

Modeling Political Individuals Using the Agent-Based Approach: A Preliminary Case Study on Political Experts and Their Limited Influence within Communication Networks

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Abstract. Agent-based modeling (ABM) has become a promising research approach in the social sciences, including economics and political science. ABM allows researchers to explore what-if questions that are not easily answered in the empirical world. As an attempt to advance cooperation between information professionals and social scientists to explore social inquiries, this paper introduces and details the design of S-RAS, an agent-based model originated from the literature of voting behavior. This paper further demonstrates an example of applying S-RAS to studying the role of political experts within communication networks. Studies in political science have identified that political experts play an important role in shaping their followers' views. Conventional wisdom suggests that citizens in a democracy who are embedded in heterogeneous networks where they perceive a significant level of disagreement are likely to be politically tolerant. While the study of communication networks helps advance our understanding about the foundation of democracy, it is worth extending this stream of research to ask whether the increase in the number of political experts within communication networks have meaningful effect on the pattern of preference distribution. Three experiments were conducted. Findings, implications and limits of this study, and cross-disciplinary cooperation are discussed.

Keywords: heterogeneity, the Receive-Accept-Sample (RAS) model, agent-based modeling (ABM), communication networks, political experts

References

- [1] T. C. Schelling, *Micromotives and Macrobehavior*, New York: Norton, 1978.
- [2] D. M. Lustick, Ian S, and R. J. Eidelson, "Secessionism in multicultural states: Does sharing power prevent or encourage it?," *American Political Science Review*, Vol. 98, No. 2, pp. 209-229, 2004.
- [3] M. Laver, "Policy and the dynamics of political competition," *American Political Science Review*, Vol. 99, No. 2, pp. 263-281, 2005.
- [4] D. Rousseau and A. M. Van der Veen, "The emergence of a shared identity: An agent-based computer simulation of idea diffusion," *Journal of Conflict Resolution*, Vol. 49, No. 5, pp. 686-712, 2005.
- [5] D. Rousseau, *Identifying Threats and Threatening Identities: The Social Construction of Realism and Liberalism*, Palo Alto, CA : Stanford University Press, 2007.
- [6] R. Huckfeldt, P. E. Johnson, and J. D. Sprague, *Political Disagreement: The Survival of Diverse Opinions within Communication Networks*, New York: Cambridge University Press, 2004.
- [7] P. Johnson, "Simulation modeling in political science," *American Behavioral Scientist*, Vol. 42, No. 10, pp. 1509-1530, 1999.

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- [8] B. Latane and A. Nowak, *Self-organizing social systems: Necessary and sufficient conditions for the emergence of clustering, consolidation, and continuing diversity*, Vol. 13, pp. 43–74, 1997.
- [9] F. C. Liu, "Constrained opinion leader influence in an electoral campaign season: Revisiting the two-step flow theory with multi-agent simulation," *Advances in Complex Systems*, Vol. 10, pp. 233-250, June 2007.
- [10] P. Converse, *The nature of belief systems in mass publics*, pp. 206-261. New York: New York: Free Press, 1964.
- [11] J. N. Druckman, "Political preference formation: Competition, deliberation, and the (ir)relevance of framing effects," *American Political Science Review*, Vol. 98, pp. 671-686, Nov. 2004.
- [12] J. T. Klapper, *The Effects of Mass Communication*, Glencoe, Ill.: Free Press, 1960.
- [13] J. Zaller, *The nature and origins of mass opinion*, Cambridge England; New York, NY: Cambridge University Press, 1992.
- [14] J. N. Druckman and A. Lupia, "Preference formation," *Annual Review of Political Science*, Vol. 3, pp. 1-24, 2000.
- [15] M. B. Oliver, "Individual differences in media effects," *Media Effects: Advances in Theory and Research* (J. Bryant and D. Zillmann, eds.), pp. 507-524, 2002.
- [16] J. Jerit, J. Barabas, and T. Bolsen, "Citizens, knowledge, and the information environment," *American Journal of Political Science*, Vol. 50, pp. 266-282, April 2006.
- [17] W. R. Neuman, M. R. Just, and A. N. Crigler, *Common knowledge: News and the construction of political meaning*, Chicago: University of Chicago Press, 1992.
- [18] R. Huckfeldt and J. M. Mendez, "Managing political heterogeneity: Perceptions of disagreement within communication networks," *Midwest Political Science Association 62nd Annual National Conference*, April 15-18, Chicago, IL, 2004.
- [19] L. M. Bartels, "Unenlightened self-interest," *The American Prospect*, Vol. 15, No. 6, pp. A17-A19, 2004.
- [20] P. Converse, "Popular representation and the distribution of information," *Information and Democratic Processes*, pp. 369-90, Urbana, IL: University of Illinois Press, 1990.
- [21] M. P. Fiorina, S. J. Abrams, and J. Pope, *Culture War? The Myth of a Polarized America*, New York: Pearson Longman, 2005.
- [22] R. Huckfeldt and J. D. Sprague, *Citizens, Politics, and Social Communication: Information and Influence in an Election Campaign*, Cambridge, England; New York: Cambridge University Press, 1995.
- [23] D. C. Mutz and P. S. Martin, "Facilitating communication across lines of political difference: The role of mass media," *American Political Science Review*, Vol. 95, No. 1, pp. 97-114, 2001.
- [24] J. M. Epstein and R. Axtell, *Growing Artificial Societies: Social Science from the Bottom Up*, Complex adaptive systems, Washington, D.C.: Cambridge, MA: The MIT Press, 1996.
- [25] R. M. Entman and S. Herbst, "Reframing public opinion as we have known it," *Mediated Politics: Communication in the Future of Democracy* (W. L. Bennett and R. M. Entman, eds.), pp. 203-225, 2001.
- [26] D. A. Graber and J. M. Smith, "Political communication faces the 21st century," *Journal of Communication*, Vol. 55, No. 3, pp. 479-507, 2005.
- [27] J. S. Lansing, "Complex adaptive systems," *Annual Reviews of Anthropology*, Vol. 32, pp. 183-204, 2003.
- [28] J. Becker, B. Niehaves, and K. Klose, "A framework for epistemological perspectives on simulation," *Journal of Artificial Societies and Social Simulation*, Vol. 8, No. 4, 2005.
- [29] A. Schmid, "What is the truth of simulation?," *Journal of Artificial Societies and Social Simulation*, Vol. 8, No. 4, 2005.

- [30] J. N. Druckman and K. R. Nelson, "Framing and deliberation: How citizens' conversations limit elite influence," *American Journal of Political Science*, Vol. 47, No. 4, pp. 729-745, 2003.
- [31] E. Fink, "Dynamic social impact theory and the study of human communication," *Journal of Communications*, Vol. 46, No. 4, pp. 4-12, 1996.
- [32] A. Nowak and M. Lewenstein, *Modeling Social Change with Cellular Automata*, Modeling and Simulation in the Social Sciences from a Philosophical Point of View, Boston: Kluwer Academic Publishers, pp. 249-285, 1996.