Genetic Algorithm Based Resource Allocation for Business Processes

by

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Abstract

Genetic Algorithm Based Resource Allocation for Business Processes

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Business process simulation enables detail analysis of resource allocation strategies without actually deploying the processes. Although business process simulation has been widely researched in recent years, less attention has been devoted to automating the simulation of business processes with the help of evolutionary computation. In this research, we aim to implement a generic GA modeling framework which can be used to simulate different kinds of business processes. Specifically, optimum resource allocation scheme for the simulation can be effectively chosen by the evolution process of a genetic algorithm (GA). The proposed generic GA modeling framework is capable of automatically retrieving information regarding available resources, temporal constraints of the tasks, and process models from a given business process and can produce the best resource assignment scheme.

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GLOSSARY

Business Process. It consists of a group of logically related tasks that utilize the resources of the organization to provide defined results in support of the objectives of an organization.

Business Process Simulation. It artificially implements and assists the management of change in a variety of manufacturing and service settings.

Chromosome. A Chromosome can be applied in genetic algorithm; it is typical implemented as a string of symbols, characters, bits, etc, but it can also be sets of real numbers.

Crossover. It is a genetic operator for generating a second generation population.

Fitness Function. It is a particular type of objective function that prescribes the optimality of a solution in a genetic algorithm, so that the particular chromosome may be ranked against all the other chromosomes.

Genetic Algorithm. It is an algorithm used to find approximate solutions to difficult-to-solve problems through application of the principles of evolutionary biology to computer science.

Mutation. It is a genetic operator used to maintain genetic diversity from one generation of a population of algorithm chromosomes to the next.

Selection. It is a genetic operator that chooses a chromosome from the current generation's population for inclusion in the next generation's population.

Workflow. It is a depiction of a sequence of operations, defined as composite task that comprises both human and computational subtasks.

LIST OF ABBREVIATIONS

AMS. Archive Management System

BP. Business Process

BPS. Business Process Simulation

CPN. Color Petri-Net

GA. Genetic Algorithm

OAIS. Open Archival Information System

SOA. Serviced Oriented Architecture

WF. Workflow

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DEDICATION

I dedicate this thesis to my parents and my husband.

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