REVIEW

A STATUE OF UNREMITTING DEVOTION

Computers and Games
Revised Selected papers of the 8th International Conference, CG2013
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This book contains 21 selected and revised papers of the 8th Computers and Games Conference (CG 2013) which was held in Yokohama, Japan from August 13-15. Since CG2004 in Ramat-Gan, the World Computer Chess Championship has been organized in conjunction with the Computers and Games conference (or vice versa). Yokohama witnessed the 20st edition of this major event since the legendary tournament in Stockholm in 1974 where KAISSA won all four games and became the first computer chess world champion. In Yokohama, JUNIOR prolonged its title in a field of only 6 participants. That was the lowest attendance ever, and maybe reason for some concern. In Stockholm, 40 years ago, 13 programs were competing, and this number steadily climbed every next tournament until 1999 when the 9th WCCC in Paderborn saw no less than 30 participants. Since then, the attendance has gradually dropped to 9 participants in Tilburg (2011) and now only 6 in Yokohama. The upshot of this trend is that for the first time a round-robin tournament could be played, surely the best way to determine the strongest program. Nevertheless, let us hope that the upcoming championship in Leiden next year, will attract more competitors. Yokohama was also the venue for the 17th Computer and Games Tournament, formerly knowns as the Computer Olympiad, which hosted 21 games. In all three Go events (9x9, 13x13 and 19x19) ZEN, brainchild of Yoji Ojima and Hideki Kato, prolonged their Olympic gold medals from Tilburg by winning all but one game. Unfortunately, as far as I am aware, the authors of ZEN have never published anything on their approach to computer Go. Of course they want to stay ahead of the competition, but as they probably have benefitted from the published work of others, I would recommend them to give something back to the community. Hence, I am looking forward to the next Computers and Games Conference in the hope that the program committee will persuade approach Ojima and Kato to share some of their wisdom with us. If that does not work, maybe an in-depth interview with probing questions by a computer Go expert is an option.

Even though the current proceedings do not contain a contribution by Ojima and Kato, there are three papers on computer Go. One of these, *On Semeai Detection in Monte-Carlo Go* by Tobias Graf, Lars Schaefers, and Marco Platzner from the University of Paderborn won the best paper award. It describes a method to detect a capturing race (in Japanes: semeai), which is a sequence of dedicated moves to determine the life-or-death outcome of that race. Even the strongest Go programs have difficulty judging such capturing races correctly, especially when several races occur simultaneously. And while MCTS has proven highly effective in most 'normal' situations, its simulation-based algorithm makes it highly unsuitable to evaluate positions containing one or more semeai because they require dedicated move sequences. While this paper describes a way to detect semeai in MCTS implementations, it does not yet offer a solution on how to correctly evaluate them. Nevertheless, realizing the danger of semeai is an important first step towards a resolution.

There was another best paper award for *Dependency-Based Search for Connect 6* written by a team of 6 researchers from National Ciao Tung University in Taiwan: I-Chen Wu, Hao-Hua Kang, Hung-Hsuan Lin, Ping-Hung Lin, Ting-Han Wei, Chieh-Min Chang, and Ting-Fu Liao. After Victor Allis, as part of his PhD research, solved Connect-Four and Go-Moku (five-in-a-row) using dependency-based search (DSB), it seemed a logical next step to apply the same approach to Connect6, a game invented in 2003 by I-Chen Wu. However, this proved very difficult, mainly because in Connect6 players place two stones on the board at each turn. In addition, the state-space complexity of Connect6 is 10^{172} (compared to 10^{105} for Gomoku and 10^{13} for Connect-Four). While solving Connect6 is still far away, the Taiwan research team successfully implemented DBS into NCTU6, their Connect6-playing program. Experiments showed an average speedup factor of 4 with occasional 50-fold speedups in difficult positions. NCTU6 won the gold medal in the Connect6 tournament at the Yokohama Computer Olympics. I-Chen Wu is a highly prolific and successful computer games researcher

whose programs won him five gold medals (Connect6, Chinese Dark Chess, NoGo, Nonograms, and Mahjong) and two silver medals (NoGo, and Chinese Chess) in the 2013 Computer Olympics.

The 21 papers in this book cover a wide variety of games and implementations. The editors have grouped 19 of them into three main classes: Monte Carlo Tree Search (MCTS) (7 papers), solving and searching (7 papers), and analysis of a game characteristic (5 papers). In addition, there is one paper on a serious game and one paper describing a new approach. Two researchers, Abdallah Saffidine and Martin Müller, stand out from the pack by each contributing to three papers at this conference.

Before reading *Programming Breakthrough* by Richard Lorentz and Therese Horey, I was not familiar with the game of Breakthrough, hence I initially misinterpreted the title as a report on a breakthrough in programming. Alas, Breakthrough is an fairly recent game which combines strategy and tactics. It was conceived in 2000 by the American game inventor William Daniel Troyka. The rules of the game are very simple, yet it is surprisingly difficult to play well. Breakthrough is played on an 8x8 board where white occupies rows 1 and 2 with 16 identical pieces and black similarly occupies rows 7 and 8. It is like playing chess with 16 pawns on each side. White begins and players take turns moving a piece forward onto an empty square (straight or diagonally) one square at a time. An opponent's piece can be captured by a diagonal move, just like a regular pawn capture in Chess. The player who first reaches the other side of the board (or has captured all his opponent's pieces) wins. One interesting feature of Breakthrough is that a game cannot end in a draw because on every move a piece has to advance. Initially, there is a subtle strategic phase in which the players position their pieces for battle. The strategic phase has a restricted length because opposing pieces inevitably collide and captures can no longer be avoided. The tactical battle that ensues can contain very deep lines (20 moves or more) that lead to forced wins. Lorentz and Horey describe the structure and the development of WANDERER, an MCTS-based Breakthrough-playing program. Although WANDERER can beat most human players, there is still a long way to go before it is a match for the top rated humans players. In the words of the authors: "We anticipate that it [WANDERER] can make it [… to] the top 10, but whether it can make it to the top 2 or 3 remains to be seen."

Like the proceedings of the previous seven Computers and Games conferences, this volume is perfectly edited, beautifully typeset and nicely printed. Except for CG2000 and CG2002, the editorial board was under the capable leadership of Jaap van den Herik. His inextinguishable energy and devotion to ICGA Journal (Editor-in-Chief since 1983) and the conference proceedings of Computers and Games (Editor-in-Chief of 6 of the 8 proceedings) and Advanced in Computer Chess/Games (Editor-in-Chief of 7 of the 13 proceedings) is such a formidable accomplishment that it is about time that the international computer games community erects a statue in his honour. Maybe not a statute in his image, because Jaap is too modest to accept that. Therefore I suggest that we plaster cast a roughly stacked-up pile of all the ICCA/ICGA Journals and all conference proceedings that he has edited and use that as the mould to pour a bronze statue to represent his unremitting devotion to the field.