

A comprehensive solution to automated inspection device selection problems using electre methods

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Abstrak

Selection of an automated inspection device for an explicit industrial application is one of the most challenging problems in the current manufacturing environment. It has become more and more complicated due to increasing complexity, advanced features and facilities that are endlessly being integrated into the devices by different manufacturers. Selection of inspection devices plays a significant role in a manufacturing system for cost effectiveness and improved productivity. This paper focuses on the application of a very popular Multi-Criteria Decision-Making (MCDM) tool, i.e. ELimination and Et Choice Translating REality (ELECTRE) for solving an automated inspection device selection problem in a discrete manufacturing environment. Using a sample case study from the published literature, this paper attempts to show how different variants of the ELECTRE method, namely ELECTRE II, IS, III, IV and TRI can be suitably applied in choosing the most efficient alternative that accounts for both the decision maker's intervention and other technical elements. Using different ELECTRE methods, a list of all the possible choices from the best to the worst suitable devices is obtained while taking into account different selection attributes. The ranking performance of these methods is also compared with that of the past researchers.