A proposed model for classifying the requirement specification using Support Vector Machine (SVM) and Fuzzy Logic

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Abstract

One of the most important activities in requirement engineering processes is Requirement specification, which may include a set of use cases that capture the requirements of systems and describe user interactions that the software must provide to the user for perfect interaction. The wrong use case diagram in the requirements specification leads to a lack of establishing the cost and complexity of the system. The aim is to detect the wrong relationship automatically between actors and use cases to improve the prediction and reduce human mistakes. The main challenge pinpoints extracting the use case diagram elements (actor, relationship, use case) to determine the relationship type (association, include, generalization) among actors, and use cases. To solve this problem, in this study we introduce a model in requirement specification to automatically detect the wrong relation among use cases and actors using a Support vector machine and fuzzy logic. The output of the support vector machine was correctly classified as 88.6%, Precision 90.3%, Recall 88.6%, and F-Measure 87.7%. Using the fuzzy logic after the SVM helped improve the result, correctly classified as 94.3%, Precision 94.7%, Recall 94.3%, and F-Measure 94.1%.

Keywords: Fuzzy logic, Requirement Specification, SVM, UML 2.0, Use Case Diagram.