

Artificial Intelligence-based Framework for Automating Practical Pipe System Installation Schedule Optimization and Generation

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ABSTRACT

Building information modelling (BIM) has offered substantial improvements in planning and scheduling in the construction industry. However, it is still time consuming to plan and coordinate between team members the detailed requirements and information for the generation of practical installation schedules. During the installation stage, there can be delays or interference that could lead to the failure of the initial schedule plan. To effectively improve the installation schedule, continual learning of the installation site situation is important, with the learnt knowledge being used to generate realistic schedules. This paper proposes a new artificial intelligence (AI) framework with machine learning (ML) and heuristic optimization techniques for automating practical pipe system installation schedule generation and optimization using 4DBIM. A BIM model is used as reference to provide pipe system component information. ML is adopted to map extracted components with the installation activities and their requirements for installation based on knowledge obtained from industry experts and piping codes. In addition, a heuristic algorithm is adopted to optimize the installation schedule. Finally, an optimal installation schedule that minimizes overlapping activities and time is suggested.