**IMPLEMENTATION OF SOFTWARE EFFORT ESTIMATION**

**A PROJECT REPORT**

***Submitted by***

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**CIVA.P [711713104013]**

***in partial fulfillment for the award of the degree***

***of***

**BACHELOR OF ENGINEERING**

**IN**

**COMPUTER SCIENCE AND ENGINEERING**

**KGiSL INSTITUTE OF TECHNOLOGY**

**ANNA UNIVERSITY :: CHENNAI 600025**

**APRIL 2017**

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**BONAFIDE CERTIFICATE**

Certified that this project report “**IMPLEMENTATION OF SOFTWARE EFFORT ESTIMATION**” is the bonafide work of “**ANJALI.D, KEERTHANA.K, FABIAN DURAIRAJ.L, CIVA.P** ” who carried out the project work under my supervision.

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**Abstract:**

In a software development process, effective cost estimation is the most challenging activity. Software effort estimation is a crucial part of cost estimation. Management cautiously considers effort and benefits of software before committing the required resources to that project or order for a contract. Unfortunately it is difficult to measure such preliminary estimation as it has only little information about the project at an early stage. In this paper, a new approach has been proposed which is based on reasoning by soft computing approach in order to calculate the effort estimation of the software. In this approach, at first the datasets are clustered in order to create the rules. In our proposed approach we have utilized Modified Fuzzy C Means Clustering (MFCM) for clustering the dataset. Once the clustering is done, various rules are obtained and these rules are given as the input to the neural network. Here we have modified the neural network by incorporating optimization algorithms. The optimization algorithms employed here are Artificial Bee Colony (ABC) algorithm, Modified Cuckoo Search (MCS) algorithm and Hybrid ABC-MCS algorithm. Hence we obtain three optimized set of rules which are used for the effort estimation process. The performance of the proposed model is investigated using parameters such as Mean Absolute Relative Error (MARE) and Mean Magnitude of Relative Error (MMRE).

**1. INTRODUCTION**

With the popularization of information engineering, customers realize the importance of project management and control in software project gradually. This requires accurate enough effort estimate and quality guarantee which provided by the software developers . Accurately predicting software development effort is a critical concern of many organisations even today. Underestimating development cost and schedule can have a detrimental impact on both the functionality and quality of software products and therefore on the developer’s reputation and competitiveness. Software project cost and effort estimation is an increasingly important field due to the overwhelming role of software in today’s global market. However, there is no optimal approach to accurately predict the effort needed for developing a software system. Usually, the information gathered at the early stages of software system development is insufficient for providing a precise effort prediction. Effort estimation methods could be based on subjective expert judgement or formal estimation models. Formal models use functional dependency to estimate effort using some value that quantifies project size .

To manage a software project effectively, accurate and reliable software effort estimation is critical activity. During the last decade, a number of software effort estimation methods with different concepts and approaches to combining the existing effort estimation methods have been developed and evaluated using historical project data. A good estimation of size and effort available right from the start in a project gives the project manager confidence about any future course of action, since many of the decisions made during development depend on, or are influenced by, the initial estimations. Hence, the effort estimation is one of the most crucial steps of planning and management of a software project .

**1.2 Objectives**

* The primary intension of this research is to estimate the effort accurately
* To estimate the effort, generate the rules based on the input attribute values
* The optimal rules will be used for accurate effort estimation
* To minimize the MRE with Neural network error minimization process.
* To estimate the effort efficiently, MMRE is used as a fitness for optimization process.

**1.3 Significance of the project**

* In a software development process, effective cost estimation is the most challenging activity.
* Software effort estimation is a crucial part of cost estimation.
* Management cautiously considers effort and benefits of software before

committing the required resources to that project or order for a contract.

**1.4 Outline of the project**

* In this approach, at first the datasets are clustered in order to create the rules. In our proposed approach we have utilized Modified Fuzzy C Means Clustering (MFCM) for clustering the dataset.
* Once the clustering is done, various rules are obtained and these rules are given as the input to the neural network. Here we have modified the neural network by incorporating optimization algorithms.
* The optimization algorithms employed here are Artificial Bee Colony (ABC) algorithm, Modified Cuckoo Search (MCS) algorithm and Hybrid ABC-MCS algorithm.
* Hence we obtain three optimized set of rules which are used for the effort estimation process.
* The performance of the proposed model is investigated using parameters such as Mean Absolute Relative Error (MARE) and Mean Magnitude of Relative Error (MMRE).

