

The IWEC-2002 Man-Machine Othello Match

Michael Buro

University of Alberta
Edmonton, Canada T6G 2E8

email: mburo@cs.ualberta.ca

1 Prelude

On May 14, 2002 Kenta Tominaga played two regular Othello games against the same Logistello version that defeated the then World Champion Takeshi Murakami 6-0 in 1997. It was not at all clear that Logistello would face a strong human Othello player at the International Workshop on Entertainment Computing (IWEC) held in Makuhari near Tokyo. Shigeru Kaneda – the 1991 World Champion – was scheduled to play. He had been preferred by the local workshop committee over the reigning World Champion Brian Rose who was eager to come to Japan. However, when I arrived at the workshop venue on May 13th to set up Logistello, I was informed that another player had been found to play against Logistello the next day. The explanation for this surprising change of plans came later: Shigeru Kaneda is a former World Champion and the Japanese Othello Federation and the Othello trademark holder Tsukuda Original do not like to see former Othello World-Champions lose against machines. So, a strong Japanese Othello player, who had not won a World Championship before, had to be found on short notice. Thanks to the tireless efforts of Takeshi Murakami, who had to convince several people to agree on an alternative player, Kenta Tominaga got the blessing and was “allowed” to play under the conditions that he plays as a private person and his official Othello titles must not be mentioned when introducing the participants. In retrospect, Kenta Tominaga was the better choice for the match. He has computer Othello experience and a higher rating than Shigeru Kaneda. In fact, 1999 he drew one game against Logistello playing as a team with Makoto Suekuni.

2 The Games

Apart from the initial surprise the two games went smoothly. A small corner was separated from a big conference room in the Sanyo building and a camera and terminal were installed for broadcasting the games to the internet and to the workshop participants who also en-

joyed live comments on the games by Takeshi Murakami. Logistello ran locally on a P3/866 notebook which made it around four times faster compared to the 1997 match against Takeshi Murakami. On average it searched 750 thousand nodes per second in middle game and 1.5 million nodes per second in the endgame. In middle game Logistello’s aggressive Multi-ProbCut [1] selective search looked 24-27 plies ahead along reasonable lines. Selective endgame search based on EndCut started at around 27 plies before the end of the games.

The opening book Logistello used was essentially the one built for the 1997 match with the addition of a couple of close or lost public Othello games that the program played in the meantime. In order to make it difficult for human opponents to prepare for Logistello its opening book algorithm was set up to give away at most four discs in the opening phase and to pick lines randomly according to this constraint. The hope was that human players compensate for a possible slight opening advantage by endgame errors later in the game.

The life web-page had to be updated manually because internet access from the notebook was denied. Hiroaki Yabe did an exceptional job of deciphering Logistello’s screen output and managing in real-time the scripts that generate the web pages from raw move sequences.

The format of the games was regular 8x8 Othello with a timing of 30 minutes per player. Two games were played with reversed colors. Kenta Tominaga requested to play white in the first game.

2.1 Game 1

In the first game Tominaga played the opening flawlessly and managed to reach an even position after 25 plies. He then chose a move that lost two discs. A later analysis showed that Logistello also would have had trouble finding the best move (b6 rather than h5) in this situation, toggling between h5 and b6 in its iterative deepening search. The score stayed at a marginal +2 win for Logistello until 36 plies into the game where Tominaga lost four discs. According to Zebra’s analysis [2] Logistello

Game 1

May 14, 16:00 JST

● Logistello (38)
○ K. Tominaga (26)

perfect play result at
move 26 (b6!): 32–32

	a	b	c	d	e	f	g	h
1			●	○				
2			●	●	○			
3		●	○	○	●	○	○	○
4	●		○	○	○	●	○	○
5			●	○	●	○	○	○
6			●	●	○	○	○	
7			●	●	●	●		
8		●	●	●	●	●		

White To Move:
f2?(-6) a3!(-2)

	a	b	c	d	e	f	g	h
1	57	58	35	34	37	38	39	48
2	54	49	21	27	32	36	47	51
3	40	30	20	10	2	11	18	16
4	33	42	1	○	●	7	13	25
5	43	41	6	●	○	5	12	26
6	44	45	19	15	4	3	8	56
7	46	50	31	22	14	9	52	55
8	53	29	24	28	23	17	59	60

	a	b	c	d	e	f	g	h
1			●	●	●	●	●	
2			●	●	●	●		
3	○	○	●	●	●	○	○	○
4	●	●	○	○	●	●	○	○
5	●	●	●	○	●	○	○	○
6			●	●	○	○	○	
7			●	●	●	●		
8		●	●	●	●	●		

White To Move:
a6?(-12) b2!a1b1g2(-8)

Game 2

May 14, 17:00 JST

● K. Tominaga (23)
○ Logistello (41)

perfect play result
at move 27: 29–35

	a	b	c	d	e	f	g	h
1								
2							●	
3			○	○	○	○	○	○
4			○	●	○	●	○	○
5			○	●	●	●	○	○
6			○	●	●	●	○	
7				●	●	●		
8							●	

Black To Move:
e2?d2(≈ -6.8) b5!(≈ -1)

	a	b	c	d	e	f	g	h
1	49	46	50	44	45	60	59	58
2	48	42	31	26	25	23	29	53
3	41	37	22	10	2	11	24	16
4	40	38	1	○	●	7	13	19
5	39	47	6	●	○	5	12	20
6	56	43	18	15	4	3	8	27
7	55	57	30	21	14	9	36	28
8	54	35	32	33	34	17	52	51

	a	b	c	d	e	f	g	h
1								
2		○	●	●	●	●	●	
3	●	●	○	●	○	●	○	○
4	●	●	○	○	○	○	○	○
5	●		●	●	○	○	○	○
6			○	●	○	○	○	○
7			●	○	○	○	○	○
8		●	●	●	●	●		

Black To Move:
b6?d1!(-18) b5!d1f1e1(-6)

played at least its last 17 moves perfectly, whereas Tominaga made four errors and lost 14 discs in his last 18 moves. Among Logistello's last 17 perfect moves the last twelve were computed by perfect endgame searches, two by selective endgame searches and three by regular middle game searches.

2.2 Game 2

Like the previous game Tominaga played a very good opening and made his first serious error only 24 plies

into the game costing him about six discs. Unlike the first game, however, Tominaga blundered by giving away twelve discs with a single move in his otherwise perfect endgame (b6 rather b5) Logistello played at least its last 18 moves perfectly, Tominaga lost twelve discs in his last 16 moves (one error).

3 Outlook

The growing number of players in Othello tournaments shows that Othello is getting more popular – in spite of the fact that programs are now much stronger than any human player. It is therefore silly to interfere in human-machine Othello events the way we saw at the IWEC workshop. Instead every opportunity to pit strong human players against machines or machines vs. machines should be taken and supported by Othello federations and the trademark holders to promote this fantastic game. Recently, the interest in computer Othello has been revived by many new programmers who connect their Othello programs to GGS [3] to play regular tournaments and to exchange ideas that are so promising that it will soon be necessary to improve Logistello to stay competitive. Othello has not been solved yet and will not be solved for decades to come.

4 References

- [1] M. Buro, Improving Heuristic Mini-Max Search by Supervised Learning, Artificial Intelligence, Vol. 134 (1-2) (2002) pp. 85-99
- [2] Zebra's Analysis of the Logistello–Tominaga Match: <http://www.othello.nu/sof/matchark/index.html>
- [3] Generic Game Server: telnet://ftp.nj.nec.com:5000