

A Case-Based Reasoning Approach to Intelligent Retrieval in Reusable Software Libraries

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Abstract: Software Reuse is the technique of reusing software components previously developed in order to reduce the effort required to develop new software.

It is generally accepted that software reuse can improve the rate of software development, reduce the costs and increase reliability. However, software reuse is only effective if it is easier to locate and adapt a reusable software component than to write it from scratch. There are many issues and problems that need to be resolved before the benefits of software reuse become widespread. These involve philosophical issues such as the encapsulation of experience and the formation of organizational structures to support it, and also technical issues such as the identification, classification, retrieval and adaptation of reusable components. This paper is concerned with the automated retrieval of software components from a reusable software library using case-based reasoning. Current automated retrieval is generally adapted from conventional text retrieval methods which are based on matching lexical and semantic attributes of software components. While these methods are easily implemented, they have serious limitations that arise out of the fact that the words and phrases used to describe software components and their functions are usually obscure, ambiguous and imprecise. Case-based reasoning is an artificial intelligence technique that makes use of a stored set of previously solved problems (cases) in order to solve new ones. It is an effective method of applying the experience and problem solving knowledge gained in the past to bear on current problems. Case-based systems find solutions to problems by examining an input situation or problem and searching a case base to find a case or situation that matches its characteristic features. If the match is identical, the problem is solved. Case-based reasoning shells are inexpensive and their retrieval mechanisms are complex. This together with the fact that the attribute based classification of cases can be used to classify reusable components, affords the opportunity of efficient intelligent retrieval of reusable components. This paper shows how both attribute and faceted based classification schemes can be accommodated by a case-based reasoning shell and examines various methods of retrieval.

