A review of industrial robot predictive maintenance research in the automotive manufacturing industry

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Abstract

With the increasing automation and digitization of manufacturing equipment, many hidden problems in industrial equipment cannot be determined by decision-makers, often causing unexpected equipment downtime or product quality degradation. Traditional maintenance methods have difficulty ensuring the stability of equipment and products. Consequently, predictive maintenance (PdM), an emerging maintenance approach, has become an active research topic in this industry. PdM can predict future trends and possible component failure modes based on data-driven and mechanistic analysis, thus, providing maintenance decisions in advance. In this study, we assessed industrial robots, essentials in automotive manufacturing, as the research object, and provided a comprehensive overview of industrial robot PdM. We then discussed the status of industrial robot failure prediction model research, analyzed the problems of various types of PdM research, proposed constructive improvement solutions, and provided an outlook on the future research trends of PdM.

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