

Accepted Manuscript

Generalized Higher-level Automated Innovization with Application to Inventory Management

Sunith Bandaru, Tehseen Aslam, Amos H.C. Ng, Kalyanmoy Deb

PII: S0377-2217(14)00919-9
DOI: [10.1016/j.ejor.2014.11.015](https://doi.org/10.1016/j.ejor.2014.11.015)
Reference: EOR 12633



To appear in: *European Journal of Operational Research*

Received date: 31 October 2013
Accepted date: 7 November 2014

Please cite this article as: Sunith Bandaru, Tehseen Aslam, Amos H.C. Ng, Kalyanmoy Deb, Generalized Higher-level Automated Innovization with Application to Inventory Management, *European Journal of Operational Research* (2014), doi: [10.1016/j.ejor.2014.11.015](https://doi.org/10.1016/j.ejor.2014.11.015)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Generalized Higher-level Automated Innovization with Application to Inventory Management

Sunith Bandaru^a, Tehseen Aslam^a, Amos H.C. Ng^a, Kalyanmoy Deb^b

^a *Virtual Systems Research Centre, University of Skövde, Skövde, Sweden*
{sunith.bandaru,tehseen.aslam,amos.ng}@his.se

^b *Department of Electrical and Computer Engineering, Michigan State University,
East Lansing, 428 S. Shaw Lane, 2120 EB, MI 48824, USA*
kdeb@egr.msu.edu

Abstract

This paper generalizes the automated innovization framework using genetic programming in the context of higher-level innovization. Automated innovization is an unsupervised machine learning technique that can automatically extract significant mathematical relationships from Pareto-optimal solution sets. These resulting relationships describe the conditions for Pareto-optimality for the multi-objective problem under consideration and can be used by scientists and practitioners as thumb rules to understand the problem better and to innovate new problem solving techniques; hence the name innovization (*innovation through optimization*). Higher-level innovization involves performing automated innovization on multiple Pareto-optimal solution sets obtained by varying one or more problem parameters. The automated innovization framework was recently updated using genetic programming. We extend this generalization to perform higher-level automated innovization and demonstrate the methodology on a standard two-bar bi-objective truss design problem. The procedure is then applied to a classic case of inventory management with multi-objective optimization performed at both system and process levels. The applicability of automated innovization to this area should motivate its use in other avenues of operational research.

Keywords: Automated innovization, higher-level innovization, genetic programming, inventory management, metal-cutting, knowledge discovery, operational research

Download English Version:

<https://daneshyari.com/en/article/6896798>

Download Persian Version:

<https://daneshyari.com/article/6896798>

[Daneshyari.com](https://daneshyari.com)