

Automating course scheduling based on artificial intelligence and database systems

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Abstract

In this paper, we propose an approach to automating course scheduling based on artificial intelligence and database systems. First, a database system is implemented for the purpose of managing diverse data in the problem domain. Second, constraints in the course scheduling problem are represented as rules in knowledge bases. Third, we adopt a constraint hierarchy to deal with the distinction between rigid constraints and soft constraints. A constraints network can then be established to solve the course scheduling problem. Finally, a feasible solution would be inferred automatically by applying the inference engine of CLIPS to these facts and rules. Since knowledge bases, facts, and inference engine are separated in our system, the change of a constraint in requirements only leads to the modification of a corresponding rule in knowledge bases. On the other hand, the database system can be manipulated alone when related data needs to be updated. A course scheduling system in the Department of Information Management at Chienkuo Institute of Technology is used as an illustrative example to demonstrate our approach.

應用人工智慧與資料庫方法於排課系統之自動化

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摘要

在本論文中，我們應用人工智慧技術與資料庫之方法於排課系統之自動化。首先，建立一個資料庫系統以管理和維護所有的課程、教師、時段、和教室資料；其次，使用知識中的規則來描述時間排程的各種限制條件；第三、採用限制結構與限制網路來處理硬性限制與軟性限制的求解問題；最後，透過 CLIPS 的推理機制，經由匹配比對的方式，自動地推理出符合限制結構的可行解。利用人工智慧語言將知識庫、事實、和推理機制分離的作法，在新增或修改限制條件時，只需更動知識庫中相對應的規則即可；另一方面，在新增或修改排課資料時，只需操作資料庫系統即可。如此，將使得排課系統的改變與維護大為容易。本論文以建國技術學院資訊管理系為例，說明我們的方法與系統。