

A Proposed Framework for Use Case based Effort Estimation using Fuzzy Logic: Building upon the outcomes of a Systematic Literature Review

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ABSTRACT

Reliable and accurate software development effort estimation has always been a daunting task for project managers. More recently, the use of Use Cases for software effort estimation has gained wide popularity. Researchers from academia as well as industry have shown interest in the Use Case based approaches because of the promising results obtained along with their early applicability. There has been a number of approaches proposed in the literature. However, there is no criteria that could be used to aid practitioners in selecting appropriate approaches suitable for their particular development efforts. In this paper we present a set of attribute-based criteria to classify and compare these approaches and provide such aid to practitioners. The set is also meant to guide researchers interested in proposing new use case-based approaches. The paper conducts a systematic review of a number of representative Use Case-based effort estimation approaches against the criteria. Analysis of the discussion highlights some open issues for future research. Addressing some of the issues, we present and discuss a framework for developing use case-based effort estimation models.

KEYWORDS

Effort Estimation, Use Case, Comparison Criteria, UML and Fuzzy Logic System.

1 INTRODUCTION

Effort is delineated as the amount of labor required to complete a certain work. Software effort estimation is the process of predicting the effort required to develop a software system based on incomplete, crude, uncertain or ambiguous inputs [1], [2]. It deals with the prediction of the most probable cost and time to actualize the required development task. Software effort estimation spawned some of the first attempts at rigorous software measurement, so it is the oldest, most mature aspect of software metrics. Researchers have proposed so many models to be used for effort estimation. One of the main inputs to any effort estimation model is the estimated or the actual software size, e.g., lines of code (LOC). As such, measuring/estimating the software size accurately and also as early as possible is of prime importance [3], [4]. A good size estimate can lead to a good effort estimate. This is a challenging task though, since on one hand, early effort estimates play a vital role when bidding for a contract or determining whether a project is feasible in terms of a cost-benefit analysis [5], [6], [7], [8]. On the other hand, however, early estimates of size, for example

