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A Survey on Effort Estimation in Agile based Software Development Projects

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Abstract: ***Agile software methodologies are used in industrial projects. They are likely to change (volatile) and flexible due to that estimation of effort and cost becomes a very difficult. If we ignore the methodologies it will effect like over budget, delay in delivery, and wrong product with bad quality. To get the good accuracy results we use case point approach using Random Forest method (RF). Random forest technique is predominantly used machine learning techniques that associates in getting improved assessed values. Besides, performance comparisons of the models acquired utilizing the RF strategy with other machine learning methods such as the Multi-Layer perception (MLP), Radial Basis Function Network (RBFN), Support Vector Regression (SVR) and Stochastic Gradient Boosting (SGB) systems are presented so as to highlight the execution achieved by each technique.***

Keywords: Use Case Point approach, Random Forest, Effort Estimation.

I. INTRODUCTION

Now a day's maintaining success in an ever-changing, fast-paced, technical world is very difficult. But keeping pace is often complex with the rate at which technology advances. To meet these challenges is critical. Researchers have been started developing methods to estimate effort, cost and its duration for agile development of software. The main key of agile software development is fast provider of software and modification on customer's demand. Estimator started for estimating the cost and schedule for a web based project. Agile development methods promote team work and process adaptability. Regression testing is performed to make sure that new changes should not have effects on working functions. It is an expensive process because it consumes more time, cost and effort. Agile based projects characteristics are Quickness, Lightness, Provide customer requirements faster, more likely to adaptive development, Division of tasks into short phases of work and adaptation of plans, Control over budget. Boosting performs an exhaustive search for best predictor to split on; RF searches only a small subset. The model created by SVR depends only on a subgroup of the training data, because the cost function for constructing the model disregards any training data near to the model expectation [9]. In this we examine about the new changes happening and its symptoms on different functionalities. We become more acquainted with about the distinctive estimation procedures and issues in it. How we perform relapse testing utilizing project and people related components [1]. The estimation based on story points is implemented by some steps like user expectation, estimation of user stories, iteration length, velocity, prioritization of user stories, delivery date are taken to implement [8].

II. LITERATURE REVIEW

Rashmi Popli and Naresh Chauhan, an Agile Software Estimation Technique based on regression Testing Efforts, It's about the agile software estimation technique based on regression testing efforts. In this we discuss about the new changes occurring and its side effects on other functionalities. We get to know about the different estimation techniques and problems in it. How we perform regression testing using project and people related factors [1].

Ratnesh Litoriya et.al Efficient Approach for Agile Web Based Project Estimation: Agile MOW has discussed how it is used to accurately estimate the size and duration. The new modified size to handle the web objects like shopping carts, java scripts and building blocks like cookies. Now a day Estimation of software cost is a difficult task due to its changes in customer requirements. In this paper we introduce a model which estimates cost and effort for web based projects using COCOMO II model [2].

Shashank Mouli Satapath et.al, Story Point Approach based Agile Software Effort Estimation using Various SVR Kernel Methods, have discussed about Support Vector regression method which gives optimal estimated values. We use some accuracy terms like MMRE and PRED and it is executed by MATLAB. The proposed model is based on 21 project data sets and follows some steps to evaluate performance. The steps involve calculation of story points and velocity, scaling and division of dataset, selection of parameters, model selection, and evaluation of performance [3].

Rashmi Popli et al, Research Challenges of Agile Estimation, have discussed about different research challenges, causes of inaccurate estimates. If we will not use the past experiences then methods like panning poker and analogy are used which are not in good practice. They are some problems because of estimation methods like large number of inter related factors, lack of measurement [4].

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Andreas Schmietendorf et al, Effort estimation for Agile Software Development Projects, Classical estimation methods need defined requirements. XP provides a set of principles, values, and practices. Effort estimation for XP projects is performed [5].

Ziauddin et.al, an effort estimation model for agile software development, has discussed the proposed model about agile teams of whole formed of generalizing specialists, and stable. In this we determine the effort by story size, complexity [6].

Sungjoo kang et.al, Model-based Dynamic Cost Estimation and tracking method for agile software development, this paper tells about cost estimation of agile software development and for tracking projects progress, the velocity is used to check the progress ,later it releases the product. The method in this paper provides dynamic tracking methodology. To estimate effort story points and function points are used. We use a technique for tracking project progress named kalman filter .In this daily changing function point is observed and given as a input to kalman filter for better estimation and velocity. The paper has a short description about the problems like it can't be related to time period due to story points represent amount of work and velocity differ from team to team. Other problem can be fluctuations in story point [7].

Anirban basu et.al, Effort estimation in agile software development using story points, this paper tells about the different size estimation methods of traditional and also the present technique implemented by using story points. It provides overview of existing techniques like FPA and COCOMO II. [8].

Shashank Mouli Satapathy et.al, Use case point approach based software estimation using various kernel methods, this paper tells about the use of use case point approach using SVR kernel methods for effort estimation. Various parameters like unadjusted actor weight, technical factors, environmental factors are used to calculate the use case point. The dataset is analyzed from many projects which later filtered and then used for implementing the proposed algorithm on SVR kernels [9].

