Project Report

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1 Introduction

An experiment was conducted at the University of Groningen, the Netherlands, in 2013 to study human strategies in extensive form perfect information games.Each participant played a perfect information game against a computer and knew that the computer was optimizing against some belief about the participant's future strategy. The main question was: *"Are people inclined to assess their opponent's future behavior in terms of its past behavior when they play a game?"* The results of the experiment did not provide conclusive evidence for *best rationalization reasoning* on the part of the participants.

In this project we conducted a new experiment in which participants played variants of Marble Drop games against a computer, which was programmed to deviate often from the *rational strategy* right at the beginning of the game. The main difference is that, we used new games with carefully designed new pay-off structures so that we can compare with the previous results and have a better understanding of the possible alternative explanations mentioned above, to provide a clearer picture of *human strategic reasoning* procedures. This experiment was held in both **Groningen**, *The Netherlands* and **Chennai and Kolkata**, *India*. The **Netherlands** section was conducted by **Rineke Verbrugge** and **Eric Jansen** (studying Masters in AI) and the **Indian** section was conducted by **Sujata Ghosh** and myself.

2 Results

2.1 Game-wise comparison between group A and group B (Indian data)

It seen that all the *bayes factors* are more or less in the neighborhood of 0.2 i.e., *group A* and *group B* players chose d almost equally. Thus they can be merged as there is no prominent discrimination.

2.2 Paired comparison among the games 1,2,3,4,1′,3′

First, a two tailed $t-test$ has been done. If the *bayes factor* is significant in favour of null hypothesis ,i.e., d is played equally in both games, no further test has been done. If not, two more on tailed t-tests are done and results have been noted.

2.3 Comparison of decisions between *first* 4 and *last* 4 rounds in each game

With *bayes factor* < 0.2 , there is a strong likelihood that d is chosen equally in the early as well as the later rounds of all the games against the *alternate hypothesis* that choice of d varies with rounds

2.4 Comparison of decisions between first 2 and last 2 rounds in each game

Except for the *games 4 and* 1′, all other results show no significant likelihood against the null hypothesis,i.e., d has been chosen equally in the first two and the last two rounds.
In both *games 1 and 4*, it is seen that a player is more strongly likely to opt for d more towards the beginning than towards the end. Whereas, the result is very strong in case of *game* 1′, the figures are quite significant as well in *game* 4.

2.5 Cross-cultural (India-Netherlands) comparison of decisions in each game

Going by the *bayes factors* in each of the games, it is concluded that in each game, players in both **India** and **The Netherlands**, are more likely to play invariably.