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Handling stakeholder conflict by agile requirement prioritization using Apriori technique☆

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ABSTRACT

Agile methodology is adopted by most of the corporate industries in the current scenario. Agile is widely preferred for its ability to adapt to frequently changing requirements where prioritization of requirements plays a major role. Existing methods to prioritize requirements such as MoSCoW, Business value, Validated learning and Walking skeleton are not able to address the problem of stakeholder conflict. In order to overcome this problem, we have proposed an idea to use Apriori algorithm to find the most frequently asked requirements which in turn helps in reducing the stakeholder conflict. Apriori algorithm has two functions, join and prune that are performed continuously to find the frequent items and is designed to operate on database containing transactions. This paper addresses how the requirements are prioritized effectively using Apriori algorithm.

1. Introduction

Business is emerging with new technologies and approaches everyday according to the economic conditions, expectations, emerging trend, market needs, etc. From the beginning, the main objective of any product development is to enhance the features of a system which in turn is valuable to the user [1–3]. The common issue faced by any software development organization is to deliver the system on time and within the budget. In order to compete effectively in a competitive environment, any problem solving technique should be novel and efficient which is instantly available as and when expected. Rather, to deliver the system in expected time without compromising the quality, an optimized development methodology is highly important. In general, the system is said to be a quality one if and only if it satisfies the needs of a customer.

The First thing that comes to our mind when we want to develop a software or product in a frequently changing business trends is Agile process development. It is an alternate approach to develop a software. Agile is a time boxed, iterative approach to software delivery that builds software incrementally from the project kick-off, instead of trying to deliver it all at once after completion. Agile process is capable of managing changing requirements. In agile methodology, product releases happen in an iterative and incremental work pieces called sprints. The features which have to be released are prioritized according to the customer needs and change requests [4].

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Agile process can easily adapt to their project portfolios due to changing business priorities. Agile projects deliver working software on a regular schedule usually once or twice in a week. [5–7]. These practices hugely help to reduce the risk of dependency on resources who may move away from the project at any point in time.

The first phase in developing any software or product is Requirements gathering. The requirements play a key role in any process [8]. Among the software development phases requirement analysis is said to be the most important phase since it is an initial step in the development and any requirement misunderstanding would lead to chaos in the later stages of software development. The requirements are treated like where the stakeholders gather together and exchange their ideas, communicate with each other, share knowledge and information. The requirements gathered are further developed to a software design followed by coding, which are the downstream artifacts [9,10]. Each requirement has to undergo a feasibility study to see if they can be implemented or not with the current software hardware environment. Success of process or the failure of the process also depends on the requirements, so they have to be gathered correctly. When there are many requirements there is a chance of project going away from the scope of meeting the needs. So they are to be gathered according to the needs and has to be prioritized properly.

Various requirement prioritization methods are available and it can be chosen as per the project's need which are listed below,

1. MoSCoW - Must have, Should have, Could have, Wont have
2. Business value - Based on the business value that will be generated to the company.
3. Kano model - Requirements prioritized based on the customer preferences.
4. Validated learning - Developing any feature that is not experimented yet and it is released to get the customer feedback and if it is successful applying it to the next release.
5. Walking skeleton- Requirements which can be completed in a very short span of time and minimal end to end features are selected.

Using these methods one can prioritize the requirement only to some moderate extent which will not consider the stakeholders and customers point of view in every constraint. To satisfy the customer needs, one needs an effective technique to list out the order of requirements.

Selection of requirements or features for every release is highly important and can never be taken light. Requirement prioritization plays an important role. Process of prioritizing the requirements provides support for following activities as:

(i) The clients or stakeholders have to identify and freeze the core requirements of the system [11].
(ii) Planning and categorizing the set of requirements for implementation in specific releases [12].
(iii) To deliver a system that satisfies the customer even if partial requirements are selected for implementation.
(iv) To predict or expect the customer satisfaction [13].
(v) To reduce stakeholder conflict.

The aim of this paper is to prescribe an effective method for prioritizing requirements. Here, Apriori algorithm has been used to generate frequently asked requirements, which are implemented first in order to overcome the stakeholder conflict and to ensure customer satisfaction.

To find out the most frequently asked requirements, the Apriori algorithm is applied which in turn helps in decreasing the stakeholder conflict. Apriori algorithm is most widely used in databases to extract frequent item set [14,15]. Apriori algorithm is designed to operate on databases containing transactions [16]. Based on threshold value (we call it minimum support value), this algorithm identifies the frequent item sets which are subsets of transactions in the database. The same technique is applied to prioritize requirements that are frequently asked by stakeholders so that the needs of the stakeholders or customers are met in an efficient and an effective way.

The paper is structured as follows: we introduce a Related work in Section 2 and Framework to priorities requirements in Section 3. We then introduce more detailed definitions for scope-aided prioritization, selection and minimization with Experimental analysis and results discussion for each, we provide first a definition of scope-aided approach and then illustrate the approach on the example anticipated in Section 4. We then describe the settings of our performance evaluations. Results are reported and illustrated separately for prioritization; selection and minimization in Section 5, and Section 6 concludes the paper.

2. Related work

Any product a customer is willing to buy depends on how well the product meets the customer needs. Here the major deal is prioritizing the user requirements which yield good results as well as customer satisfaction. Prioritization of requirements is all about making the user stories in the order of its importance and business value [17]. It still depends on many factors like project constraints, stakeholder characteristics, and the environment under which the product is being developed [18,19]. Further, these requirements are developed as iterations and the requirement with highest priority is implemented first.

The major stakeholders are the developers of the product who are the most influential people in the requirement prioritization process [20]. Prioritization process includes both developers and customers. The complication begins while involving