Research of the Information Dynamics for Daihinmin

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The Game Theory proposed by Von Neumann and Oskar Morgenstern brought us rational and strategic decision-making. So it gave to the world a constant result.

In 2012, the Game Information Dynamic Model was devised by the research group of Iida. This adds the concept of Information Dynamics based on hydrodynamics to traditional Game Theory. And we can look at the stream of information. In addition, it contains many concepts of physics such as information speed, information acceleration and information energy. And we can analyze the strong of game field and the Intellectual interaction. The results of this analysis to games such as Shogi, Soccer and Judo was already reported.

But this model can be applied to two-player games basically. On the other hand, there exists the many multi-player games. For the moment, the result of analysis for multi-player game is not reported.

The research of multi-player games did not advance much so far. It is difficult to use the existing technique in the multi-player game. First, multi-player games have many situations that Nash equilibrium is difficult to apply. Because we need to think about each player's benefit from other player's action rather than own's benefit. Second, there requires a large computational complexity in multi-player game, so it is difficult to calculate for us even using computer.

We try to analyze multi-player games with the Game Information Dynamic Model in order. To understand the stream of games where the

actions of many players are mixed. So we suppose that a multi-player game is the set of two-player games, and propose the technique to analyze these games.

For the analysis, we study the game's log from the Daihinmin free software. In these logs, a single human player was played against many computer players. We got the game scores calculated by the Daihinmin software. To analyze this huge quantity of data, we need to think about the addition method. Therefore, we introduce the way to analyze the multi-player games with the Game Information Dynamic Model. By change a multi-player game into many two-player games, I think this technique is useful because the similar technique was reported in a previews study.

But this result is only for one-played game, a question remains whether it is right or not. I think that it is necessary to analyze many game scores and compile statistics on the data in order to change the results into a reliable data.