

## Performance Evaluation of Production Schedules Based on Process Mining

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**Abstract :** External environment of enterprise is rapidly changing majorly by global competition, cost reduction pressures, and new technology. In these situations, production scheduling function plays a critical role to meet customer requirements and to attain the goal of operational efficiency. It deals with short-term decision making in the production process of the whole supply chain. The major task of production scheduling is to seek a balance between customer orders and limited resources. In manufacturing companies, this task is so difficult because it should efficiently utilize resource capacity under the careful consideration of many interacting constraints. At present, many computerized software solutions have been utilized in many enterprises to generate a realistic production schedule to overcome the complexity of schedule generation. However, most production scheduling systems do not provide sufficient information about the validity of the generated schedule except limited statistics. Process mining only recently emerged as a sub-discipline of both data mining and business process management. Process mining techniques enable the useful analysis of a wide variety of processes such as process discovery, conformance checking, and bottleneck analysis. In this study, the performance of generated production schedule is evaluated by mining event log data of production scheduling software system by using the process mining techniques since every software system generates event logs for the further use such as security investigation, auditing and error bugging. An application of process mining approach is proposed for the validation of the goodness of production schedule generated by scheduling software systems in this study. By using process mining techniques, major evaluation criteria such as utilization of workstation, existence of bottleneck workstations, critical process route patterns, and work load balance of each machine over time are measured, and finally, the goodness of production schedule is evaluated. By using the proposed process mining approach for evaluating the performance of generated production schedule, the quality of production schedule of manufacturing enterprises can be improved.

**Keywords :** data mining, event log, process mining, production scheduling

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