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强化学习在基于多主体模型决策支持系统中的应用 ——以湖泊水环境决策支持系统为例

倪建军[1], 刘明华[1], 任黎[2], 张传标[1]

1. 河海大学 计算机与信息学院(常州), 常州 213022;
2. 河海大学 水文水资源学院, 南京 210098

Reinforcement learning for DSS based on multi-agent model: A case of lake water environment DSS

NI Jian-jun[1], LIU Ming-hua[1], REN Li[2], ZHANG Chuan-biao[1]

1. College of Computer and Information, Hohai University, Changzhou 213022, China;
2. College of Hydrology and Water Resources, Hohai University, Nanjing 210098, China

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摘要 利用研究复杂系统和多主体(multi-agent)建模的相关知识与方法, 将湖泊水环境中的各种实体, 如政府、排污企业以及各种水生生物等抽象为具有一定智能的主体, 建立湖泊水环境智能决策支持系统. 并将强化学习方法应用到智能决策支持系统中, 实现湖泊水污染的智能预测与预警. 最后, 以太湖流域为应用背景, 进行了初步的仿真实验, 实验结果验证了该方法的有效性.

关键词: 强化学习   决策支持系统   多主体建模   水污染治理

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Abstract: The lake water environmental problem has been more and more serious. It is a very important subject to find a more effective way of water pollution control. In this paper, the lake water environment decision support system (DSS) is set up, using the knowledge and methods of complex system and multi-agent modeling. The various entities in the lake water environment (such as government, polluting enterprise and a lot of aquatic organisms) are abstracted as the agents, which have some certain intelligence. A method based on reinforcement learning is proposed to achieve the intelligent prediction and warning of the lake water pollution. At last, a preliminary simulation experiment is conducted on the application of Taihu Lake basin. The experiment results show that the proposed method is effective.

Key words: reinforcement learning   decision support system   multi-agent modeling   water pollution control

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[1]   刘永, 郭怀成, 范英英, 等. 湖泊生态系统动力学模型研究进展[J]. 应用生态学报, 2005, 16(6): 1169-1175.Liu Y, Guo H C, Fan Y Y, et al. Research advance on lake ecosystem dynamic models[J]. Chinese Journal of Applied Ecology, 2005, 16(6): 1169-1175.

[2]   Ni J J, Zhang C B, Ren L. An intelligent decision support system of lake water pollution control based on multi-agent model[C]// Proceeding of International Conference on Computational Intelligence and Security, New Jersey: IEEE Computer Society, 2009: 2221.

[3]   毛国柱, 刘永, 郭怀成, 等. 湖泊富营养化控制技术综合集成方法框架[J]. 环境工程, 2006, 24(1): 65-67.Mao G Z, Liu Y, Guo H C, et al. Comprehensive integration of lake eutrophication control technique[J]. Environmental Engineering, 2006, 24(1): 65-67.

[4]   Sasikumar K, Mujumdar P P. Fuzzy optimization model for water quality management of a river system[J]. Journal of Water Resour Planning and Management, 1998, 124(2): 79-88.

[5]   程春田, 欧春平. 流域防洪决策支持系统集成管理[J]. 大连理工大学学报, 2001, 41(1): 108-111.Cheng C T, Ou C P. Integrated managemen decision-support system for flood control of river basin[J]. Journal of Dalian University of Technology, 2001, 41(1): 108-111.

[6]   Huang G H, Sun W, Nie X H, et al. Development of a decision-support system for rural eco-environmental management in Yongxin County, Jiangxi Province, China[J]. Environmental Modelling & Software, 2010, 25(1): 24-42.

[7]   王慧敏, 佟金萍, 马小平, 等. 基于CAS范式的流域水资源配置与管理及建模仿真[J]. 系统工程理论与实践, 2005, 25(12): 119-137.Wang H M, Te J P, Ma X P, et al. Complex adaptive system (CAS)-based allocation and management of river basin water resource[J]. Systems Engineering -- Theory & Practice, 2005, 25(12): 119-137.

[8]   Tian J, Wang Y L, Li H Z, et al. DSS development and applications in China[J]. Decision Support Systems, 2007, 42(4): 2060-207

[9]   倪建军, 徐立中, 王建颖. 基于CAS理论的多Agent建模仿真方法研究进展[J]. 计算机工程与科学, 2006, 28(5): 83-86.Ni J J, Xu L Z, Wang J Y. Advances in multi-agent modeling and simulation based on the CAS theory[J]. Computer Engineering & Science, 2006, 28(5): 83-

[10]   Monticino M, Acevedo M, Callicott B, et al. Coupled human and natural systems: A multi-agent-based approach[J]. Environmenta Modelling & Software, 2007, 22(5): 656-663.

[11]   廖守亿, 戴金海. 复杂适应系统及基于Agent的建模与仿真方法[J]. 系统仿真学报, 2004, 16(1): 113-117.Liao S Y, Dai J H. Study on complex adaptive system and agent-based modeling & simulation[J]. Journal of System Simulation, 2004, 16(1): 113-117.

[12]   陈宗海, 杨志华, 王海波, 等. 从知识的表达和运用综述强化学习研究[J]. 控制与决策, 2008, 23(9): 962-975.Chen Z H, Yang Z H, Wang H B, al. Overview of reinforcement learning from knowledge expression and handling[J]. Control and Decision, 2008, 23(9): 962-975.

[13]   高阳, 陈世福, 陆鑫. 强化学习研究综述[J]. 自动化学报, 2004, 30(1): 86-100.Gao Y, Chen S F, Lu X. Research on reinforcement learning technology: A review[J]. Acta Automatica Sinica, 2004, 30(1): 86-100.

[14]   王涛, 陈海, 白红英, 等. 基于Agent建模的农户土地利用行为模拟研究——以陕西省米脂县孟岔村为例[J]. 自然资源学报, 2009, 24(12): 2056- 2066.Wang T, Chen H, Bai H Y, et al. Agent-based modeling of simulation on households land-use behavior -- A case of Mengcha village of Mizhi County in Shaanxi province[J]. Journal of Natural Resources, 2009, 24(12): 2056-2066.

[1]   王 煜;陈学广;洪 流;陈 琛. 基于MDA的GBDSS决策服务组合平台模型与运作机制[J]. 系统工程理论实践, 2010, 30(7): 1312-1319.

[2]   洪文兴;翁洋;朱顺痣;李茂青. 垂直电子商务网站的混合型推荐系统[J]. 系统工程理论实践, 2010, 30(5): 928-935.

[3]   赵晗萍;蒋家东;冯允成. 基于GA-RL的进化博弈求解主从博弈结构的供应链协调问题[J]. 系统工程理论实践, 2010, 30(4): 667-672.

[4]   刘伟兵;王先甲. 进化博弈中多代理人强化学习模型[J]. 系统工程理论实践, 2009, 29(3): 28-33.

[5]   周复之. 固定收益决策支持系统机理建模与数据挖掘的协同研究[J]. 系统工程理论实践, 2009, 29(12): 38-45.

[6]   谭俊峰;张朋柱;黄丽宁. 综合集成研讨厅中的研讨信息组织模型[J]. 系统工程理论实践, 2005, 25(1): 86-92.

[7]   杨敏;邱菀华. MG模型模拟我国金融市场格式化特征的研究[J]. 系统工程理论实践, 2004, 24(7): 15-23.

[8]   张杰;郭晶;蒋晓原;范洪达. 基于OOS的国防通信网多模型决策支持系统研究[J]. 系统工程理论实践, 2004, 24(7): 82-87.

       :   .   :   [J].   . 2004. 24(4): 1-10.