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Research Article Requirement Prioritization and Scheduling in Software Release Planning Using Hybrid Enriched Genetic Revamped Integer Linear Programming Model

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Abstract: The main objective of this study is to scheduling the prioritized requirements that make the software release in a better way. Software release is a single or a group of change in an already evolved software product that can result in another new product. Therefore, a good planning is essential and a bad plan can always lead to irrelevant features (requirements) being included in the release which in turn can affect the release time of the software. In order to overcome this delay, two things have to be considered such as requirements prioritization and scheduling. Prioritization of requirements means that the significant requirements are released in priority. Second is to schedule these prioritized requirements so as to release the new version on time. If we just do requirement prioritization without making an appropriate time plan, there is a high chance that the project may exceed the release schedule and this probability will grow as the number of dependencies increases. So we have to perform requirement prioritization and scheduling as one model that can minimize the project duration. So the paper consolidates both the processes of software release, prioritization and scheduling, called as Hybrid EGRILP model in order to maximize the revenue and to minimize the project duration. The requirements prioritization is performed using the Enriched Genetic process where the premature convergence problem is overcome and the Revamped Integer Linear Programming (RILP) is introduced with the enriched genetic process. This combination of methods maximizes the profit of the software and minimizes the release time of the software.

Keywords: Modified genetic algorithm, modified heuristic Integer Linear Programming (ILP) model, premature convergence problem, requirements prioritization, requirements scheduling, software release planning

INTRODUCTION

A software release is a collection of new or changed features that can be included in an updated or new version of a software product. At the time of software release planning, the features to be involved in a software release are stable in a way that the budget, technical, risks and resource constraints are met (Rahman and Rokonuzzaman, 2014). Software development is defined as a sequence of actions where the requirements of the users are converted into the final software product. These activities includes converting the user requirements into a model (prototype), progressing the model into real time development (software) and sometimes also includes the maintenance of the delivered software product.

The software release planning has two steps, requirement management and software planning. In requirement management process, the requirements are modified; new requirements are additionally added while software planning phase deals with the way of reaching the goal, processing the risk factors, satisfying the constraints, delivering the final product that promises customer and user satisfaction (Meenakahi, 2014). The requirement selection process should be completed before adding the requirements to the software product. Each considered requirement will not have the same priority and a decision to select the most appropriate requirement is the most vital task of software requirement prioritization.

The next significant process in software development is scheduling these prioritized requirements. Since the selected requirements are having dependencies with each other, scheduling these requirements may have a restriction with time constrained metric (Sandhia and Anil, 2014). Therefore, it is essential to arrange (order) the optimal requirements for the reason of determining the requirements that have to be included in the next version of software release and also it is essential to determine an appropriate time plan to release the software.

An appropriate Software Release Planning includes both requirement prioritization and scheduling. Most of the existing release planning models focuses only on requirement prioritization but our proposed model takes into consideration both these aspects (i.e.,) requirement prioritization and scheduling. Prioritization of

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