2010 INVITED GAME FOR MOGOTW VS. HUMAN GO PLAYER IN TAIWAN

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ABSTRACT

This article reports the invited games played in the *2010 Invited Game for MoGoTW vs. Human Go Player*, held at National University of Tainan (NUTN), Taiwan, on Mar. 21, 2010. Twenty-four Go players ranking from 1D(Dan) to 3D were invited to challenge the computer Go program *MoGoTW* by playing 9×9 games to validate if *MoGoTW* has been reached to 1D, 2D or 3D based on the amateur Taiwanese scale. From the games results, *MoGoTW* won 23 out of 24 games so that *MoGoTW* was awarded the 1D, 2D, and 3D certificates, by the Taiwanese Go Association at the Haifong Weiqi Academy on Apr. 2, 2010. In the future, the team members of *MoGoTW* in both Taiwan and France will continue to improve the weaknesses of *MoGoTW* to let computer Go achieve as much as computer chess or Chinese chess.

1. INTRODUCTION

Go is one of the most complex board games. It is played regularly by millions of players in many countries around the world. Despite several decades of artificial intelligence, there are still no computer Go programs that can challenge a strong professional player in 19×19 games [1]. This is because Go is a problem with high uncertainty, especially for big board games, like 19×19 board. Each Go player has his own thinking way to play with his opponent, and each top professional Go player would take different strategies even though facing the same situation. For the past several years, computer Go has been developing by researchers. In 1998, Martin Müller won despite 29 handicap stones against *Many Faces of Go*. In 2008, *MoGo* and *CrazyStone* won Myung-Wan Kim (8^{th} Dan Pro and winner of the 2008 US Open) and Kaori Aoba (4^{th} Dan Pro, 4P) in 19×19 games with handicap 9 and 7 stones, respectively. Since 2008, National University of Tainan (NUTN) and other organizations have hosted or organized several Go-related events, including the *2008 Computational Intelligence Forum & World 9×9 Computer Go Championship* (http://go.nutn.edu.tw/) [2], *2009 Invited Games for MoGo vs. Taiwan Professional Go Players* (*Taiwan Open 2009*, http://go.nutn.edu.tw/2009/) [3], and *FUZZ-IEEE 2009: Panel, Invited Sessions, and Human vs. Computer Go Competition* (http://oase.nutn.edu.tw/FUZZ_IEEE_2009/) [4].

In Feb. 2009, *MoGo* won with handicap 7 and 6 stones against Chou-Hsun Chou (9P and winner of the LG Cup 2007) and Li-Chen Chien (1P), respectively, at *Taiwan Open 2009*. Taiwanese Go players were invited to play with four world's top computer Go programs, including *MoGo*, *Fuego*, *Zen*, and *Many Faces of Go* at the *FUZZ-IEEE 2009: Panel, Invited Sessions, and Human vs. Computer Go Competition*, held in Jeju Island, Korea, on Aug. 20–23, 2009. In this event, *Fuego* won by 2.5 points as White against Chou-Hsun Chou in a 9×9 game. The computer Go *MoGoTW* was developed based on *MoGo* 4.86 Sessions plus the Taiwan (TW) modifications developed jointly with the Taiwanese colleagues for a Ntational Council Science (NCS)-National Research Agency (ANR) research project between Taiwan and France. In Oct. 2009, *MoGoTW* also won the first 9×9 game against top professional Go player (Chou-Hsun Chou) as Black (http://mogotw.nutn.edu.tw/chinese/result_20091026.htm). Therefore, computer Go Programs have won both as White and Black against top players in 9×9 game.

