

Abstract

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Evolution of Software Reliability Growth Models: A Comparison of Auto-Regression and Genetic Programming Models

Building reliability growth models to predict software reliability and identify and remove errors is both a necessity and a challenge for software testing engineers and project managers. Being able to predict the number of faults in software helps significantly in determining the software release date and in effectively managing project resources. Most of the growth models consider two three parameters to estimate the accumulated faults in the testing process. Interest in using evolutionary computation to solve prediction and modeling problems has grown in recent years. In this paper, we explore the use of genetic programming (GP) as a tool to help in building growth models that can accurately predict the number of faults in software early on in the testing process. The proposed GP model is based on a recursive relation derived from the history of measured faults. The developed model is tested on real-time control, military, and operating system applications. The dataset was developed by John Musa of Bell Telephone Laboratories. The results of a comparison of the GP model with the traditional and simpler auto-regression model are presented