



From Bandits to Monte-Carlo Tree Search: The Optimistic Principle Applied to Optimization and Planning

By Rémi Munos

now publishers Inc. Paperback. Book Condition: New. Paperback. 146 pages. Dimensions: 9.1in. x 6.1in. x 0.6in. From Bandits to Monte-Carlo Tree Search: The Optimistic Principle Applied to Optimization and Planning covers several aspects of the optimism in the face of uncertainty principle for large scale optimization problems under finite numerical budget. The monographs initial motivation came from the empirical success of the so-called Monte-Carlo Tree Search method popularized in Computer Go and further extended to many other games as well as optimization and planning problems. It lays out the theoretical foundations of the field by characterizing the complexity of the optimization problems and designing efficient algorithms with performance guarantees. The main direction followed in this monograph consists in decomposing a complex decision making problem (such as an optimization problem in a large search space) into a sequence of elementary decisions, where each decision of the sequence is solved using a stochastic multi-armed bandit (mathematical model for decision making in stochastic environments). This defines a hierarchical search which possesses the nice feature of starting the exploration by a quasi-uniform sampling of the space and then focusing, at different scales, on the most promising areas (using the optimistic principle) until eventually performing a...



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