

Development and Integration of Scrum Tree Algorithm with K-means Data Clustering

Rupali A. Mahajan, S. K. Yadav, S. A Mahajan



Abstract: *The goal of project management is usually to anticipate or perhaps estimate as most potential issues and so complications as conceivable; and then to approach, coordinate and restrain actions in order that the tasks accomplished as effectively as plausible in spite of each associated risk. To deal with upcoming era initiatives, Scrum and agile platform is indicating the ideal. Scrum project control is a method for controlling software execution that originates beneath the wider umbrella of agile assignment control. It gives a light and portable procedure framework which usually holds iterative as well as, progressive methods; assisting businesses achieve functioning software even more often. Scrum is definitely an agile software advancement method engineered to put strength, target, quality, and openness to project groups producing software products. It harnesses fabricated life analysis by permitting groups to function in close proximity to the border of commotion to promote speedy system progress. Consequently, presently there is a need of project management tool integration with new scrum tool facilities. This paper presents the k-means data clustering integration with our developed scrum tree algorithm and also the integration for efficient project management. The results show that the proposed research is better than the existing project development model.*

Keywords: *Scrum, Agile, project management, cost model, scrum algorithm, project integration, software development modeling*

I. INTRODUCTION

A project is short-term for the reason that it has an identified commencing and finalizing over time, and so consequently outlined extent and solutions. Likewise, a project is exclusive because it is not necessarily a schedule procedure, although a particular group of procedures crafted to complete a unique objective [1]. Therefore a project workforce frequently involves professionals exactly who do not generally perform collectively occasionally from distinct agencies and throughout diverse geographies. Scrum is a verified and as well, broadly implemented approach for attaining application agility [2, 3]. By means of functioning to put it briefly sprints, this kind of iterative routine may be continual until finally a sufficient amount of work things are

generally accomplished, the funds are reduced or perhaps deadline occurs. Project inspiration is managed, and so whenever the project terminates Scrum assures which the the majority of important work is finished. Various groups commence out employing spreadsheets to control the item backlog and so activity panels to find out and modify the state of assignments at the time of the recent sprint, frequently by way of a whiteboard and sticky remarks [4, 5]. This method is likely to function well for modest, co-located groups. Nevertheless, as the backlog raises and distant users need project presence various agencies put into action a more advanced tool to centrally control assignments and permit cross-team cooperation [6]. Projects might be accomplished promptly and with budget and even now be unsuccessful in the event that a project really does not achieve the predicted outcomes and level of quality, it can barely be evaluated as effective [7].

The majority of prevalent challenges occur within the project lack of success are not putting first properly, without having an appropriate organization strategy, not ignoring the development right into stages [8, 9]. Customers Complications prospects to conflicting clashes which may possess a negative impact within the project. A Project Manager requires professional conversation abilities to prevent everyone aboard and in contract [10]. It is very vital that project requirements are described evidently and so entirely out of the start. Change demands may trigger the project to move and pass up deadlines and then ineffective Conversation Functions. Aside from this powerful stakeholder supervision is crucial [11]. It truly is the capability to determine people influenced by means of are probably the impact the effective end result of the project. An experienced project manager will certainly assure collaborative operating conditions exactly where project stages can be assessed and so mentioned by most stakeholders. Controlling a project begins by way of developing a good perception of specifically what precisely the team is trying to attain [12]. It seems straightforward, although is actually convenient to get misplaced when ever if you're coping with challenging organization complications. This type of reasonably limited perspective offers significant implications on the extended work. Applying Scrum by way of a totally bundled aspect layout conditions prospects to unpredicted, quick development of a software program by way of developing, adaptable elements similar to the procedure of highlighted balance [13, 14]. Unexpected jumps in features lead in previously as opposed to anticipated delivery of application in the initial Scrum. Development responsibilities, formerly organized to consider days, may possibly frequently be achieved in several hours applying somebody else's program as an opening stage [15].

Revised Manuscript Received on October 30, 2019.

