

Intelligent Adaptive Learning in a Changing Environment

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Abstract : Nowadays the trend to develop ever more intelligent and autonomous systems often takes its inspiration in the living beings on Earth. Some simple isolated systems are able, once brought together, to form a strong and reliable system. When trying to adapt the idea to man-made systems it is not possible to include in their program everything the system may encounter during its life cycle. It is, thus, necessary to make the system able to take decisions based on other criteria such as its past experience, i.e. to make the system learn on its own. However, at some point the acquired knowledge depends also on environment. So the question is: if system environment is modified, how could the system respond to it quickly and appropriately enough? Here, starting from reinforcement learning to rate its decisions, and using adaptive learning algorithms for gain and loss reward, the system is made able to respond to changing environment and to adapt its knowledge as time passes. Application is made to a robot finding an exit in a labyrinth.

Keywords : reinforcement learning, neural network, autonomous systems, adaptive learning, changing environment

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