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A case-based approach using inductive indexing for corporate bond rating

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Abstract

Case-based reasoning (CBR) is a problem solving technique by re-using past cases and experiences to find a solution to problems. The central tasks involved in CBR methods are to identify the current problem situation, find a past case similar to the new one, use that case to suggest a solution to the current problem, evaluate the proposed solution, and update the system by learning from this experience. In doing tasks, one of the critical issues in building a useful CBR system lies in the application of general domain knowledge to the indexing of cases, which may support the retrieval of relevant cases to the problem.

This paper investigates the effectiveness of inductive learning approach to case indexing process for business classification tasks. We suggest this approach as a unifying framework to combine general domain knowledge and case-specific knowledge. Our particular interest involves optimal or near optimal decision trees that represent an optimal combination level between the two knowledge types. The proposed approach is demonstrated by applications to corporate bond rating. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Corporate bond rating; Case-based reasoning; Inductive learning

1. Introduction

Case-based reasoning (CBR) is a problem solving technique that is fundamentally different from other major artificial intelligence (AI) approaches. Instead of relying on making associations along generalized relationships between problem descriptors and conclusions, CBR benefits from utilizing case-specific knowledge of previously experienced problem situations. A new problem is solved by finding a similar past case and reusing it in the new problem situation. A wide range of applications of CBR has been reported [1,4,7,14,16,17,19,20,23], including business classification for decision making such as bond rating [3,26,27] and bankruptcy prediction [2].

The central tasks that CBR methods have to deal with are to identify the current problem situation, find a past case similar to the new one, use that case to suggest a solution to the current problem, evaluate the proposed solution and update the system by learning from this experience [12,23,30].

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