CALL FOR PAPERS

Physics-Based Simulation Games

IEEE Transactions on Computational Intelligence and AI in Games (TCIAIG)
Special issue: Physics Simulation Games
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Physics simulation games such as Angry Birds, Cut the Rope, Gears, or Feed Me Oil have become increasingly popular in recent years with the wide availability of touchscreen devices. These games are based on a physics simulator that has complete information about all the physical properties of all game objects and the game world. As such, each move and its consequences can be exactly simulated and displayed, which makes the physical behaviour of the game appear very realistic. These games are easy to play as the possible moves are simple. What makes these games hard and engaging is that the number of possible moves can be very large and effectively infinite, and that the consequences of moves are unknown in advance. The large number of moves is due to the effect of the exact location and/or timing of moves, where small changes may result in differences in the outcome of the physics simulation. Without actually simulating a move its outcome is very hard to predict. This gets even harder if the exact physical properties are unknown in advance and have to be observed and learned, or if the game can only be observed using a vision system – both of which correspond to how humans are playing these games.

Playing these games as well as or better than the best human players requires a successful AI agent to solve a number of challenging problems from different areas of AI. The impact of successful solutions to these problems goes way beyond games and will be an essential feature of intelligent agents that interact with the physical world. Several AI competitions, such as Angry Birds (aibirds.org), Computational Pool (stanford.edu/group/billiards) or the Physical Travelling Salesman problem (ptsp-game.net), have been initiated to foster research on this important area. We invite high quality work on any aspect of physical simulation games research. Topics include but are not limited to:

- detect and identify relevant game objects using vision, including previously unknown objects
- learn physical properties of relevant game objects and their effects
- learn the physics of a game
- infer and approximate the outcome of moves
- plan the best move or sequence of moves in a given situation
- approximation strategies and dealing with uncertainty
- combining simulation and reasoning
- methods for experimentally evaluating the performance of agents
- system description and evaluation of successful AI agents
- analyzing the complexity of game levels or designing provably hard levels
- physics simulation games for education or serious games

Authors should follow normal TCIAIG guidelines for their submissions, but identify their papers for this special issue during the submission process. Submissions should be 8 to 12 pages long. Short papers of 4 to 6 pages are also invited. Extended versions of previously published conference/workshop papers must be accompanied by a covering letter that explains the novel and significant contribution of the extended work. See http://www.ieee-cis.org/pubs/tciaig/ for author information.

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