

DELHI TECHNOLOGICAL UNIVERSITY (Formerly DCE)



SOFTWARE PROJECT MANAGEMENT (SE-405)

Comparison of Software Project Cost Estimation Techniques and Models

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INTRODUCTION

- Software development cost estimation (SDCE) has always been an interesting and budding field in Software Engineering. This study will support the SDCE by exploring its techniques and models and collecting them in one place.
- The success of a software project depends on whether it is aligned with the customer requirements and that it is completed within the deadline, within the given budget allocated for the project. Due to this very reason, finding a model that is accurate and reliable in determining the cost of a software project is of utmost importance.
- Several research studies were done for surveying the cost estimation techniques. We both read around 15-20 research papers on the selected topic to know about the different cost estimation techniques and models. It was after this that we selected the ones that we found were most widely used in the software industry.

OBJECTIVE

- We categorized software development cost estimation techniques and models into different categories and enlisted down the strengths and weaknesses of each one of them.
- Listing the pros and cons of every model and technique will assist the stakeholders and project managers in finding the best approach for their software project.
- The study will be useful in comparing different models, which will further aid the project managers in choosing the correct model according to given situations and environments.
- The comparative study will include the conventional and the newer models, thus assisting in gathering information about the evolution of software project management. Moreover, this will lead to a better understanding of the recent trends in the cost estimation field.
- Based on the research results, we will be deciding which model is the ideal model in estimating the cost of a given software project.

CLASSIFICATION OF TECHNIQUES

1. Parametric / Algorithmic techniques
2. Expertise-based techniques
3. Learning-oriented techniques
4. Dynamics-based techniques
5. Regression-based techniques
6. Size-based estimation techniques
7. Composite techniques



PARAMETRIC / ALGORITHMIC TECHNIQUES

For generating cost estimates as a function of major cost factors we used Algorithmic models. The various models under this techniques are:

1. **Software Life-Cycle Model (SLIM)**
2. **COCOMO**
3. **SEER-SEM**
4. **Checkpoint**
5. **ESTIMACS**
6. **PRICES-S**
7. **COSYSMO**
8. **COCOMO-II**

EXPERTISE – BASED TECHNIQUES

Expertise based estimation techniques are based on the ability of one or more people, called experts in software development, to work to estimate software development efforts.

The various techniques are:

1. **Delphi Technique**
2. **Wideband Delphi Technique**
3. **Work Breakdown Structure (WBS)**
4. **Rule-Based Systems**
5. **Planning Poker**
6. **Top-Down Approach**
7. **Bottom-Up Approach**

LEARNING – ORIENTED TECHNIQUES

Learning-oriented techniques use prior knowledge as well as current information to develop software cost estimation models. These techniques take reference from previous experiences and build a model to automate the estimation process.

The various techniques are:

1. **Case-Based Reasoning (CBR)**
2. **Neural Networks (NN)**
3. **Genetic Algorithm (GA)**
4. **Genetic Programming (GP)**

DYNAMIC – BASED TECHNIQUES

As compared to other techniques, dynamics-based techniques consider cost factors to be dynamic as they change over the period of the system development process. Changes in software factors such as design requirements, budget, project time etc. will change the productivity of the project. This type of technique is suitable for planning & management.

The only technique that we used for dynamic-based technique approach was **System Dynamics Approach**.

REGRESSION – BASED TECHNIQUES

Regression-based techniques are very famous in model building and are used in combination with model based methods. They estimate software costs as a function of key cost factors by using mathematical algorithms.

The Various techniques are:

1. **Standard Regression**
2. **Robust Regression**
3. **Fuzzy Logic-Based Methods**
4. **Fuzzy Systems**

SIZE – BASED ESTIMATION TECHNIQUES

Software estimation techniques are used to predict the software size for software development projects.

The Various techniques are:

1. **Function Points**
2. **Full Function Points (FFPs)**
3. **Use Case Points**

COMPOSITE TECHNIQUES

Composite techniques incorporate at least two procedures to define the most reasonably useful frame for estimation through the cons of a technique.

The only technique that we came across in composite technique approach was **Bayesian Approach**.

Strengths and Weaknesses of the Discussed Approaches



CONCLUSIONS



- There have been ample researches that propose various software development cost estimation models but there was a lack of research in comparing the different models.
- We were able to find out situations pertaining to every technique and model in which the technique opted will not generate satisfactory results and will hence be an overhead on the software project undertaken. Therefore, we concluded that no cost estimation technique is 100% ideal for all scenarios.
- According to the results mentioned above, we strongly recommend the usage of Hybrid Techniques that are formed by combining two or more of the existing models. The models can be selected based on the strengths mentioned in our study. The model can be chosen by prioritizing which pros are mandatorily needed in the software project and which cons can be compromised. In this way, a near-to-perfect hybrid approach could be applied as per the nature of the software project

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THANK YOU

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