Abstract
The areas of artificial life, artificial intelligence, and robotics are progressive fields with nearly limitless possibilities. The dLife software package is a Java library developed by Professor Grant Braught of Dickinson College aimed specifically at these three fields. dLife includes extensive packages for key components such as neural networks, genetic algorithms, basic computer vision and robot control. The packages for robot control, however, have been limited to working with physical robots. At times working with physical robots can be impractical (e.g. too time consuming / cost prohibitive). To address these situations I have developed additional packages in dLife that create a bridge between its resources, and those of Player/Stage (an open source robotics platform used for simulations). These additional packages produce a near seamless integration between the physical robots that dLife already supports (the Pioneer, Hemisson, and Khepera III robots), and simulated versions in Player/Stage.

dLife Model with Player/Stage

Physical vs. Simulated Environments

API Consistency
Care has been taken to ensure that there is no change in API between interacting with a simulated robot in Player/Stage and its physical equivalent. Thus, any user program interacting with a simulated robot via dLife can also interact with the corresponding physical robot. When interacting with any robot, the user will be interacting with the Controller and Robot classes. The user will communicate with the robot by making calls to its appropriate Sensor and Effector classes.

Integration Significance
The addition of this Player/Stage interface makes dLife an ideal platform for conducting multiple Player/Stage simulations in parallel. The availability of parallel simulations makes it practical to study the use simulated evolution for the design of controllers for the physical robots. Such simulations may also provide a viable means for testing theories and hypothesis about biological evolution.

Sources

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