

Automated Classification of User Requirements Written in Arabic Using Machine Learning Algorithms

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Abstract

Requirement engineering is a critical step in software engineering, influencing software development outcomes. The manual classification of software requirements into Functional Requirements and Non-Functional Requirements is a laborious and costly process with varying accuracy. Errors in classification can lead to misunderstandings and incomplete products. Arabic requirements pose additional challenges due to their structural and semantic characteristics, contributing to inherent ambiguity. In addition to the lack of Arabic Studies as well as the public datasets for requirements written in Arabic. This study proposes combining machine learning and deep learning algorithms with optimization techniques to streamline the categorization of Arabic requirements. Optimal configurations for several classifiers are identified and examined stemming

techniques. In addition, an Arabic data set for requirements was collected. The results demonstrate the effectiveness of the proposed approach, enhancing productivity and mitigating risks. The SVM classifier achieves an F1-Score of 0.93, while combining it with ISRISemmer improves the score to 0.95. The Arabert model achieves the highest F1-Score of 0.96, highlighting its performance in classifying Arabic requirements accurately.

Keywords: Deep Learning, Functional Requirement, Machine Learning, Non-Functional Requirement, Arabic Requirements Classification.