Cost Issues in Software Engineering

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Abstract

Software cost estimation (SCE) is a process of predicting efforts and costs in terms of money, time and staff for each software.

One of the problems with estimating software costs is the evaluation of estimation models. Practitioners have been concerned to appreciate for their inability the costs associated with software development accurately. This concern has become more urgent as the problems associated with development costs continue to increase. Consequently, considerable research attention is now directed to provide a complete understanding of the software development process and the preparation and evaluation of software cost estimating tools. Many estimation models have been proposed in the last twenty to thirty years. Many software companies track and analyse project performance by measuring the accuracy of cost estimation. A number of measures are reported in the literature, but have deficiencies. There is no widely accepted standard for assessing estimation models and existing measures are sometimes inconsistent
with each other. We also show the surveys indicate that the mean absolute error percentage (MAPE) is the most widely used measure of prediction accuracy in companies and organizations. However, it is skewed.

Models of estimation are usually analysed against two attributes: precision of the estimation of coherence and its consistency. This article examines existing measures for estimating accuracy and consistency, and proposes two new methods: weighted mean quartile relative error (WMQ) as a measure of the accuracy and standard deviation of the proportions of the estimates of the actual observation (SDR) as a measure of consistency. A new criterion has also been proposed to determine the parameters of the regression model. In this paper, we also evaluated five of the most popular methods used to estimate software costs (historical analogy, expert judgment, Delphi method, algorithmic approach and bottom-up approximation). We investigate an alternative relative measure of precision, which avoids MAPE bias: the hit ratio protocol: log (forecast / real). Experience shows that dynamic neural and based techniques are less mature than other kinds of techniques, but that all kinds of techniques are challenged by the rapid pace of change in software technology.

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Keywords

Cost estimation, Cost Issues, Software Engineering, Weighed Mean Quartiles (WMQ), Root Mean of Squares of Error (RMSE), SLOC algorithm, Delphi approach, Bottom-up approach.