Forecasting heartbeat delay for failure detector over Internet using neural network

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Abstract

To overcome Internet dynamic characteristics and accurately predict next heartbeat message arrival time for failure detection service, a two-layer feed forward neural network is proposed to learn nonlinear and linear characters of heartbeat messages, perform one-step-ahead prediction to estimate future heartbeat message delay. Inputs are sliding window of observations of the

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heartbeat delays, output is the one-step-ahead future value, the neural network is trained by back-propagation algorithm, its weights and basis are adjusted by approximate steepest descent rule. Simulation shows that this adaptive algorithm can accurately capture heartbeat message dynamics and make minimum prediction error with different network environments such as bottleneck link, link down and up, less and more available bandwidth, smaller and bigger heartbeat interval.

Inspec keywords: failure analysis; forecasting theory; backpropagation; feedforward neural nets; Internet
Subjects: Other computer networks; Neural computing techniques; Computer communications

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