Alex J smola, a tutorial on SVR the author discussed about the basic idea of SVR and its kernels. It provides information regarding cost function and risk function [10].

Shashank Mouli Satapathy et.al, Early Stage Software Effort Estimation using Random Forest Technique based on Class Point Approach, this paper helps to analyze the effort estimation of class point approach which implemented by random forest technique .The data is collected from various projects to create dataset. In order to the implement the class point approach fuzzy logic process are used [11].

III. METHODOLOGIES USE

A. Use case Point Approach

It is a software estimation technique used to predict the software size for projects. Use case is a group of activity to achieve a goal. It is implemented by using unadjusted use case weight, unadjusted actor weight, technical complexity factor, and environmental complexity factors.

B. Random Forest

Random forest is a name given to that general technique of random decision forests which is a method for learning classification, regression and other tasks, that operate by constructing a numerous decision trees at training time and giving the output as the class that is the mode of the classes (classification) or mean prediction (regression) of the individual trees. RF which selects only a subset of predictors for each split, can handle significantly larger problems before slowing. RF grows trees in parallel independently of one another. RF will not over fit the data.

IV. PROPOSED APPROACH

The proposed methodology is connected more than forty information set utilized as a part of. The usage of such information set proposes to evaluate software development effort and gives initial test confirmation of the practicality of the UCP approach. The usage of this information set assesses the effort required to develop software and accept the practicability of change. The proposed algorithm is for software effort estimation using random forest technique based on use case point approach. In this we estimate the effort of agile projects which helps to produce a better product using the analysis and implementing it. It estimate effort estimation for agile projects, Calculate MMRE and PRED and comparison of results in order to access their accuracy. Proposed algorithm steps:

1. Select use case diagrams from agile projects.
2. Then identify actors in the diagram.
3. Set complexity level for every factor, represented in integers like 1, 3, and 5.
4. Calculate the unadjusted values for factors.
5. Calculate total use case point for the use case diagram.
6. Select dataset from projects.
7. Filtering the data set means removing missing data, incomplete data from the collected project's data.
8. Apply Random Forest technique: first divide the original dataset to training set and testing set. Choose the training subset and calculate the results, otherwise construct next split by choosing the variable subset and then calculate Gini index at each split. The minimum value of gini index is used to select best split.
9. Calculate the MMRE, PRED.
10. Calculate the predicted results.
11. Comparison of predicted result with the actual result provides performances of the algorithm.

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12. Calculate the predicted results, the effort of the project is represented by plotting the training and testing samples along with use case points.
13. Comparison of predicted result with the actual result provides performances of the algorithm.