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Overlooking the elements of project administration interaction is harmful to task supervision mainly because the achievement of tasks as well as, task managers is straight pertinent to just how perfectly task manager's converse with the stakeholders and then the project staff in satisfying the project perspective and establishing a great carrying out assignment team. Agile task management strategy is applicable to a process, which in turn is shared right into many modest units which usually will be accomplished with a particular time frame. This kind of is compared to an extensive execution of the overall assignment. An essential function in this article is designated to individual assets. Because of this, a supervisor needs to be capable to coordinate an energetic assignment squad, the association in which usually is structured on convenience, cohesiveness, and so on the investigation for project.

Software program production generally will take place in group based tasks in which the individuals function toward a distributed objective. Various businesses possess challenges with shifting what precisely customers study in one particular venture to different tasks inside corresponding organization. Know-how Administration is a set of approaches and methods to boost the switch and employ of distinct designs of knowledge in an organization or group. The very primary stage of project management or scrum agile management is the knowledge management. A collection of procedures are needed to assist in knowledge management. This kind of will certainly become strategies for gathering up and circulating knowledge, and so can be actions an individual component of the business is undertaking, and also task executives and software program developers [16].

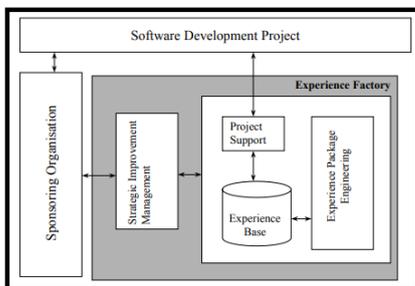


Figure 1- Software Project Management tool [16]

To deal with the Management include maintaining an eye on every single employee's improvement and figuring out the best way every activity suits inside the enormous snapshot. However, software program choices produce additional effective assignment supervision feasible without the requirement for a number of spreadsheets. Effective applications are actually required to accomplish successful project management. This paper presents the development and integration of k-means data clustering module and scrum tree algorithm [17] which can be used as an extension for project management tool.

II. PROPOSED METHODOLOGY

To provide the efficient resources management and to meet stakeholder requirements, proposed research considered the agile software development. The scrum tree algorithm is

modified with development of k-means data clustering module which provides the requirement clustering. In big software development projects, number of requirements (considered as a cluster of requirements) and each cluster of main requirements holds the sub-module requirements. Hence, to map the software development process we need to identify the module completion matrix.

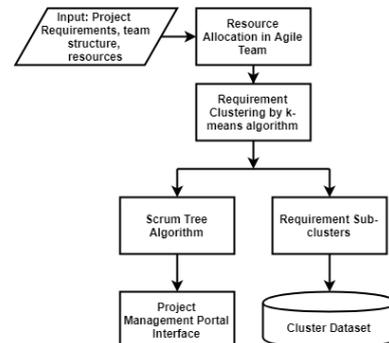


Figure 2 – Proposed k-means requirement clustering

As shown in figure 2 above, the k-means clustering facilitates the input information like project specific requirements, team member details, resources availability etc. All requirements must be gathered to form a main cluster of requirements. Further to that, team allocation is done based on number of requirements, knowledge of team member and resources available.

The k-means requirement clustering is shown in proposed algorithmic steps below.

Proposed Algorithm: k-means requirement clustering

1. Input: Project Requirements, team members count, resources
2. Array *ReqIdArr*[] //Requirements storage
3. Array *TMember*[] // Team member IDs storage
4. Array *ResourceIdArr*[] // Resource IDs storage
5. String *ClusterReq*
6. String *subClusterReq*
7. Array *SprintId*[]
8. Array *ProjectId*[]
9. while (*ReqIdArr*[] != 0) do
10. Add *ClusterReq* to *ReqIdArr*[]
11. while (*TMember*[] != 0) do
12. for (i=1; i>= *TMember*[]; i++)
- Add *subClusterReq* to *TMember*[] //Allocate task to team member
13. while (*ResourceIdArr*[]==*TMember*[])
14. Add *TMember*[] to *SprintId*[]
15. Add *SprintId*[] to *ProjectId*[]
16. Display () //Show *ProjectId*, *Cluster*, *Sub-cluster*, team member, *Sprint* details on project management interface
17. end while

The proposed algorithm can handle significant amount of requirements for multi project management too. The dataset of requirement is built using k-means algorithm which further integrated to our developed scrum tree algorithm [17].

