2018年度研究推進プログラム（科研費獲得推進型）研究成果報告書

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研究課題
観戦者体験向上のためのプロシージャル・プレイ・ジェネレーション強化

I. 2018年度研究推進プログラム（科研費獲得推進型）研究実施計画について

申請時に計画された研究計画を簡潔に記載してください。
以下の論文で発表する予定の内容を発展させていく予定。

[1] Makoto Ishihara, Suguru Ito, Ryota Ishii, Tomohiro Harada and Ruck Thawonmas, "Monte-Carlo Tree Search for Implementation of Dynamic Difficulty Adjustment Fighting Game Al's Having Believable Behaviors," The 2018 IEEE Conference on Computational Intelligence and Games (CIG 2018), 14-17 August 2018, Maastricht (The Netherlands) (accepted for presentation, h-5 index = 21)

[2] Ryota Ishii, Suguru Ito, Makoto Ishihara, Tomohiro Harada and Ruck Thawonmas, "Monte-Carlo Tree Search Implementation of Fighting Game Al's Having Personas," The 2018 IEEE Conference on Computational Intelligence and Games (CIG 2018), 14-17 August 2018, Maastricht (The Netherlands) (accepted for presentation, h-5 index = 21)

II. 研究成果の概要

I.に基づき、平成30年度科学研究費助成事業―科研費―申請に向けて実施した研究活動や調査内容、その成果について記載してください。
計画通りに前記の各論文での研究成果を発展させ、その研究成果を下記の発表予定の国際会議（ゲームに関するトップ国際会議）の論文にまとめた。


In this paper, we propose a fighting game AI that selects its actions from the perspective of highlight generation using Monte-Carlo tree search (MCTS) with three highlight cues in the evaluation function. The proposed AI is targeted for being used to generate gameplay in live streaming platforms such as Twitch and YouTube where a large number of spectators watch gameplay to entertain themselves. Our results in a user study conducted using FightingICE, a fighting game platform used in an international game AI competition since 2013, show that gameplay generated by the proposed AI is more entertaining than that by a typical MCTS AI. Detailed analyses of gameplay from all the methods assessed in the user study are also given in the paper.


Abstract—This paper proposes a motion gaming AI that encourages players to use their body parts in a well-balanced manner while promoting their enjoyment. The proposed AI uses time series forecasting to predict what actions its opponent human player will perform with respect to a candidate action of the AI, from which result it estimates the amount of movement (momentum) to be produced on each part of the body of the human player against its action. The AI finally selects an action with the goal of making the momentum of body parts on each side of the player body equal. In this AI, a Monte Carlo Tree Search (MCTS) is employed for candidate action selection and is embedded with a dynamic difficulty adjustment (DDA) mechanism for enhancing enjoyment of the game. Our results offer a contingent evidence that an opponent gaming AI can be used to effectively improve the human player’s balance, enjoyment, engrossment, personal gratification while playing the game.