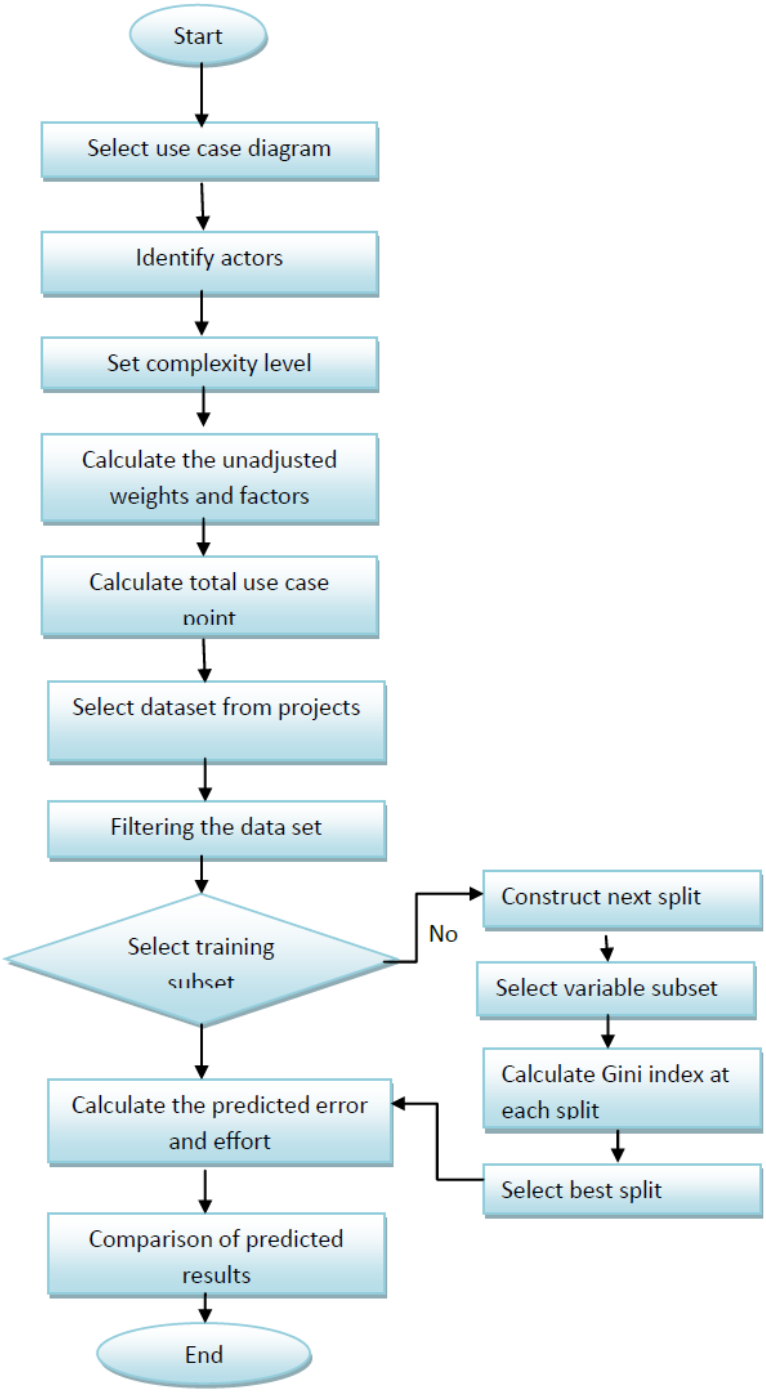

Figure 4.1: Flow chart for the algorithm

A. Performance Measures

1. MMRE: Mean Magnitude of Relative Error: It is summation of MRE over n observations

$$MMRE = \sum_{1}^{N} \frac{|ActualEffort_i - PredictedEffort_i|}{ActualEffort_i}$$

2. Prediction Accuracy (PRED)

$$PRED = |(1 - (\frac{\sum_{i=1}^{N} |actual_i - predicted_i|}{N})) * 100$$

B. Comparison

RF builds trees in parallel furthermore employments voting strategy on the prediction. In these good outcomes are obtained by higher estimation of PRED and lower estimation of MMRE. Later on a comparative analysis of proposed technique with other techniques will be shown.

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V. CONCLUSION

The model used for agile software's effort estimation is use case point approach. In any case, the class point model is one of the exertion estimation models which is utilized on account of its effortlessness, speed what's more, exactness to a specific degree. In this paper, the proposed enhanced use case point model has been executed utilizing the RF system and produced results are contrasted and the outcomes acquired from the MLP, RBFN, SVR, SGB techniques. The outcomes illustrate that the random forest technique gives lower estimates of MMRE and higher estimates of prediction accuracy. Hence, it could be inferred that effort estimation using the random forest technique outruns other machine learning strategies. The calculations for above technique were actualized, and the outputs were created utilizing MATLAB. Expansion to this technique may be made by applying other machine learning strategies like CART etc on the use case point approach.

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REFERENCES

[1] Rashmi Popli and Naresh Chauhan (2013), "An Agile Software Estimation Technique based on Regression Testing Efforts", proc. of 13th Annual International Software Testing Conference in India, 04 – 05 December2013, Bangalore, India, pp.1-9.

[2] Ratnesh Litoriya, Abhay Kothari (2013), "An Efficient Approach for Agile Web Based Project Estimation: Agile MOW", Department of Computer Engineering, JJT University, Rajasthan, India; Department of CSE, SIMS, Indore, pp.298-303.

[3] Shashank Mouli Satapathy, Aditi Panda, Santanu Kumar Rath(2014) "Story Point Approach based Agile Software Effort Estimation using Various SVR Kernel Methods" Department of Computer Science and Engineering National Institute of Technology Rourkela - 769008, Odisha, India, pp.304-307.

[4] Rashmi Popli, Dr. Naresh Chauhan(2013) "Research Challenges of Agile Estimation" YMCAUniversity of Science & Technology, pp.108-111.
V. Mahnic (2011) "A Case Study on Agile Estimating and Planning using Scrum" University of Ljubljana, Faculty of Computer and Information Science, Trzaska25, 1000 Ljubljana, pp. 123-128.

[5] Andreas Schmietendorf, Martin Kunz, Reiner Dumke (2008) "Effort estimation for Agile Software Development Projects", Milan, Europe, pp. 113-126.

[6] Ziauddin,Shahid Kamal Tipu, Shahrukh Zia(2012) "an effort estimation model for agile software development", Gomal university, Pakistan, pp. 314-324.

[7] sungjoo kang,okjoo choi, Jongmoon Baik "Model-based Dynamic Cost Estimation and tracking method for agile software development", KAIST, Taejon Korea,pp.305-701.

[8] Anirban basu, Evita Coelho (2012) "Effort estimation in agile software development using story points", east point college of engineering and technology, Bangalore, Karnataka, India, pp.7-10.

[9] Shashank Mouli Satapathy, Santanu Kumar Rath(2014) "Use case point approach based software estimation using various kernel methods", NIT, Rourkela, India, pp. 1-13.

[10] Alex J smola,"A tutorial on SVR ", pp. 1-24.

[11] Shashank Mouli Satapathy, Santanu Kumar Rath, Barada Prasanna Acharya(2014), " Early stage software effort estimation using random forest technique based on optimized Class Point Approach", pp.22-23.

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