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.

References

2. Magne Jørgensen, NOVEMBER 2005, Evidence-Based Guidelines for Assessment of Software Development Cost Uncertainty., IEEE TRANSACTIONS ON SOFTWARE ENGINEERING, VOL. 31, NO. 11,
5. Politecnico di Milano, Department of Electronics and Information, 2006, Cost implications of software commonality and reuse; C. Francalanci , , Third International Conference on Information Technology: New Generations (ITNG'06)
Cost Issues in Software Engineering


11. S. M. Sabbagh Safari-Department of Computer Engineering, University of Vali Asr Rafsanjan, Rafsanjan, Kerman, Iran, F. Ziaaddini-Department of Information Technology, Kerman Branch, Islamic Azad University, Kerman, Iran, 2016, Optimization of software cost estimation using harmony search algorithm, 1st Conference on Swarm Intelligence and Evolutionary Computation (CSIEC)

12. Farhad Soleimanian Gharehchopogh-Department of Computer Engineering, Hacettepe University, Ankara, Turkey, Raheleh Rezaeei-Department of Computer Engineering, Urmia Branch, Islamic Azad University, Iran, Bahman Arasteh-Department of Computer Engineering, Tabriz Branch, Islamic Azad University, Iran, 2015, A new approach by using Tabu search and genetic algorithms in Software Cost estimation, 9th International Conference on Application of Information and Communication Technologies (AICT)


14. Tarig Ahmed Khalid-Faculty of Computing and Informatics, Multimedia University, Cyberjaya, Malaysia, Eng-Thiam Yeoh-Faculty of Computing and Informatics, Multimedia University, Cyberjaya, Malaysia, 2017, Early cost estimation of software reworks using fuzzy requirement-based model, International Conference on Communication, Control, Computing and Electronics Engineering (ICCCCCEE)


19. Tarig Ahmed Khalid-Faculty of Computing and Informatics, Multimedia University,
Cyberjaya, Malaysia, Eng-Thiam Yeoh-Faculty of Computing and Informatics, Multimedia University, Cyberjaya, Malaysia, 2015, Controlling software cost using fuzzy Quality based EVM, 2015 International Conference on Computing, Control, Networking, Electronics and Embedded Systems Engineering (ICCNCEE)

20. A better measure of relative prediction accuracy for model selection and model estimation, Chris Tofallis


22. A systematic review of cost estimation models, G. Rajkumar1, Dr.K.Alagarsamy2 1Assistant Professor, N.M.S.S.Vellaichamy Nadar College, Madurai, India. 2Associate Professor, Computer Centre, Madurai Kamaraj University, Madurai, India


24. Emily Oh, André van der Hoek, Jan 2009, Challenges in Using an Economic Cost Model for Software Engineering Simulation

25. December 2011, Future of Software Engineering Research, National Coordination Office for Networking and Information Technology Research and Development


29. Ana Magazinius, Robert Feldt, April 2011, Exploring the Human and Organizational Aspects of Software Cost Estimation


31. A Systematic Review of Software Development Cost Estimation Studies

32. A review of software surveys on software effort estimation

33. Software development cost estimation approaches — A survey

34. Software Effort Estimation with Multiple Linear Regression: review and practical application


36. Lessons Learned from Collecting Systems Engineering Data

37. An Empirical Validation of Software Cost Estimation Models

38. Assessing software cost estimation models: criteria for accuracy, consistency and regression

39. The software maintenance project effort estimation model based on function points

40. COCOMO-Based Effort Estimation for Iterative and Incremental Software Development

**Index Terms**

Computer Science

Software Engineering
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.