**2. SYSTEM ANALYSIS**

**2.1 EXISTING SYSTEMS:**

**1.LOC (**Algorithmic)

**ADVANTAGE:**

Very easy in implemantaion to estimate the size of software

**DRAWBACKS:**

Prediction of line is tough in early stages,not good for very large project and language dependent**.**

**2.Functional point (**Algorithmic)

**ADVANTAGE:**

Applied early in SDLC.GUI based, better than LOC,language free

**DRAWBACKS:**

Lots of judgement involved, start after the design specification, Less research data is available on function

**3.** **Expert judgement** (Nonalgorithmic)

**ADVANTAGE:**

Fast prediction, adapt to especial projects

**DRAWBACKS:**

Its success depend on expert usually is done incomplete

**4.Basic COCOMO (**Algorithmic)

**ADVANTAGE:**

Basic COCOMO is good for quick,early,rough order of magnitude estimates of software costs,commonly used in small projects,compatible for assemble language to PL/I.

**DRAWBACKS:**

Not used in large projects where size is greater than 10000.Accuracy is limited. Its prediction is .25 which is quite poor

**5.Linear model (**Algorithmic)

**ADVANTAGE:**

It is a best method of prediction using linear regression technique

**DRAWBACKS:**

Little difference between actual and predicted result and error is also need to calculate

**2.2 Proposed System:**

In this paper, a new approach has been proposed which is based on reasoning by soft computing approach in order to calculate the effort estimation of the software.

In this approach, at first the datasets are clustered in order to create the rules. In our proposed approach we have utilized Modified Fuzzy C Means Clustering (MFCM) for clustering the dataset.

Once the clustering is done, various rules are obtained and these rules are given as the input to the neural network.

Here we have modified the neural network by incorporating optimization algorithms. The optimization algorithms employed here are Artificial Bee Colony (ABC) algorithm, Modified Cuckoo Search (MCS) algorithm and Hybrid ABC-MCS algorithm. Hence we obtain three optimized set of rules which are used for the effort estimation process. The overall flow diagram of our proposed method is shown in fig 1below,

Error estimates (MMRE, MARE, MRE)

Input dataset

Generation of testcases

Clustering of testcases using MFCM

Classification Using Hybrid Neural Network

Optimization using ABC-MCS

Output effort value

Proposed Classifier

**Fig 1:** Proposed software effort estimation model.

**2.3 Feasibility Study**

Feasibility study is a high level capsule version of the entire process intended to answer a number of questions like: What is the problem? Is there any feasible solution to the given problem? Is the problem even worth solving? Feasibility study is conducted once the problem clearly understood. Feasibility study is necessary to determine that the proposed system is feasible by considering the technical, operational, and economical factors. By having a detailed feasibility study the management will have a clear-cut view of the proposed system.

The following feasibilities are considered for the project in order to ensure that the project is variable and it does not have any major obstructions. Feasibility study encompasses the following things

* Technical Feasibility
* Economical Feasibility
* Operational feasibility

In this phase, we study the feasibility of all proposed systems, and pick the best feasible solution for the problem. The feasibility is studied based on three main factors as follows.

**2.3.1 Economical Feasibility**

In this step, we verify which proposal is more economical. We compare the financial benefits of the new system with the investment. The new system is economically feasible only when the financial benefits are more than the investments an expenditure. Economical Feasibility determines whether the project goal can be within the resource limits allocated to it or not. It must determine whether it is worthwhile to process with the entire project or whether the benefits obtained from the new system are not worth the costs. Financial benefits must be equal or exceed the costs. In this issue, we should consider,

* The cost to conduct a full system investigation.
* The cost of h/w and s/w for the class of application being considered.
* The development tool.
* The cost of maintenance etc.,

Our project is economically feasible because the cost of development is very minimal when compared to financial benefits of the application.

**2.3.2 Operation Feasibility**

In this step, we verify different operational factors of the proposed systems like man-power, time etc., whichever solution uses less operational resources, is the best operationally feasible solution. The solution should also be operationally satisfied user objectives could be fitted into the current system operation.

* The methods of processing and presentation are completely accepted but the clients since they can meet all user requirements.
* The clients have been involved in the planning and development of the system.
* The proposed system will not cause any problem under any circumstances.

Our project is operationally feasible because the requirements and personnel requirements are satisfied. We are a team of 4 members and we worked on this project for three working months.

**2.3.3 Technical feasibility**

In this step, we verify whether the proposed systems are technically feasible or not, ie., all the technologies required to develop the system are available readily or not.

Technical Feasibility determines whether the organization has the technology and skills necessary to carry out the project and how this should be obtained. The system can be feasible because of the following grounds.

* All necessary technology exists to develop the system.
* This system is too flexible and it can be expanded further.
* This system can give guarantees of accuracy, ease of use, reliability and the data security.
* This system can give instant response to inquire.

Our project is technically feasible because, all the technology needed for our project is readily available.