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V-LAB® - A DISTRIBUTED INTELLIGENT DISCRETE-EVENT ENVIRONMENT FOR AUTONOMOUS AGENTS SIMULATION

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ABSTRACT—This paper presents a fusion between discrete-event systems specification (DEVS) and intelligent tools from soft computing. DEVS provides a robust and generic environment for modeling and simulation applications employing single workstation, distributed, and real-time platforms. Soft computing is a consortium of tools for natural intelligence stemming from approximate reasoning (fuzzy logic), learning (neural network or stochastic learning automaton), optimization (genetic algorithms and genetic programming), etc. The outcome of this fusion is what is called "Intelligent DEVS," called IDEVS here. IDEVS is an element of a virtual laboratory, called V-Lab®, which is based on distributed multi-physics, multi-dynamic modeling techniques for multiple platforms. This paper will introduce IDEVS and V-Lab® and a theme example for a multi-agent simulation of a number of robotic agents with a slew of dynamic models and multiple computer work stations.

Key Words: Soft computing, fuzzy logic, neural networks, genetic algorithms, virtual laboratory, discrete-event simulation, SLA, multi-agent systems, V-Lab®, DEVS, IDEVS, rovers