

A Self-Evolutionary Model for Automated Innovation of Construction Technologies

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Abstract

Previous approaches for innovation of construction technologies are constrained by the existing processes or engineer's experience and knowledge, thus are essentially incremental. This paper presents a selfevolutionary approach to assist automated innovation of construction technologies. The proposed approach integrates a text mining technique, patent analysis, and a Genetic Algorithm (GA) to form a prototype automated radical technology innovation model that has not been developed before. Previous technology information stored in the public technological repositories (e.g., published specifications, public patent databases, etc.) is adopted as the design knowledge for building the function model of a target technology. It is then translated into a genetic operation tree (GOT) for the self-guided evolution with a GA. Finally, the innovative solution is recovered as a function model and realized in a 3D model. A traditional road manhole construction technology is selected as demonstration case study to show the feasibility and potentials of the proposed method for automated innovation of construction technologies.

Keyword : Computer-aided innovation, TRIZ, Genetic operation tree, Construction technology innovation