SEMANTIC CORRELATION OF BEHAVIOR FOR THE INTEROPERABILITY OF HETEROGENEOUS SIMULATIONS

by

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ABSTRACT

A desirable goal of military simulation training is to provide large scale or joint exercises to train personnel at higher echelons. To help meet this goal, many of the lower echelon combatants must consist of computer generated forces with some of these echelons composed of units from different simulations. The object of the research described is to correlate the behaviors of entities in different simulations so that they can interoperate with one another to support simulation training. Specific source behaviors can be translated to a form in terms of general behaviors which can then be correlated to any desired specific destination simulation behavior without prior knowledge of the pairing. The correlation, however, does not result in 100% effectiveness because most simulations have different semantics and were designed for different training needs. An ontology of general behaviors and behavior parameters, a database of source behaviors written in terms of these general behaviors, and heuristic metrics are used to compare source behaviors with a database of destination behaviors.

This comparison is based upon the similarity of sub-behaviors and the behavior parameters. Source behaviors/parameters may be deemed similar based upon their sub-behaviors or sub-parameters and their relationship (more specific or more general) to destination behaviors/parameters. As an additional constraint for correlation, a conversion path from all required destination parameters to a source parameter must be found in order for the behavior to be correlated and thus executed. The length of this

conversion path often determines the similarity for behavior parameters, both source and destination.

This research has shown, through a set of experiments, that heuristic metrics, in conjunction with a corresponding behavior and parameter ontology, are sufficient for the correlation of heterogeneous simulation behavior. These metrics successfully correlated known pairings provided by experts and provided reasonable correlations for behaviors that have no corresponding destination behavior. For different simulations, these metrics serve as a foundation for more complex methods of behavior correlation.

TABLE OF CONTENTS