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ANALYSING ROLES OF POSITION IN CURLING BASED ON SHOT-SCORES

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Background

The neighbouring countries are getting better at curling

Athletic ability | Sports coaching | Tactical ability

Japan could lose its advantage

Curling Science Project: to support tactical phase

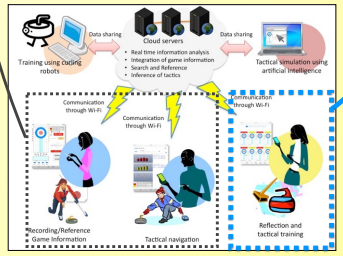
Fumito Masui, Hiroki Ueno, Hitoshi Yanagi and Michal Ptaszynski: **Toward Curling Informatics - Digital Scorebook Development and Game Information Analysis,** *Proceedings of IEEE-CIG2015* (2015.08) Tainan, Taiwan

Fumito Masui, Kohsuke Hirata, Hiromu Otani, Hitoshi Yanagi, and Michal Ptaszynski: **Informatics to Support Tactics and Strategies in Curling**, *International Journal of Automation Technology*, Vol.10, No.2, pp.244-252 (2016.03)

Digital score book system "*iCE*"

Hiroki. Ueno, Fumito. Masui, and Hitoshi. Yanagi: **Development of A Portable Database System for Supporting Curling Tactics,** *Proceedings of 25th National Conference of Japan Society of Training Science for Exercise and Sport*, 2012. (in Japanese)

- Recording/Reference game information
- Tactical navigation

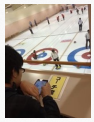


Curling Science Project

Our Goal

Pointing out the tactical role of each position by analysing the accelerated game information database to support tactics in curling

Analysing the recorded game information obtained from *iCE*



Detailed Analysis of the Shot-Score

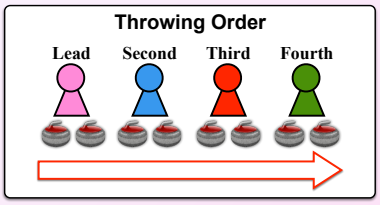
Shot-Score（Tactics performance skills）
→Five-point scale which indicates how the player complies with the instructions of the skip player (game captain)

0 point (failed) ⟷ 4 points (perfect)

Methods

①

Investigation of 3,621 shots extracted from 26 games of all four tournaments by *iCE* in the 2014-2015 season and the 2015-2016 season.



Display the score of the opponent

	1	2	3	4	5	6	7	8	9	10	EE	計
	0	0	0	0	2	1	1					4
	1	0	0	2	0	0	0					3

Display the shot in detail

②

Investigation of the correlations between DFGS and DTSS, DFGS and DPSS.

- **Difference in the Final Game Score (DFGS)**
- **Difference in the Team Shot Score (DTSS)**
- **Difference in the Position Shot Score (DPSS)**

③

Analysing the correlation between the position and the shot-score

Investigation of the each position :

- **Tactical role of each position**
- **Objectively understand relationship between each position and score**

Analysis

Team

Correlation Coefficient：0.916

Strong positive correlation between DFGS and DTSS.

↓

If the shot-score of the competing team and one's own team is known, the match result can be roughly predicted.

Lead

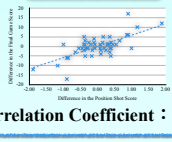
Correlation Coefficient：0.763

This position covers first moves of the game and there is the *Free Guard Zone Role* that applies only to this position.

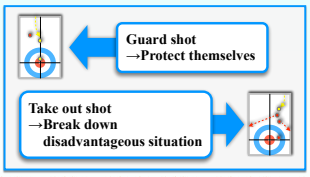
↓

There is a strong correlation to the final score by the *Free Guard Zone Role*.

Second



Correlation Coefficient：0.698

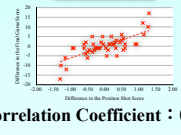


Decrease the number of stones in the house for reducing the risk of one's own team.

↓

Role of these position will change depend on the situation and team tactics.

Third



Correlation Coefficient：0.738

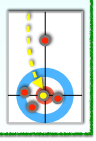
Fourth

Correlation Coefficient：0.868

Always responsible for the final shot in the end.

↓

Strongest correlation in all positions. Greatly influences the final score.



Conclusions

- **Strong positive correlation between the shot-score difference and the score difference.**
  →The match result can be roughly predicted.
- **Analysis focusing on the shot-score is effective in finding characteristics for each position.**
  →Fourth and Lead：Tactical role which is related directly to the score.
  Third and Second：Supporting role which is not related directly to the score.

Analysis focusing on the shot score is valid for feature extraction of each team and player.

Future Work

- **Increasing the size of the game information database.**
- **Analysing tactical role of each position and each team.**
- **Aim to support the Japanese national team in the Winter Olympic games in 2018.**