of research questions:**

 it guides the elaboration of research questions to be used to search for relevant papers in the literature;

**2.Search results:**

This section discusses the result of the search process, the selection process, and the qualitative analysis of the selected papers. We summarize the results in Fig. 4. The description of each step and the number of remaining papers are also in the figure.

We detail the application of the SLR methodology as follows. Section 4.1 discusses relevant papers that are applied to the context of Industry 4.0 but do not meet all the criteria to be part of this SLR. After analyzing the exclusion criteria,

**Conclusion**

The development of this systematic literature review aimed to discuss the main issues related to machine learning and reasoning for predictive maintenance in the context of Industry 4.0. We discussed the concepts and technologies applied in this area. We also presented the challenges faced in its application in the real world.