

1. Record Nr.	UNINA9910624394103321
Autore	Lorenz Uwe
Titolo	Reinforcement learning from scratch : understanding current approaches - with examples in Java and Greenfoot // Uwe Lorenz
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	9783031090301 9783031090295
Descrizione fisica	1 online resource (195 pages)
Disciplina	005.133
Soggetti	Java (Computer program language) Reinforcement learning Java (Llenguatge de programació) Aprenentatge per reforç (Intel·ligència artificial) Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Preface -- Introduction -- Contents -- 1: Reinforcement Learning as a Subfield of Machine Learning -- 1.1 Machine Learning as Automated Processing of Feedback from the Environment -- 1.2 Machine Learning -- 1.3 Reinforcement Learning with Java -- Bibliography -- 2: Basic Concepts of Reinforcement Learning -- 2.1 Agents -- 2.2 The Policy of the Agent -- 2.3 Evaluation of States and Actions (Q-Function, Bellman Equation) -- Bibliography -- 3: Optimal Decision-Making in a Known Environment -- 3.1 Value Iteration -- 3.1.1 Target-Oriented Condition Assessment ("Backward Induction") -- 3.1.2 Policy-Based State Valuation (Reward Prediction) -- 3.2 Iterative Policy Search -- 3.2.1 Direct Policy Improvement -- 3.2.2 Mutual Improvement of Policy and Value Function -- 3.3 Optimal Policy in a Board Game Scenario -- 3.4 Summary -- Bibliography -- 4: Decision-Making and Learning in an Unknown Environment -- 4.1 Exploration vs. Exploitation -- 4.2 Retroactive Processing of Experience ("Model-Free Reinforcement Learning") -- 4.2.1 Goal-Oriented Learning ("Value-Based") -- Subsequent

evaluation of complete episodes ("Monte Carlo" Method) -- Immediate Valuation Using the Temporal Difference (Q- and SARSA Algorithm) -- Consideration of the Action History (Eligibility Traces) -- 4.2.2 Policy Search -- Monte Carlo Tactics Search -- Evolutionary Strategies -- Monte Carlo Policy Gradient (REINFORCE) -- 4.2.3 Combined Methods (Actor-Critic) -- "Actor-Critic" Policy Gradients -- Technical Improvements to the Actor-Critic Architecture -- Feature Vectors and Partially Observable Environments -- 4.3 Exploration with Predictive Simulations ("Model-Based Reinforcement Learning") -- 4.3.1 Dyna-Q -- 4.3.2 Monte Carlo Rollout -- 4.3.3 Artificial Curiosity -- 4.3.4 Monte Carlo Tree Search (MCTS) -- 4.3.5 Remarks on the Concept of Intelligence.

4.4 Systematics of the Learning Methods -- Bibliography -- 5: Artificial Neural Networks as Estimators for State Values and the Action Selection -- 5.1 Artificial Neural Networks -- 5.1.1 Pattern Recognition with the Perceptron -- 5.1.2 The Adaptability of Artificial Neural Networks -- 5.1.3 Backpropagation Learning -- 5.1.4 Regression with Multilayer Perceptrons -- 5.2 State Evaluation with Generalizing Approximations -- 5.3 Neural Estimators for Action Selection -- 5.3.1 Policy Gradient with Neural Networks -- 5.3.2 Proximal Policy Optimization -- 5.3.3 Evolutionary Strategy with a Neural Policy -- Bibliography -- 6: Guiding Ideas in Artificial Intelligence over Time -- 6.1 Changing Guiding Ideas -- 6.2 On the Relationship Between Humans and Artificial Intelligence -- Bibliography.
