Title	Competitive game environment and its application: Case study with focus on tournament entertainment
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Citation	
Issue Date	2017-03
Type	Thesis or Dissertation
Text version	author
URL	http://hdl.handle.net/10119/14162
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Description	Supervisor: , ,

Abstract

This study explores a novel way for analyzing tournament structures. Our goal is to find the best suitable tournament under considered purposes. Aside from the number of matches, we address on two other important aspects: competitiveness development and ranking precision. Competitiveness development emphasizes the importance participants' motivation in every match while keeping the matches exciting throughout the tournament. Ranking precision reflects the convincement of tournament results, so that prizes can be distributed with minimum complains and dissatisfaction.

To address competitiveness development, this study proposes a new method which visualizes tournament structures as a tree using graphical model approach, which we call *progress tree*. Considering the similarities of sorting algorithm with the ranking process, ranking precision is discussed based on the quality of algorithm for the ranking task. This study also analyzes well known tournament structures such as single elimination, double elimination, round robin and Swiss system. The performed analysis reveals the strength and weakness of each tournament structure. Although each tournament has its own pros and cons, none of them can convince the tournament results for all participants while keeping the matches strongly motivating thoroughly. Thus, a new tournament structure called *reaper tournament system* is proposed in this study to meet those requirements.