Preventing the Drought of Lakes by Using Deep Reinforcement Learning in France

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Abstract : Drought and decrease in the level of lakes in recent years due to global warming and excessive use of water resources feeding lakes are of great importance, and this research has provided a structure to investigate this issue. First, the information required for simulating lake drought is provided with strong references and necessary assumptions. Entity-Component-System (ECS) structure has been used for simulation, which can consider assumptions flexibly in simulation. Three major users (i.e., Industry, agriculture, and Domestic users) consume water from groundwater and surface water (i.e., streams, rivers and lakes). Lake Mead has been considered for simulation, and the information necessary to investigate its drought has also been provided. The results are presented in the form of a scenario-based design and optimal strategy selection. For optimal strategy selection, a deep reinforcement algorithm is developed to select the best set of strategies among all possible projects. These results can provide a better view of how to plan to prevent lake drought.

Keywords : drought simulation, Mead lake, entity component system programming, deep reinforcement learning

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