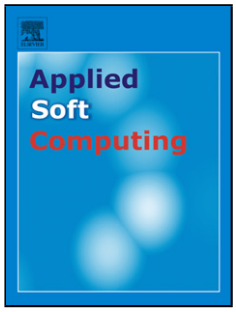

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Incorporating User Preferences in Ant Colony Optimization for the Next Release Problem

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Abstract

The selection of which requirements should be implemented in the next software release is an important and complex task in the software development process, considering the presence of budget constraints and other conflicting aspects. In this context, Search Based Software Engineering, has the main objective of applying automatic search methods to solve complex software engineering problems. However, most of these methods do not consider human expertise during the search, especially due to the difficulty in mathematically modelling the user's preferences. Consequently, the user can present some resistance or place little confidence in the final results, given that his/her knowledge and domain expertise was not properly considered in the solution construction. This paper aims at proposing an interactive model for the Next Release Problem using Ant Colony Optimization, where the user can define which requirements he/she would like to include or not in the next release. Employing humans and a simulator, an empirical study was performed that considers real-world and artificial instances. The achieved results demonstrate that the loss of score was, on average, 12% when it was compared with a solution with no human intervention. On the other hand, the algorithm generates solutions that have more than 80% of the met preferences, as defined by the users. Furthermore, the results showed that ACO can be an interesting choice as an interactive search

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