

Two Software Reliability Tools - a Demonstration

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Two software reliability modeling tools have recently become available. One of these tools is CASRE (Computer-Aided Software Reliability Estimation). CASRE is designed to address the ease of use issues that make some currently available tools difficult for the non-specialist to use. Specifically, the principal outputs of some tools are model parameter estimates, which can be difficult for non-specialists to interpret. In CASRE, the primary way in which modeling results are presented is as high-resolution plots. After one or more models have been executed, the results for each model are drawn in the same graphical display window. Users can manipulate this window's controls to display the results in a variety of ways. Statistical evaluations of the models, such as model hits and trends, may also be graphically displayed. Modeling results can also be shown in a tabular form and saved as an ASCII text file that can be imported into a statistical modeling package for further analysis. CASRE also incorporates our earlier findings that prediction accuracy may be increased by combining the results of several models in a linear fashion by allowing users to define their own combinations and record them as part of the tool's configuration. Once combination models have been defined, the steps required to execute them are no different than executing a simple model.

To simplify the operation of the tool, CASRE's command interface is menu driven. Selective enabling and disabling of menu options guides users through the selection of a set of failure data and execution of a model. Having the commands appear on pull-down

menus frees users from having to learn a new command language. The menu systems also makes it easy for users to easily navigate through the command hierarchy.

The second tool is version 5 of SMERFS (Statistical Modeling and Estimation of Reliability Functions for Software), developed at the Naval Surface Warfare Center. This version has the following enhancements to the functionality of version 4:

1. Implementation of the Jelinski-Moranda model.
2. Selection of the optimal starting point for the Schneidewind model.
3. implementation of four statistical methods for determining the applicability of models. These are prequential likelihood, bias, bias trend, anti noise. Models can be ranked with respect to one or more of these criteria.

CASRE and SMERFS use the same library of statistical modeling routines to estimate software reliability. CASRE provides a wider variety of plots than does SMERFS, and the resolution of CASRE's plots is at the pixel level rather than the character level. However, SMERFS uses more of the capabilities of the modeling libraries than does CASRE. For instance, SMERFS makes use of the calendar-time component for the Musa Basic model, which CASRE does not use. SMERFS also computes the optimal starting point for the Schneidewind model, which the current version CASRE does not do.

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