Human Experiment in a Hybrid Agent-Based Model

Data Key

11/22/2020

Demographic Output

dfCollins2020Demographic

Data key

Player	Experiment participant ID
Game	The game number being played
Age	Coded: “18-20,” “21-29,” “30-39,” “40-49,” “50-59,” “60 or older,” or “Prefer not to answer”
Gender	Coded: Female, Male, Other, or “Prefer not to answer”
Education	Coded: “Less than a high school degree,” “High school degree,” “Some college credit, no degree,” “Associate degree,” “Bachelor’s degree,” “Master’s degree,” “Doctoral degree,” or “Prefer not to answer”
Video game experience	Coded one if selected “sometimes” or greater on a Likert scale
Board game experience	Coded one if selected “sometimes” or greater on a Likert scale
Game theory experience	Coded one if selected “Medium” or greater on a Likert scale
CoreCS	Whether or not the current partition is a core partition
Core	Whether or not the human player is currently in a core coalition
Reward	The current reward (payoff) the human player receives under their current coalition

Output from Experiments

dfCollins2020GameXoutput

Data Collected

- The simulation generates a line of data every time ‘player 0’ is involved in a decision
  - During the human experiment trails, these will be the decisions that human player makes as they play ‘player 0’
  - During the computerized agent version, these are decisions relating to the coalition suggestions of the computerized agent that involve ‘player 0’

Data key - 1

First column	IGNORE: The game number being played. This number is arbitrary allocated withing the simulation.
Player	Experiment participant ID
Player's Turn	0: Bot's turn (and a coalition involving player 0 has been suggested and all involved bot players has said "yes" to the new suggested coalition) 1: Human's turn 2: Final summary output line
Decision Consistency	If human's Turn: Would the suggested coalition increase the human players utility? 0: No 1: Yes If bot's Turn: Would a bot playing 'player 0' have made the same decision about offered coalition? 0: No 1: Yes In both cases: 2: Final summary output line

Data key - 2

Coalition Suggestion	If human's Turn: Was it possible for the bots to make the same coalition suggestion given the limitations of the suggestion algorithm? 0: No 1: Yes If bot's Turn: Did 'player 0' accept the offer to join the suggested coalition? 0: No 1: Yes In both cases: 2: Final summary output line

Data key - 3

Current Coalition Structure	The next “N” outputted numbers uniquely represent the coalition structure that partitions the players 0 to N-1. *
Suggest Coalition	The next “N” outputted numbers uniquely represent a suggested coalition. A value of one indicates that the player is a member of the coalition. A value of zero indicates they are not.
Resultant Coalition Structure	Same as current if no games

*The numbers are a codeword representation of a partition, for example 0102 represent the coalition partition (13)(2)(4)

It is unique by using the following rules of encoding:

Generate a code $c_0c_1c_2c_3…c_{n-1}$ using $c_1 = 0$ and $0 \leq c_r \leq max\ (c_0, c_1, …, c_{r-1}) + 1$ for $0 \leq c_r \leq n-1$

See for more details: Djokić, B., M. Miyakawa, S. Sekiguchi, I. Semba and I. Stojmenović (1989). "Short Note: A Fast Iterative Algorithm for Generating Set Partitions." The Computer Journal **32**(3): 281-282.

Data key - 4

Round Number	This is the current round number. A round is a suggestion from ‘player 0’ (even if its just their current coalition) followed by suggestions from the algorithm. Unlike many of the over values, it starts at 1.
Core Partition Formed	It the current coalition structure is a core partition, then the number of the core partition is give here (0+). Otherwise, this value is -1
Coalition in a core partition	If ‘player 0’ coalition can be found in any of the core partitions, then the first one it is a member of number is given here. Otherwise, this value is -1
Player 0 current reward	This is ‘player 0’ current reward given the coalition they are current a member of.