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# Fine-Tuning Parameters for Emergent Environments in Games Using Artificial Intelligence

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## Abstract

This paper presents the design, development, and test results of a tool for adjusting properties of emergent environment maps automatically according to a given scenario. Adjusting properties for a scenario allows a specific scene to take place while still enables players to meddle with emergent maps. The tool uses genetic algorithm and steepest ascent hill-climbing to learn and adjust map properties.Using the proposed tool, the need for time-consuming and labor-intensive parameter adjustments when setting up scenarios in emergent environment maps is greatly reduced. The tool works by converting the paths of events created by users (i.e., the spreading of fire and the flow of water) for a map to the properties of the map that plays out the scenario set by the given paths of events. Vital event points are preserved while event points outside the given scenario are minimized. Test results show that the tool preserves more than 70 percent of vital event points and reduces event points outside given scenarios to less than 3 percent.

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