Using Genetic Algorithm to Bridge Decision Making Grid Data Gaps in Small and Medium Industries

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Abstract—Maintenance management is certainly the important factor to support the successfullness of Small and Medium Industries (SMIs). The SMIs will gain larger profits with the correctness of maintenance system which can minimize the expenses incurred. The application with Decision Making Grid (DMG) for appropriate maintenance strategy has been achieved with favorable outcome. However, the problems, i.e. incompleteness, unavailability and inconsistency of data are the common practice gaps in SMIs. The presences of data gaps cause adverse effects on the DMG process which is certainly not able to provide satisfactory results of maintenance strategies. To overcome the problems, the current research applies the most optimal heuristic adaptive methods of Genetic Algorithm (GA) to generate optimal variable values of machine breakdowns from a DMG process on observed SMIs to be processed into other related problematic SMIs. The combination method has produced remarkable validation results against decision-making of maintenance strategies for all machines with the accuracy of 90,81%. The results deliver the trust toward related SMIs with the data problems or even new concerned SMIs with the absences of data to utilize this DMG-GA method for maintenance decision making which can help maintenance personnel by giving the correct selection of the maintenance strategy.

Keyword—Small and Medium Industries; Decision Making Grid; Genetic Algorithm; Maintenance decision making.

CONCLUSION AND FUTURE WORKS

The research describes the decision making for maintenance machine in Small and Medium Industries with DMG-GA method. The validation of DMG-GA method towards the data of frequency and downtime for all machines have obtained the accuracy of 90,81%. Based on this remarkable result, the system should be utilized to select the correct maintenance strategy for each machine in other related industries or new concerned industry which has the data gaps. Other learning methods such as Neural-Network as well as to increase the system functionality by using distributed computing technology are expected to be embedded on this research to provide more optimal results as well as better performances of the system.

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