BMC Software Inc.

Technical Disclosure Publication Document

Intelligent Job Runtime Prediction

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Overview

This document describes a solution/system/algorithm that intelligently learns the correlation of environmental factors on the expected runtime of a job-processing system.

Background

In today's multi-tiered software architectures, there is always a question about how much hardware/software is needed at each tier in order to handle expected workloads and quality of service benchmarks. Often this is a mix of art and science, past experience, and guesses. Many elements of this problem are exceedingly difficult in job-processing systems. There are an unlimited number of tasks to be performed, each with its own unique response characteristics based on a huge number of environmental factors such as CPU, memory, or network utilization. Other variables, such as inconsistent network quality and latency, can further complicate the issue.

Solution

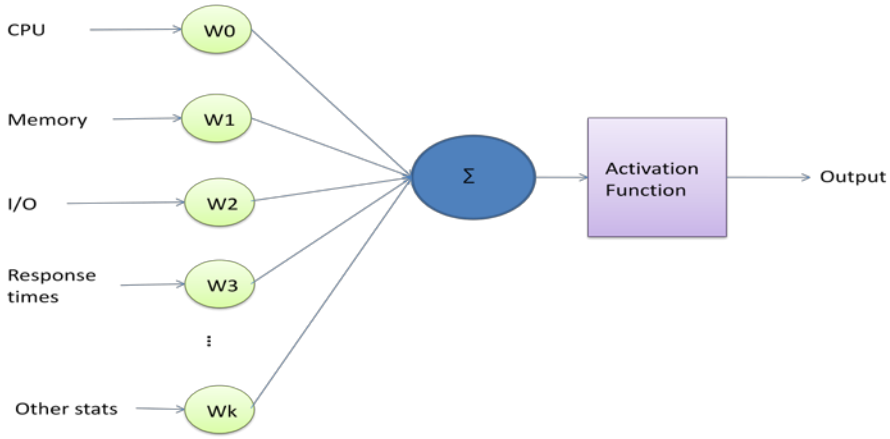
One solution to the above problem falls into the realm of control theory and is utilized by many Virtual Capacity Management solutions. Instead of using control theory to determine scalability requirements, the algorithm attempts to model the effect of various factors on the task completion time in a way that can be "trained" by the analysis of historical data to make accurate predictions for job times under different conditions and estimate required capacity environment, including dependency on third-party systems, which a job would require to execute within a given run time. By extension, other "performance characteristics" like memory footprint or the dynamic usage of a priority resource can be optimized or bounded in a similar way.

The learning algorithm will start with a default expected runtime of the job pre-programmed into the system. Then, utilizing a learning algorithm, such as a neural network with a genetic algorithm for the weights, the algorithm will attempt to factor in the various other environmental factors on a per job-item basis. This includes, but is not limited to, CPU, memory, input/output, response times, disk size, and other external

factors that may affect the final result. This information will be retained by the system such that future learned values can be validated against historical information.

Drawings

The Neuron



The Neural Network