

SIMULATION DEVELOPMENT ENVIRONMENT USING SIMULATION SNAPSHOT MANAGER

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ABSTRACT

Modeling and simulation solve problems by developing simulator that expresses the target system in the real world with computer code. However, as the problem to be solved becomes more complex, it takes much time to develop a simulation model and software. Therefore, we propose a development methodology and environment that can efficiently implement simulator by reusing the verified model and implementing a new one. The proposed method saves the simulation model verified in the simulation development and operation process and reuses it in the new simulation model development process and execution process.

1 INTRODUCTION

From academic research to actual product development, modeling and simulation technology are used in various ways throughout the product development and research process. For example, during the problem-solving process, a simulationist may develop simulator by modeling a real-world system and implementing it into computer code(Zeigler et al 2000). However, as the process and problematic situation become more complex, creating the simulation model and software takes more time. Therefore, we propose a development methodology and development environment that can efficiently implement simulator by reusing the verified model to implement a new simulation model.

Accordingly, various cases exist as research to quickly develop simulation models. For example, a simulationist may modulate the event sequence of a simulation model to reuse an existing simulation model (Kwon et al 2017), and a collaborative modeling method has been proposed to develop a new model quickly(Sung et al 2012).

This research proposes a simulation environment that enables the rapid implementation of new models by reusing verified models and leveraging them to implement the simulator rapidly. The proposed environment saves verified simulation models during a simulation run. The environment generates a snapshot of the simulation model instance and stores it in the database during the simulation run. Once a verified simulation is stored in the database, a simulator developer may restore the snapshot into the computer memory to test a new simulation model or conduct experiments.

2 PROPOSED SYSTEM

A simulationist develops a simulation model or simulator to conduct experiments to achieve simulation objectives. However, various kinds of errors may occur during the development process of the simulation model. As a result, the simulationist may repeatedly execute simulations to reproduce the problematic

behavior to fix the errors. The proposed environment saves and restores a simulation model without a specific data marshaling process. The proposed simulation environment implements the Snapshot manager

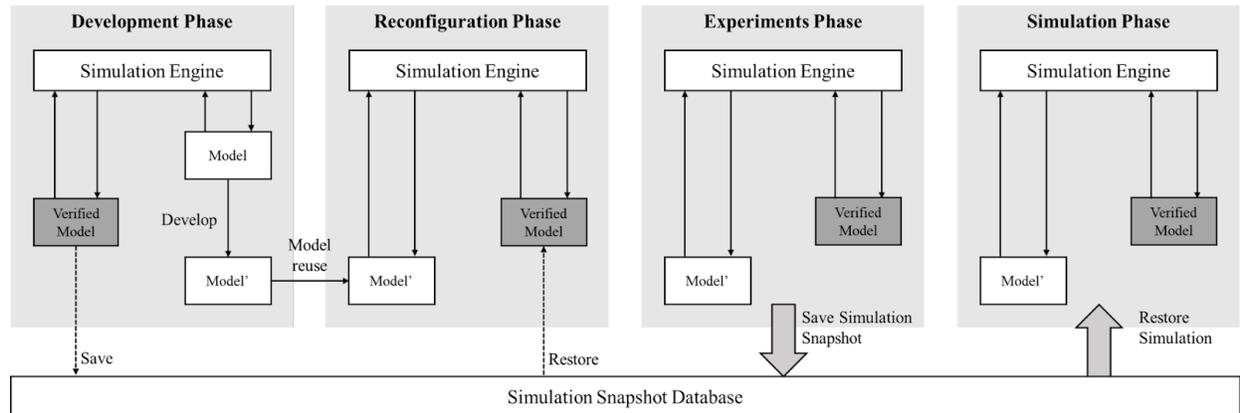


Figure 1 Simulation development process using simulation save and restore.

based on the eventsim (Choi, 2022). a discrete event system formalism-based simulation engine to store/restores a simulation model in the computer memory. Figure 1 shows the simulation development process using Snapshot manager.

Also, the Snapshot manager may store/restore not only individual simulation models but also simulation engine instances so that the simulationist may store/restore simulation runs. Model modulation is a feature of the proposed environment that differentiates it from other simulation environments. The researchers may change the values of the model instance in the computer memory when a simulationist restores a snapshot of a simulation model or engine. As a result, the simulationist may restore a verified simulation model and reuse it to test a newly developed model or conduct experiments.

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