From Internal Validation to Sensitivity Test: How Grid Computing Facilitates the Construction of an Agent-Based Simulation in Social Sciences

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Over the past decades, we see a trend that social scientists adopt the experiment approach to study our social and political world. Particularly, agent-based modelling (ABM) is employed as a tool for "thought experiment" because theorists usually (1) fall short of empirical data to contrast with experiment results and (2) are more interested in solving theoretical puzzles than empirical puzzles. Applications of ABM in the social sciences, therefore, are commonly centered on issues that do not require a serious empirical validation process, at least compared to empirical data. Consequently, current application of ABM in social sciences (except the field of business management) has not reached the stage of sound validation and verification (V&V). To take a further step out of this situation, we suggest that researchers adopting computer-based approach conduct sensitivity test of their models. This step at least ensures that simulation results are robust and trust worthy. Few scholars in this field, however, are aware of the utility of grid and cloud computing that can advance the application of ABM. This paper is devoted to bridge the two sides (grid computing and political science) by, first, describing how grid and cloud computing may help the design of an agent-based model. Second, we will present an example of (re)constructing the SRAS model of political

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preference formation—an agent-based model based on John Zaller's (1992) Receive-Accept-Sample theory, and put it into a sensitivity test with the power of grid computing.

Keywords: Agent-based modeling; empirical validation; empirical validation.

Appendix II: Using SRAS in Repast Simphony

1. Download "Eclipse + Repast Simphony" toolkit from
   http://repast.sourceforge.net/download.html
2. Install the toolkit (for more details, see http://repast.sourceforge.net/docs.html)
3. Download SRAS from
   http://www2.nsysu.edu.tw/politics/liu/ABM/ISGC2011/SRAS.rar
4. Unpack the file and in Repast, import SRAS: File -> Import
5. Execute SRAS
   (1) Run SRAS Model: Press the black triangle [▼] beside Run [⏵] button and choose
       SRAS Model (see Fig1). Wait for a few seconds, SRAS will display (see Fig 2).
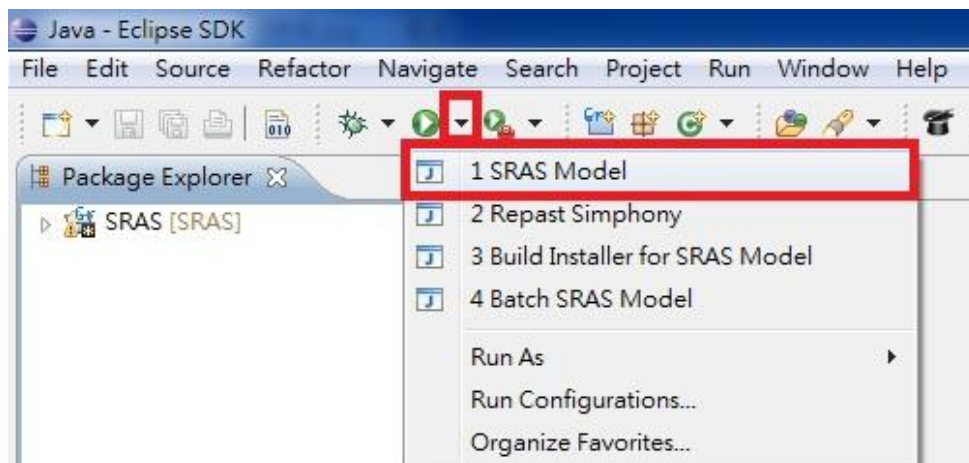
(Fig 1)
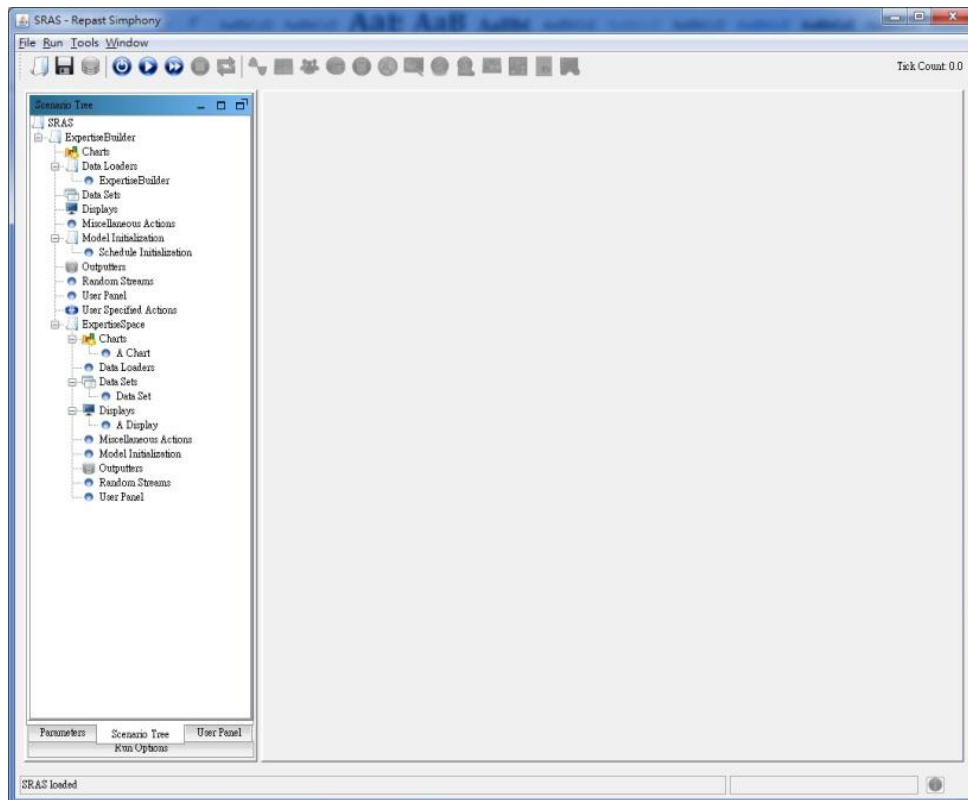
(Fig 2)

