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Paralleling Simulation of Operations Plan Based on Decision Point Controlling

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Abstract

Operational Plan Paralleling Simulation Based on Decision Point Controlling (P2SDPC) can realize the operational plan's dynamic adjusting and cutting impossible branch based on decision point controlling technology. From then on, we can improve the efficiency of operational plan's simulation by the way of paralleling simulation. Thus we can overcome the problem of the simulation's higher complex and lower efficiency cause of multi-factor combination explosion. This provide a road to commander's decision efficiently based on computer aid.

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Keyword: Decision point, operational plan, multi-branches

1. Introduction

The operational plan made by staff often is a multi-branches plan in the modern battle environment. On one hand, this is caused by the uncertainty of the battle field; on the other hand, there are indeed many possibly operation for the same goal. Once the operational plans had been made, commander will be attention at the plan's feasibility, which plan will be happened mostly and which efficiency is best. Operation

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simulation and evaluation is a proper meaning to testify the operational plan, and provide commander facility to making decision rapidly.

Multi-branches operational plan has a trend to increase explosively because of the commander's decision temporary and the affection of occasion. Such characters of operational plan have risen up the hard and the expend of time of the plan's evaluation. Traditionally operational plan's simulation methods, such as CPR(Core Plan Representation)^[1,2], SPAR(Shared Planning and Activity Representation)^[3,4], sysML^[5] and so on, almost based on static and supposition beforehand, have some characters like the simulated entities coupled closely with computing resource, can't adjust with dynamic situation, usually simulating as a series mode^[6]. In fact, these methods essentially divide an operational plan into several different static plans, then simulate one by one serially. This meaning of simulation has poor efficiency, can't compare multi-branches simulation result real-time, so can't fulfill the need of quickly decision aid with closing real dynamic operation.

2. Operational plan paralleling simulation based on decision point controlling (P2SDPC)

Cause of the operational plan's dynamically, we provide a method of decision point control to constraint the amount of possibly branches, that's meaning the route simulated decreased. According to the operational plan's multi-branches, we use parallel simulation technology to realize simulate multi-route once at a time. It can be proved by experiment that P2SDPC can improve the plan simulation's hard and efficiency greatly from the same situation. Hence, P2SDPC provide a road for commander to making decision aiding by computer. The detail as follows:

As shown as figure 1, operational plan's description module based on operational plan's serial of time and the relationship of cause and effect, use the searching method of deep priority, realize the description of multi-branches operational plan. Its output enters into the decision simulation control module. decision simulation control module use simulation scene duplicate and paralleling simulation to realize dynamically multi-branches operational plan's exercise. Its output enters into dynamically multi-branches paralleling simulation thread pool. Thread pool transfers model compute service and simulation compute resource through resource control module to realize paralleling simulation. Its output enters into the simulation result's contrast module. The simulation result contrast module makes sure which plan is the best based on the compare of simulation result.

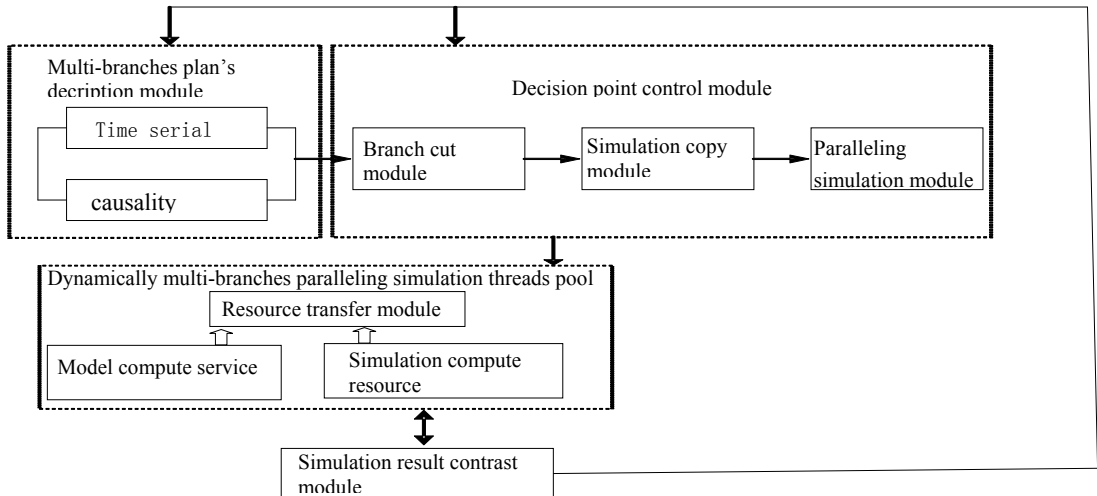


Fig. 1 Operational Plan Paralleling Simulation Based on Decision Point Controlling (P2SDPC)

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