

# From Virtual to the Simulated World: Modelling the friendship network in Second Life<sup>1</sup>

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## 1. Introduction

Understanding social systems and the dynamics of empirical social networks has always been a challenge for social ethnographers (Schensul et al. 1999). Collecting information about the actors and their ties (e.g. friends, advice, social clubs etc.) is a challenge that the researchers interested in social networks face in the real world. While gathering the data is both time consuming and expensive in many circumstances (Degenne and Forse 2003), issues such as the 'boundary-specification' problem can affect the conclusions drawn from the analysis of such networks. The boundary-specification problem as posed by Niklas Luhmann refers to the task of specifying inclusion rules for actor or relations in a network study (Kossinets 2006). In practice, conclusions drawn from the analysis of such empirical networks are not taken back to the original respondents or validated against the target system.

In contrast to the real world, (3-D) virtual worlds provide the environment where real actors take part via their *avatars*. Individuals can hide their real identity, if they wish, and interact with other avatars in many ways similar to the real world. For example, in the massively multiplayer role-playing game *World of Warcraft*<sup>2</sup> (*WoW*), people can make alliances, join hands on common objectives, have friends and foes and build ties that may change in the passage of time. Second Life<sup>3</sup>, provides a much general environment for individuals to socialize, trade and build their own spaces or hyperbolae. Whereas in the real world, there is a dearth of social network data, especially, the longitudinal data, all activities of the avatars in the virtual worlds are logged. They provide the opportunity for social science researchers to test their theories, e.g. exchanges, norms, social activities, trust and reputation (c.f. Krotoski 2007). The virtual worlds and Second Life in particular, are therefore fairly suitable to conduct ethnographic and social networks and also recruit volunteers for research (Bainbridge 2007).

We still do not know to what extent observing the social interactions of the avatars in the virtual world can help in understanding the human social behaviour in reality. In this paper, we propose the idea of simulating the social networks abstracting from what we know that happens in Second Life. Agent-based simulated networks allow the flexibility to test hypotheses under different simulation settings. Rather than applying social network analysis measures directly to the available actual data, agent-based simulations may help in enhancing our knowledge of the system first. One may cross-validate the output to the real phenomena, both qualitatively and quantitatively (Moss and

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<sup>1</sup> In collaboration with Bruce Edmonds

<sup>2</sup> <http://www.wow-europe.com/en/index.xml>

<sup>3</sup> <http://secondlife.com/>

Edmonds 2005), and it would then be appropriate to choose an appropriate measure for analyzing the social networks.

In the next section, I present the outline of an agent-based model for friendship network which I would like to implement in the near future. Agents in the model represent the virtual avatars of real actors in Second Life. The aim of this modelling exercise is to devise behavioural rules for the agents in the model and analyse the generated friendship network. These rules would be an abstraction of the mechanism for making acquaintances and memberships in various communities of interests. An important aspect of this work would be investigating the evolution of trust among the agents based on the findings reported from the virtual world. The simulated networks and their statistical characteristics could then be cross-validated against the empirical research about friendship ties and trust in Second Life (c.f. Krotoski 2007).

## 2. The Model

The population in the simulation comprises of agents (simulated representation of the avatars) and within a restricted environment in which they are allowed to interact. The number of agents in the model is not fixed. Agents may remain dormant for longer periods and become active again, or may decide to drop-off the simulated world forever. Also, new agents may join the world during the simulation. There is a fixed upper limit for the maximum number of agents in the world at any time during the simulation. A sketch of the agents attributes and their rules of interaction are outlined below:

Agents are defined with respect to their profiles, assigned at the start of the simulation. The profile consists of:

- Basic characteristics (avatar appearance, gender, age group)
- Interests (sampled from a pool of interests; kept fixed)
- Communities memberships (fixed upper limit)
- A list of acquaintances or known avatars
- A list of friends (an upper limit; a subset of acquaintances)

### *General rules about friendship:*

- Agents may add other agents as their acquaintances. It is assumed that the agents reciprocated in affirmative when they receive an offer for acquaintanceship as a norm. The acquaintance relation is mutual.
- Each agent determines whether any of their acquaintances is a 'friend' or not. The decision depends upon the *similarity* between their basic characteristics, *frequency* of their interaction, *co-location*, and common communities. A likely consequence of this implementation would be an asymmetric friendship relation, i.e. an agent *A* identifying *B* as a friend, while for *B* might only merely remain an acquaintances.
- Both the acquaintance and friendship ties are dynamic and are updated by agents regularly.
- Agents can introduce their friends to each other which may result in the evolution of triadic relations.

#### *Communities in the artificial world:*

At the start, there will be some already existing communities (the number could be setup in the start of the simulation). Each community would have at least one focal person (or coordinator) who is responsible to keep the community viable. Viability of the community depends upon the size of its membership; assigned randomly. A community ceases to exist if the membership falls below this threshold. If an agent finds a more interesting community and has already reached the maximum number of memberships, it would leave off the 'least interested' one. Some agents are assigned the role of innovators who would invite others to join a new community and sends message to their acquaintances. Acquaintances accepting this offer would invite their own network of acquaintances.

#### *Co-location:*

At the start, we assign the agents random location in the simulated world. Agents may prefer to roam around or be *teleported* to specific fixed locations of interests. They have a visibility range and if they find another agent, they can check that agent's basic characteristic and can invite them to be their acquaintance. Besides the communities and friends' introduction, co-location is the third way through which agents get in contact with each other.

### **3. Summary**

I have outlined the idea of simulating the evolution of friendship network as it happens in Second Life. The first prototype model will be implemented soon. The sketch calls for filling many gaps and I hope to receive useful comments in this workshop. The prototype model (to be developed in Java) and the first results will be made available at the Centre for Policy Modelling hyperbola (in Second Life) as well as on the website (in the cyberspace).

### **References**

- Bainbridge, W.S., The Scientific Research Potential of Virtual Worlds, *Science* 27 July 2007: Vol. 317. no. 5837, pp. 472 - 476
- Degenne, A. and Forse, M. (2003), *Introducing Social Networks*, translated by A. Borges, London et al.: Sage Publications
- Kossinets, G. (2006), Effects of missing data in social networks, *Social Networks*, vol. 28, pp. 247-268, Elsevier
- Krotoski, A. (2007), Making e-friends and influencing people: Assessing the perceptions of opinion leaders in a virtual world, *International Sunbelt Social Network Conference (Sunbelt2007)*, Corfu, Greece
- Schensul, J.J., Lecompte, M.D., Trotter II, R.T., Cromley, E.K. and Singer, M. (1999), *Mapping Social Networks, Spatial Data, and Hidden Populations*, London et al.: Altamira Press