There are two steps first is to pass requirement to form sub-cluster and store as a historical dataset and other is to send requirements which processed by k-means clustering algorithm to display all requirement, team member and allocated resources with sprint details on project management interface of tool.

Thus, the speed of information processing is increased and project manager can review progress of project without wasting time for daily sprints. The detail flow of processes is shown in following figure 3. This will be very efficient tool for next generation machine learning enabled project management.

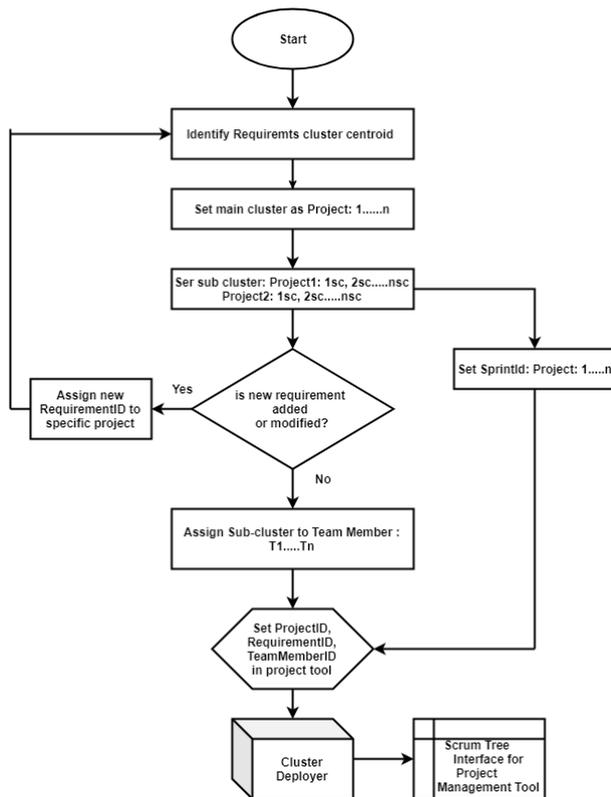


Figure 3 - Proposed Integration of Scrum Tree, k-means algorithm with project management tool

As earlier section mentioned regarding innovative advancement of k-means requirement clustering criteria, we examined on-going project supervision tools and as well, scrum framework. The outcomes of evaluation are outlined in subsequent sector of this paper.

III. RESULT ANALYSIS

As previous section discussed about new development of k-means requirement clustering algorithm, we tested existing project management tools and scrum framework. The results of analysis are discussed in table 1 below.

The performance is analyzed based on tools like Kanban [9], ProjectZila [12], Six Sigmaoid [13] and proposed algorithms tested for effectiveness integration.

Table 1- Proposed

Tool Used for requirement cluster	With Proposed Integration (%)	Without proposed integration (%)
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Kanban	91.576	89.632
ProjectZila	90.340	89.016
Six Sigmaoid	92.067	90.819

The results shown in table-1 depict that proposed Scrum Tree and K-means algorithm integration with all above mentioned 3 project management tools are effective only after integration of algorithms with existing tools. Hence, for big project requirement cluster management and monitoring proposed research is the best way.

IV. CONCLUSION

In this paper we discussed the need of project requirement clustering using k-means clustering algorithm with scrum tree algorithm. The ultimate aim of proposed research is to provide the Agile project management with power of Scrum framework to avoid daily sprint sessions. This in turn lowers the development time frame and saves cost of project by utilizing resources for other sub-requirement cluster development. The integration of algorithm with existing project management tool provides facility for team members and project managers to see updates of project task on single portal instead of lots of meetings. The agile development is based on Scrum framework so this paper analyzed results for better performance. Overall, proposed research can further be developed for multiple project management with reduced time frame of software development life cycle. As a future development we would like to suggest Machine Learning and Artificial Intelligence components for automatic project monitoring.

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