The *2010 Invited Game for MoGoTW vs. Human Go Player* (http://go.nutn.edu.tw/2010/) was held at NUTN, Taiwan on Mar. 21, 2010. The age of the 24 invited Go players were from 8 to 13. And, they were divided into three groups according to their dan grade of Go, namely 1D–3D (Dan). Each group had eight children. *MoGoTW* won all of the games except one game against a 3D Go player. Despite one lost game, *MoGoTW* was qualified to award three certificates with 1D, 2D, and 3D level on Apr. 2, 2010. It was the first time that the Taiwanese Go association awarded a certificate to a computer Go program. Simultaneously, a ceremony about the cooperative agreement memorandum between NUTN and Taiwan's National Center for High-Performance Computing (NCHC) in Taiwan was held and four Go players, including a 9P, 1P, 7D, and 6D, were invited to play against *MoGoTW*. In the end of the games, *MoGoTW* won 3 out of 7 games. The remainder of this report is as follows. Section 2 describes the game results. Finally, we draw the conclusions in Section 3.

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2. GAME RESULTS

We have constructed a website for the *2010 Invited Game for MoGoTW vs. Human Go Player* held in Taiwan on Mar. 21 and Apr. 2. The detailed profiles of all invited Go players are listed in Table 1. All games are 9×9 by adopting the Chinese rule. Komi is 7.5 and each game is 45 minutes per side. Table 2 shows the games' basic information. It indicates that *MoGoTW* ran on four types of different machines, including a DELL PowerEdge R900 with 16 cores, NUTN-Mini-Cluster with 24 cores, HP DL785G6 with 16 cores, NUTN-Mini-Cluster with 16 cores, and IBM x3850 with 8 cores. NUTN-Mini-Cluster with 16 cores was established by connecting two machines of IBM x3850 with 8 cores via the Internet. Ming-Chi Cheng is invited to give comments on the games. Cheng was born in Taiwan in 1965 and went to Japan to learn Go when he got the scholarship of the Ing Chang-Ki Weichi Educational Foundation in 1978. He became a 1P and 7P professional Go player in 1982 and 1995, respectively, and returned to Taiwan to popularize the Go education at Tainan city in 2000. He is currently a president of the Tainan Go association. Figs. 1 and 2 show the outcomes of games 18 and 28. Game 18 is the game that *MoGoTW* was supposed to win; however, human was supposed to win at game 28. More comments on games 18 and 28 are given at the bottom of Figs. 1 and 2, respectively. Fig. 3 shows a picture that all attendees took together after all games, held at NUTN on Mar. 21, were finished. Fig. 4 shows the three invited Go players are against *MoGoTW* at the Haifong Weiqi Academy on Apr. 2.

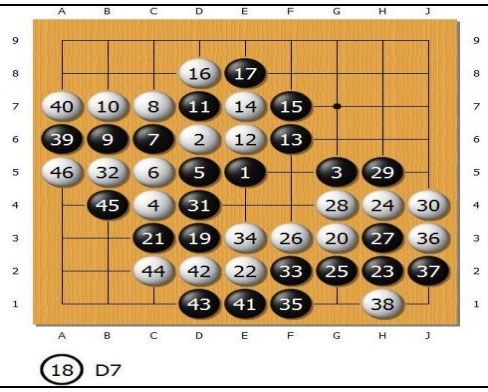
Table 1. Profiles of invited Go players.

No.	Name	Age	Sex	Dan Grade	No.	Name	Age	Sex	Dan Grade
1	Chun-Hsun Chou	30	Male	9P	16	Tung-Yueh Liu	10	Male	2D
2	Yuan-Jung Chang	28	Male	1P	17	Chien-Cheng Wang	12	Male	2D
3	Tai-Hsiung Yang	55	Male	7D	18	Han-Hsuan Chen	11	Male	2D
4	Shih-Min Chin	53	Male	7D	19	Cheng-Chang Kuo	10	Male	2D
5	Hsiang-Wen Cheng	25	Male	6D	20	Yi-Chun Huang	10	Male	2D
6	Yeh-Yang Liu	25	Male	6D	21	Wei-Chih Kuo	12	Male	2D
7	Chen-Wei Chang	12	Male	3D	22	Shang-En Lee	14	Male	2D
8	Chen-Ting Yen	13	Male	3D	23	Yi Hung	9	Male	1D
9	Chi-Liang Chung	13	Male	3D	24	Chen-Ying Chang	10	Female	1D
10	Li-Yuan Hsu	10	Female	3D	25	Shih-Tsung Shih	11	Male	1D
11	Kuo-Chi Tsai	11	Male	3D	26	Yueh-Han Hsu	8	Male	1D
12	Ming-Yang Hsieh	12	Male	3D	27	Ping-En Cheng	13	Male	1D
13	Yi-Hsiang Wang	12	Male	3D	28	Ping-Cheng Lu	11	Male	1D
14	Yi-Chun Hsieh	14	Female	3D	29	Tsai-Chi Lo	12	Female	1D
15	Chuan-Ting Liu	8	Male	2D	30	Yu-Ta Chung	7	Male	1D

Table 2. Games' basic information.

