

A Novel Approach of NPSO on Flexible Logistic (S-Shaped) Model for Software Reliability Prediction

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Abstract : In this paper, we propose a novel approach of Neural Network and Particle Swarm Optimization methods for software reliability prediction. We first explain how to apply compound function in neural network so that we can derive a Flexible Logistic (S-shaped) Growth Curve (FLGC) model. This model mathematically represents software failure as a random process and can be used to evaluate software development status during testing. To avoid trapping in local minima, we have applied Particle Swarm Optimization method to train proposed model using failure test data sets. We drive our proposed model using computational based intelligence modeling. Thus, proposed model becomes Neuro-Particle Swarm Optimization (NPSO) model. We do test result with different inertia weight to update particle and update velocity. We obtain result based on best inertia weight compare along with Personal based oriented PSO (pPSO) help to choose local best in network neighborhood. The applicability of proposed model is demonstrated through real time test data failure set. The results obtained from experiments show that the proposed model has a fairly accurate prediction capability in software reliability.

Keywords : software reliability, flexible logistic growth curve model, software cumulative failure prediction, neural network, particle swarm optimization

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