Optimizing Discrete Spaces via Expensive Evaluations: A Learning to Search Framework

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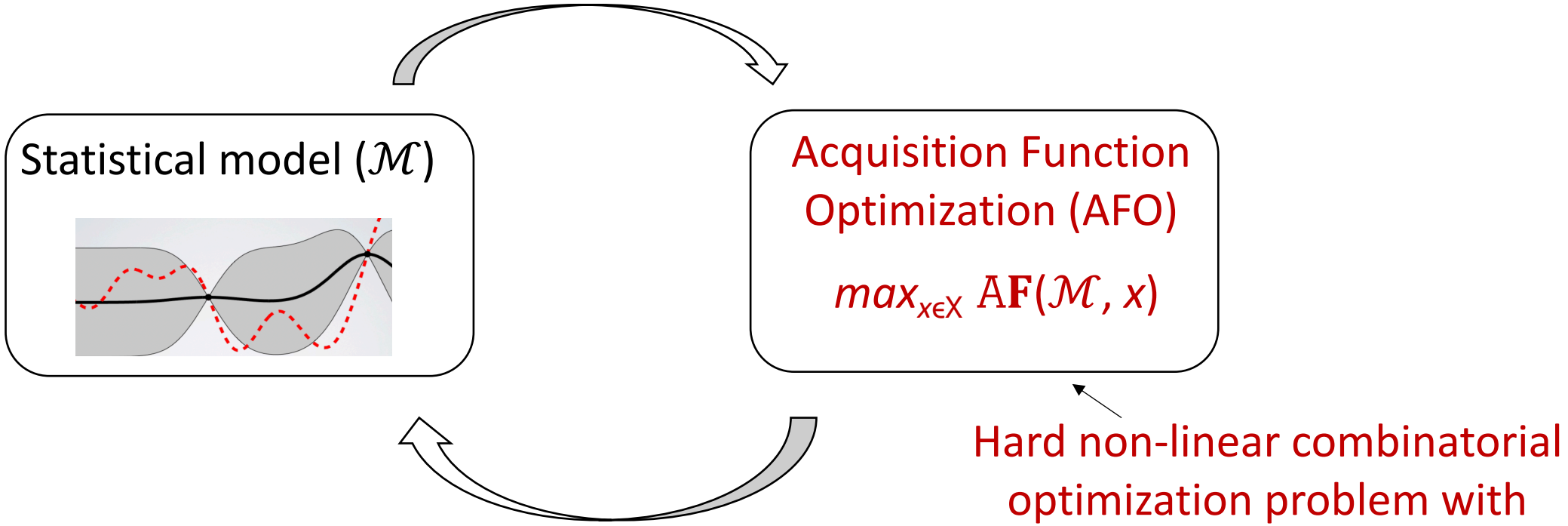
Problem Setup and Key Challenge

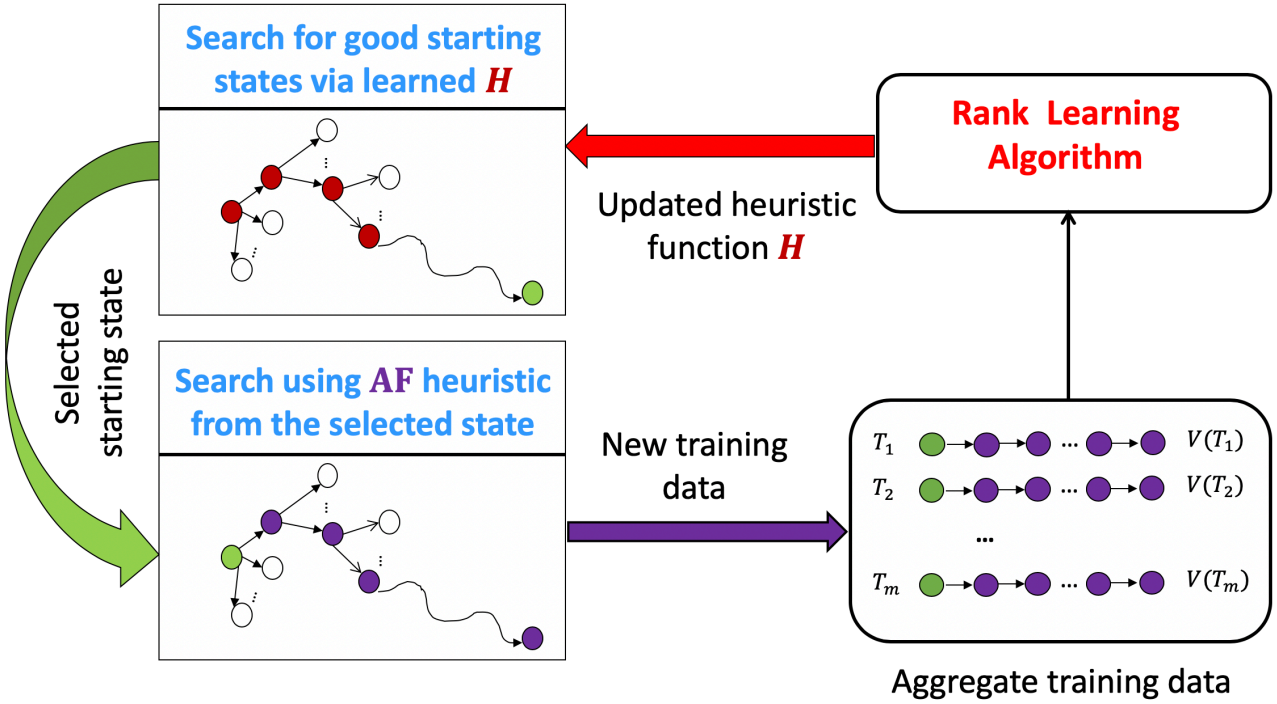
- **Problem**: Optimize discrete spaces (e.g., sets, sequences, graphs) via expensive black-box function evaluations
  - Multi-core chip design via simulations; Materials design via physical lab experiments
- **Bayesian Optimization (BO) Framework**



L2S-DISCO: A Learning to Search Framework

❑ **Key Idea:** Integrate combinatorial search with machine learning methods to solve AFO problems

Repeatedly execute the following two steps
Step 1: Execute search strategy $\mathcal{A}$ guided by current search control knowledge $\mathcal{H}$ to uncover promising structures
Step 2: Update the parameters of $\mathcal{H}$ using the online training data generated from the past search experience



Local Search instantiation of L2S-DISCO