Using Multi-Arm Bandits to Optimize Game Play Metrics and Effective Game Design

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Abstract : Game designers have the challenging task of building games that engage players to spend their time and money on the game. There are an infinite number of game variations and design choices, and it is hard to systematically determine game design choices that will have positive experiences for players. In this work, we demonstrate how multi-arm bandits can be used to automatically explore game design variations to achieve improved player metrics. The advantage of multi-arm bandits is that they allow for continuous experimentation and variation, intrinsically converge to the best solution, and require no special infrastructure to use beyond allowing minor game variations to be deployed to users for evaluation. A user study confirms that applying multi-arm bandits was successful in determining the preferred game variation with highest play time metrics and can be a useful technique in a game designer's toolkit.

Keywords : game design, multi-arm bandit, design exploration and data mining, player metric optimization and analytics
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