Using Reinforcement Learning to Guide Game Rule Design

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To make sure that a game is interesting, easy to play and balanced, game developers need to test it thoroughly and adjust its rules. This is challenging for individual developers due to the lack of human testers. With the recent development of machine learning technologies, computers can learn to play games by itself. I suggest training the computer to play games so that we can find problems in game rules by observing the computer's strategy. In this work, I used Q-learning algorithm with experience replay to train my program to play a variant of the Snake game. By observing the computer's strategy, I found two problems in the game design. Besides, I also summarized several guidelines on how to train a computer, including adjusting parameters and pre-training. My research can help game developers to test their games and the guidelines can be applied to AI players designing as well.

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