

ABSTRACT

Now a day, technology upgrade in short time period leads manufacturers to difficulty. Because the manufacturers tend to produce new product within the short time and they need to spend their money and time. On the other hand, the excess products, which are not sold may produce additional loss to the manufacturers. In later period based on some research study, the manufactures start using the E-O-L products to fulfill the component requirement in the new product manufacturing. But those strategies not provided proper procedure to handle the E-O-L products. It leads manufacturer to spend high for the reverse logistics and disposal. These issues are formulated as the multi period disassembly problem in manufacturing industry. Thus to overcome multi period disassembly problems of the manufacturing industries, this study is motivated to propose a novel meta heuristics approach for handling the E-O-L products in new product manufacturing and the proposed strategy should provide more profit at short time.

The motivated objective of the research is achieved after the successful execution of five strategies. In the first strategy, the multi agent system using JADE environment is executed to understand the behavior and flow of reverse logistics for the disassembly of E-O-L products. In the second strategy an adaptive genetic algorithm is proposed for selecting the optimal number of E-O-L products to disassembly to fulfill the components requirements in the manufacturing process. The optimal combination of E-O-L products are selected based on the total cost. In the third strategy an artificial bee colony algorithm is proposed for the scheduling the disassembly to order of E-O-L product. The bee colony is executed based on cost and time required for the selected E-O-L products. In the fourth strategy, a hybrid bee colony cuckoo search algorithm is proposed for the scheduling and optimal E-O-L product selection. The strategy provided better convergence by using the update procedure of cuckoo in bee colony. Finally, in the fifth strategy, a hybrid bee colony bat optimization is proposed to stable and better convergence for the optimal scheduling and product selection in E-O-L reverse logistics.

The proposed strategies are implemented using JAVA and MATLAB to analysis its performance. The first strategy is implemented in JADE environment using java coding, it helps to understand the virtual route flow of complete reverse logistics for E-O-L product disassembly. The remaining four strategies are implemented using MATLAB 2014a by considering a case data. The considered case data includes the detail of end of life personal computers with attributes as the components of the personal computer. These performance of the proposed strategies are validated based on the cost, time and convergence rate. The overall performance of fifth strategy using hybrid bee colony bat algorithm provided better performance in terms of the cost, time and convergence. Thus based on the implementation analysis, the proposed study suggest that the proposed hybrid bee colony bat algorithm become the most suitable meta heuristics approach for multi period disassembly in manufacturing industries.