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An efficient parameter optimization of software reliability growth model by using chaotic grey wolf optimization algorithm

Dhavakumar P.^a ; Gopalan N.P.^b

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^a Department of Computer Science and Engineering, Periyar Maniammai Institute of Science and Technology, Thanjavur, Tamil Nadu, India^b Department of Computer Applications, National Institute of Technology, Trichy, India14 93rd percentile
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Abstract

Software reliability growth model (SRGM) with modified testing-effort function (TEF) is a function to evaluate and foresee the parameters of the data. Reliability of software is portrayed as the distinct possibility that for a predefined time, a software package will continue to run on an advance domain without frustration. SRGM utilized a few optimization procedure algorithms to advance the parameters by bifurcating them into a few stages however to upgrade the technique by using all of the parameters at the same time, the algorithm utilized is the chaotic grey wolf optimization algorithm (CGWO). CGWO is an advanced heuristic system for portraying the execution by achieving complex parameter optimization and designing application issues. Different parametric reliabilities rely upon the attributes or characteristics of the data. The parameters are predicted using the Pham-Zhang (PZ) model. Tandem computer software dataset DS1 and DS2 are used to compare the predicted parameter of SRGM obtained by Pham-Zhang (PZ) model using testing effort functions (TEFs) based on the evaluation metrics mean square error (MSE), relative error (RE) and coefficient of determination (R^2). To enhance the reliability of SRGM, the parameters of SRGM estimated using TEF and enhanced using chaotic maps to improve search performance. By using

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the constrained benchmark functions the results of chaotic maps are obtained. Based on the chaotic graph results, the Chebyshev graph shows a good convergence rate of 78%. Overall, 86% of the results revealed an association between the choice variable and fitness criteria for CGWO. In the SRGM using CGWO, the expected result is completely mechanized and does not require any client necessity. © 2020, Springer-Verlag GmbH Germany, part of Springer Nature.

Author keywords

Chaotic grey wolf optimization algorithm; Coefficient of determination; Mean square error; Relative error; Software reliability growth model; Testing effort functions

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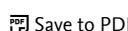
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