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Designing an Integrated Environment for Artificial Intelligence

Andrew B. Ritger

Illinois Wesleyan University

Lionel R. Shapiro, Faculty Advisor

Illinois Wesleyan University

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Oral Presentation 1.2

DESIGNING AN INTEGRATED ENVIRONMENT FOR
ARTIFICIAL INTELLIGENCE

Andrew B. Ritger and Lionel R. Shapiro

Department of Computer Science and Mathematics, Illinois Wesleyan University

The Shelley Research Group (part of the Illinois Wesleyan Intelligence Network on Knowledge - IWINK) has been in existence for several years, and has benefited immensely from various student contributors who have added such components as robotic arm control, cross platform networking, an artificially intelligent tic-tac-toe player, and an interactive teaching tool demonstrating the functionality of artificial neural networks. What is lacking, however, amidst these undergraduate contributions to the Shelley project, is an effective means of integrating existing components into a single cohesive functional unit, let alone any easy means of making further contributions within a simple unified context.

The focus of this research has been to design an all-encompassing structure for incorporating the different components of Shelley (both existing and future). Because we must operate under the assumption that we cannot predict what future contributions will be made to Shelley, nor how these components will be used, this integrated environment must be both flexible and expandable in such a way as to not confine future projects.

The pursuit of artificial intelligence relies heavily upon interaction with the surrounding environment. For this reason, many of the existing components are devices for receiving input from Shelley's surroundings (such as vision cameras) or acting upon the surroundings (such as robotic arms). Thus, we can assume that future contributions will fall under two primary categories: additional devices (either cognitive modules, such as neural networks, or interactive devices, such as cameras or arms), or intelligence agents (such as tic-tac-toe players, or navigation systems) which will use these devices. The environment must then be flexible in two manners -- allowing for the addition of further devices, and a task management mechanism for accessing these devices. The solution is to use a modern operating system model where the devices which Shelley uses to interact with her environment correspond to computer hardware devices and their drivers, the intelligence agents are analogous to processes which run on the system and use the devices, and the task manager which coordinates these agents and their usage of devices can be compared to the modern kernel.