

# Analysis of Production Scheduling Results Using Process Mining Approach

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## Extended Abstract

Manufacturing industries are under great pressure caused by the rising costs of energy, materials, labor, capital, and intensifying worldwide competition. In particular, frequent change of customer requirements is a tough challenge to manufacturing company. To cope with this challenge in today's dynamic business environment, production scheduling plays a pivotal role in meeting due date on time and allocating resources optimally.

Production scheduling is the process of selecting and assigning manufacturing resources for specific time periods to the set of manufacturing processes in the plan [1]. But it is a difficult problem, particularly when it takes place in an open, dynamic environment. In a manufacturing system, rarely do things go as expected. The set of things to do is generally dynamic. The system may be asked to do additional tasks that were not anticipated, and is sometimes allowed to omit certain tasks. Therefore, many manufacturing companies are using computerized scheduling system to generate the realistic production schedule efficiently. However, it is difficult to know whether the generated schedule is good or not to follow. Existing scheduling solutions only provides limited statistics about the performance of schedule.

In this study, the validity of generated production schedule is evaluated by analysing event logs within in the production scheduling software system based on the process mining approach since every software system writes logs during the schedule generation phase for the purpose of debugging and auditing. Process mining aims to exploit the massive amount of event data recorded by today's information systems to gain valuable insights into business processes by unearthing, among others, actual process behavior, model deviations, performance characteristics, and bottlenecks [2].

In this study, the usefulness of process mining approach is proposed for analysing the results of production schedule in various ways. For a case study, the Simio RPS scheduling system [3] is used for generating production schedule and event logs. This example production schedule is for 27 customer orders having 2~4 process steps for pipe products. Generated schedule from Simio RPS system is evaluated in terms of frequency of process step and time duration of each process step using event log. The findings are as follows: critical manufacturing process route pattern, work load balance of each machine within a workstation, workstation utilization of each work order, means waiting time of each work order. Based on these statistics, the validity of production scheduling result is evaluated.

## References

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