Book Summary

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This excellent book on recently developed deep Reinforcement Learning methods consists of 25 chapters and covers both fundamentals of Reinforcement Learning and new topics such as chatbots training with reinforcement learning, trust region policy methods and AlphaGo Zero methods.

The book first summarises the main ideas behind Markov decision processes, the cross-entropy method and the Bellman equation of optimality. Next, it goes at the level of deep Q-networks, including their extensions such as duelling and categorical deep Q-networks. The actor-critic methods have been given special attention. Trust region policy optimisation and proximal policy optimisation (PPO) are also considered in detail, with many examples.

The book is a very useful and practical guide towards understanding and hands on experience of the Reinforcement Learning domain. The book also gives knowledge on deep learning with Pytorch—starting gradually with tensors, gradients, and neural network building blocks with different loss functions, and then moving to numerous examples with diff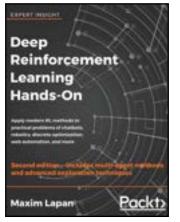erent Reinforcement Learning methods. The book is accompanied by a Github link with the related Python code[1] which stimulates reproducible research.

The presented methods are aimed at generating control strategies and have a broad range of applicability—in robotics (for path planning) and in intelligent transport systems, including for autonomous vehicles

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"...the new architecture, called imagination-augmented agent (I2A), is to allow the agent to imagine future trajectories using the current observations..."

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and others. The Reinforcement Learning control algorithms presented in this book can be implemented with different types of sensor data and can leverage advancements in multi-sensor data fusion.

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[1] https://github.com/PacktPublishing/Deep-Reinforcement-Learning-Hands-On?tab=readme-ov-file

The digital versions of each of the published volumes are available at https://isif.org/publication/perspectives/issues.