No	Date	Environment	White	Black	Result
1	04/02/2010	DELL PowerEdge R900 (16cores/32G)	**Chun-Hsu Chou**	MoGoTW	W+Res.
2	04/02/2010	DELL PowerEdge R900 (16cores/32G)	MoGoTW	**Yuan-Jung Chang**	B+Res.
3	04/02/2010	DELL PowerEdge R900 (16cores/32G)	**Yuan-Jung Chang**	MoGoTW	W+Res.
4	04/02/2010	NUTN-Mini-Cluster (24cores/52G)	**MoGoTW**	Shih-Min Chin	W+Res.
5	04/02/2010	HP DL785G6 (16cores/48G)	**MoGoTW**	Yeh-Yang Liu	W+0.5
6	04/02/2010	HP DL785G6 (16cores/48G)	**Yeh-Yang Liu**	MoGoTW	W+Res.
7	04/02/2010	HP DL785G6 (16cores/48G)	**MoGoTW**	Yeh-Yang Liu	W+Res.
8	03/21/2010	DELL PowerEdge R900 (16cores/32G)	**Tai-Hsiung Yang**	MoGoTW	W+Res.
9	03/21/2010	DELL PowerEdge R900 (16core/32G)	**MoGoTW**	Tai-Hsiung Yang	W+0.5
10	03/21/2010	DELL PowerEdge R900 (16cores/32G)	**MoGoTW**	Tai-Hsiung Yang	W+0.5
11	03/21/2010	DELL PowerEdge R900 (16cores/32G)	Hsiang-Wen Cheng	**MoGoTW**	B+Res.
12	03/21/2010	HP DL785G6 (16cores/48G)	Chen-Wei Chang	**MoGoTW**	B+1.5
13	03/21/2010	HP DL785G6 (16cores/48G)	**MoGoTW**	Chen-Ting Yen	W+3.5
14	03/21/2010	HP DL785G6 (16cores/48G)	Chi-Liang Chung	**MoGoTW**	B+1.5
15	03/21/2010	HP DL785G6 (16cores/48G)	**MoGoTW**	Li-Yuan Hsu	W+0.5
16	03/21/2010	HP DL785G6 (16cores/48G)	Kuo-Chi Tsai	**MoGoTW**	B+1.5
17	03/21/2010	HP DL785G6 (16cores/48G)	**MoGoTW**	Ming-Yang Hsieh	W+4.5
18	03/21/2010	DELL PowerEdge R900 (16cores/32G)	**Yi-Hsiang Wang**	MoGoTW	W+Res.
19	03/21/2010	DELL PowerEdge R900 (16cores/32G)	**MoGoTW**	Yi-Chun Hsieh	W+1.5
20	03/21/2010	NUTN-Mini-Cluster (16cores/16x2G)	Chuan-Ting Liu	**MoGoTW**	B+1.5
21	03/21/2010	NUTN-Mini-Cluster (16cores/16x2G)	**MoGoTW**	Tung-Yueh Liu	W+0.5
22	03/21/2010	NUTN-Mini-Cluster (16cores/16x2G)	Chien-Cheng Wang	**MoGoTW**	B+1.5

