

Context Aware Recommender Systems for Requirements Engineering Tasks

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Abstract

Requirements engineering is a sub-discipline of software engineering that includes tasks related to the elicitation, analysis, specification, management and validation of the requirements. Current trends in software engineering, such as global development, large scale systems and outsourcing have brought forth changes to the traditional methods of conducting requirements engineering tasks. One such change is the use of distributed collaborative tools, such as online forums, to assist in the early requirements elicitation. These tools have the potential to drastically improve the elicitation process by creating highly inclusive environments and harness the opinions and points of view of great numbers of stakeholders. However, their adoption comes with the risk of getting swamped with too much data, making it hard for a requirements analyst to process the information.

As such, our prior work has focused on using data mining and machine learning techniques to assist in the requirements elicitation within online forums. The techniques we have implemented include clustering algorithms to classify and categorize the feature requests of the stakeholders and the use of recommender systems to suggest discussion topics that might be of interest to the stakeholders. Up to this point, the implemented recommender system is a variation of the traditional collaborative recommender system; where the users correspond to the stakeholders, the items to be recommended are discussion topics and the ratings are based on the participation of the stakeholders in the discussions. More concretely, a user's profile is represented as a binary array that indicates to which discussion topics he has contributed posts.

While this approach has been quite effective, we believe that there is a great opportunity for improvement of the recommender system algorithms via contextual awareness.

One such example of contextual information is the role of the stakeholders. Typically, stakeholders identify themselves with several roles – such as architect, developer, user, etc. When they enter their posts in the forums these are normally within the context of a role. By associating the posts entered in a session with the roles that match them, the recommender system can use this information to only suggest discussion topics that are relevant to the role that the stakeholder is actively playing.

Another opportunity for including context arises from incorporating the time and stage in the software development lifecycle into the recommender system algorithm. By making the recommender system aware of the stage in the development process, the recommendations can be more targeted to the tasks at hand. For example, early in a project the stakeholders might be more interested in discussions related to key functional aspects; whereas later during the maintenance stage of a project the stakeholders might be more interested in discussions related to the evolution of the software system and the impact of change on the existing architecture and features.

As such, we hypothesize that the inclusion of contextual information about the stakeholders will result in an increase in the effectiveness of the recommender system.