Research on Optimized Problem-solving Solutions Selection of the Production Process

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Abstract
In manufacturing industries, various problems may occur during the production process. A problem is a complex status, which involves relevant context in working environments. A problem-solving process is often initiated to create a solution for achieving the desired status; in this process, determining how to obtain a solution from the various candidate solutions is an important issue. In such uncertain working environments, context information provides rich clues for problem-solving decision making. Therefore, this work uses a selection approach for an optimized problem-solving process to assist workers in choosing a reasonable solution. A context-based utility model explores the problem context information to obtain the candidate solutions’ actual utility values; a multi-criteria decision analysis uses the actual utility values to determine the optimal selection order of candidate solutions. The selection order is presented to the worker as an adaptive knowledge recommendation. The worker chooses a reasonable problem-solving solution based on the selection order. This paper uses a high-tech company’s knowledge base log as the analysis data. The experimental results show that the chosen approach to an optimized problem-solving solution selection is effective. The contribution of this research is in demonstrating a method, which is easy to implement in a problem-solving knowledge recommendation system for selecting a reasonable solution.

Keywords: Problem-solving, Context-based utility model, Multi-criteria decision analysis, ELECTRE, Adaptive knowledge recommendation.