(2) Set parameter: you can reset parameter values at "Parameter" at lower left side (see Fig 3 and Fig 4).
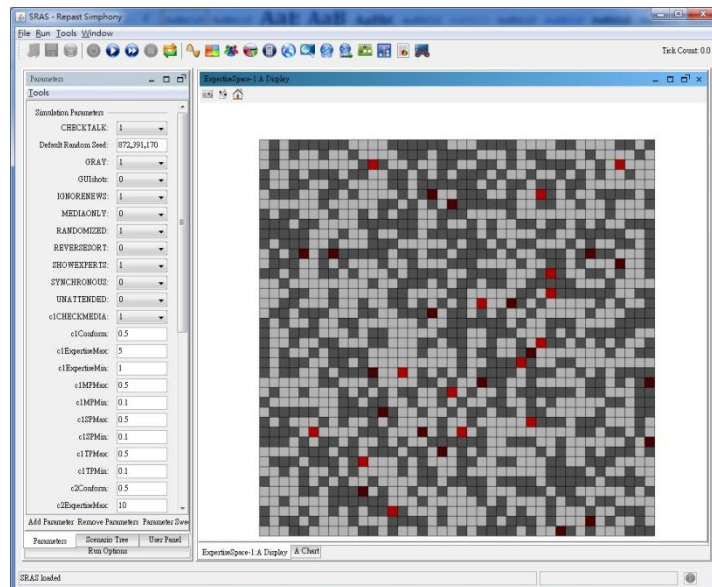

(Fig 3)
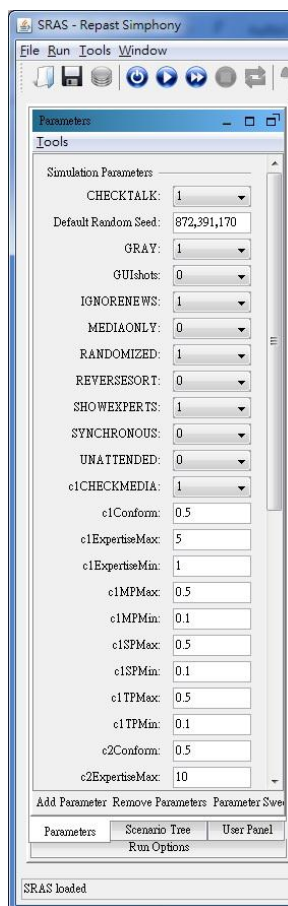
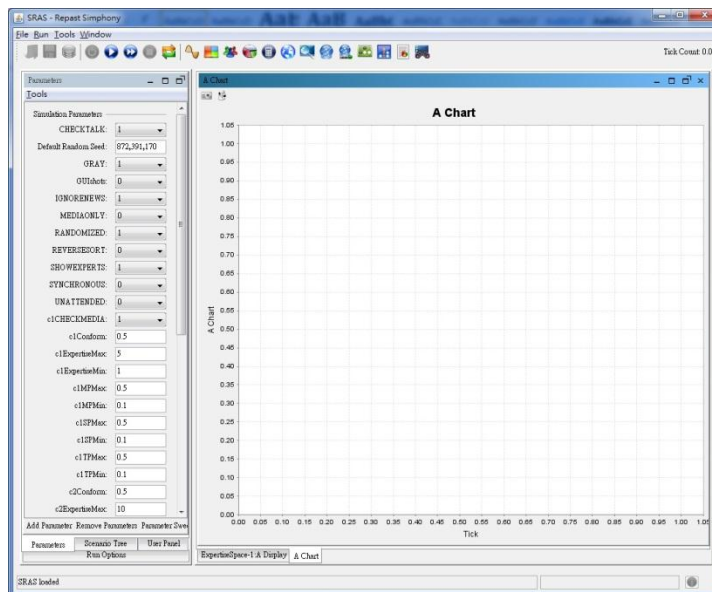(Fig 4)

(3) Initial SRAS: press the initialize run button [ ]. Then Repast will display two windows (see Fig 5 and Fig 6) and give some messages at bottom frame (see Fig 7).

(Fig 5)

(Fig 6)

(Fig 7)

(4) Run SRAS: now you can run SRAS step by step by press [⏩] or run until it stop by press [▶].

4