23	03/21/2010	NUTN-Mini-Cluster (16cores/16x2G)	**MoGoTW**	Han-Hsuan Chen	W+0.5
24	03/21/2010	NUTN-Mini-Cluster (16cores/16x2G)	Cheng-Chang Kuo	**MoGoTW**	B+Res.
25	03/21/2010	NUTN-Mini-Cluster (16cores/32G)	**MoGoTW**	Yi-Chun Huang	W+0.5
26	03/21/2010	NUTN-Mini-Cluster (16cores/16x2G)	Wei-Chih Kuo	**MoGoTW**	B+1.5
27	03/21/2010	HP DL785G6 (16cores/48G)	Shang-En Lee	**MoGoTW**	B+1.5
28	03/21/2010	IBM x3850 (8cores / 20G)	Yi Hung	**MoGoTW**	B+1.5
29	03/21/2010	IBM x3850 (8cores / 20G)	**MoGoTW**	Chen-Ying Chang	W+0.5
30	03/21/2010	IBM x3850 (8cores / 20G)	Shih-Tsung Shih	**MoGoTW**	B+3.5
31	03/21/2010	IBM x3850 (8cores / 20G)	**MoGoTW**	Yueh-Han Hsu	W+0.5
32	03/21/2010	IBM x3850 (8cores / 20G)	Ping-En Cheng	**MoGoTW**	B+Res.
33	03/21/2010	IBM x3850 (8cores / 20G)	**MoGoTW**	Ping-Cheng Lu	W+4.5
34	03/21/2010	IBM x3850 (8cores / 20G)	Tsai-Chi Lo	**MoGoTW**	B+1.5
35	03/21/2010	IBM x3850 (8cores / 20G)	Yu-Ta Chung	**MoGoTW**	B+3.5

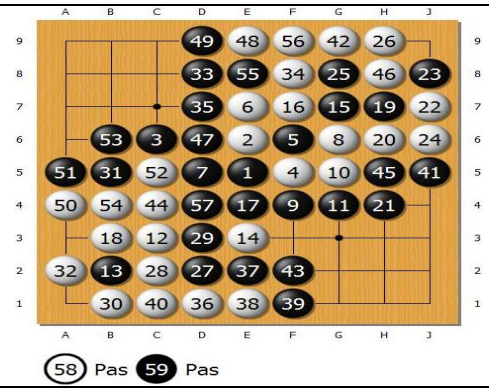


Results: MoGoTW (Black) vs. Yi-Hsiang Wang (3D). White won by resignation.

Comments:

- Black 5 and Black 7 are good moves because Black got the whole right bigger territory by giving White much fewer stones, which let Black to be able easily win the game.
- By answering Black 21 at C3 let group of White stones at the bottom-right corner alive to turn Black into a loss. If Black 21 had have played at 33, Black would have won.
- Owing to the bad move of Black 21 and the failure to deal with the corner by playing Black 23, Black eventually lost the game.
- This game also shows that Black has a problem with handling the life-and-death at the corner.

Fig. 1 Game 18.



Results: MoGoTW (Black) vs. Yi Hung (1D). Black won by 1.5 points.

Comments:

- Black 3 is recommended to play at D6 or D5. It seems that the response to White 2 was not created into the Black's opening book.
- Black 13 is a very bad move for Black to try to handle the life-and-death at the bottom-left corner, and Black 13 is recommended to play at 14 or 27.
- Originally, White definitely wins the game because of bad moves, Black 3 and Black 13. However, a White's fatal mistake, White 28, turns White into a loss. White 28 is recommended to play at 29.
- This game shows that if Black does not encounter the ko-fight and life-and-death problem, Black performs very steadily.

Fig. 2 Game 28.

Fig. 3 Games at NUTN on Mar. 21, 2010.

Fig. 4 Games at Haifong Weiqi Academy on Apr. 2, 2010.

3. CONCLUSION

The advances in computational intelligence have contributed the computer Go to improve very much for the past years. This report has revealed that *MoGoTW* has successfully got the 1D, 2D, and 3D certificates awarded by the Taiwanese Go association by winning 23 out of 24 games against 1–3D amateur Go players on Mar. 21. However, the game results indicate that *MoGoTW* still has the problem with the ko-fight and life-and-death, which often cause to turn the game into a loss. More research still needs to be done before the artificial intellignece completly solves 9×9 Go by winning 4 out of 7 games in the future.

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