

ABSTRACT

An Approach for Ontology Instrumented Reconfigurable Simulation. (May 1995)

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This dissertation describes an approach for the autogeneration of simulation models from descriptions of the domain given by experts. There has been a great deal of work which addresses the gap between real world situations and their subsequent simulation model idealizations. The focus of most of these previous efforts has been on the interface between the agents who are responsible for the descriptions, and the model definition in a structured simulation modeling environment. Our contribution attempts to close this description to model gap, and provide a simple, robust, yet highly reusable architecture for simulation model development directly from user descriptions. The generated model designs rely on a very simple structure supportable within virtually all discrete event simulation engines, making the proposed strategy supportable with existing commercial simulation packages. The user simply provides state transition descriptions of the various objects which are recognized in the situation under study.

Application prototypes utilizing the ODRS engine (Ontology Driven Reconfigurable Simulation) have been constructed which ride on the WITNESS simulation engine. Once the appropriate domain ontology has been captured, and the goal of the modeling effort identified, these descriptions are used to design a control strategy that directs entity flow through a generic model which essentially reconfigures itself to mimic the real world process. The architecture is based upon the implicit description of the real world process embedded within the input ontology. This effort provides a major step toward the automation of model design from descriptions made by the domain experts.