Predicting Guild Membership in Massively Multiplayer Online Games

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Abstract. Massively multiplayer online games (MMOGs) offer a unique laboratory for examining large-scale patterns of human behavior. In particular, the study of guilds in MMOGs has yielded insights about the forces driving the formation of human groups. In this paper, we present a computational model for predicting guild membership in MMOGs and evaluate the relative contribution of 1) social ties, 2) attribute homophily, and 3) existing guild membership toward the accuracy of the predictive model. Our results indicate that existing guild membership is the best predictor of future membership; moreover knowing the identity of a few influential members, as measured by network centrality, is a more powerful predictor than a larger number of less influential members. Based on these results, we propose that community detection algorithms for virtual worlds should exploit publicly available knowledge of guild membership from sources such as profiles, bulletin boards, and chat groups.

Keywords: group formation, MMOGs, community detection, homophily.

1 Introduction

Guilds in massively multiplayer online games (MMOGs) have been shown to parallel real-world social structures such as work teams and friendship networks [1,2]. Previous work has leveraged data from MMOGs and virtual worlds to conduct large-scale studies of group formation [3–5]. In the real-world, group membership can be a gateway to increased social capital. However, membership benefits are often more tangible in the virtual world, where guilds can confer direct social, economic, and military benefits to the players in the form of privileged communication channels, shared assets, control of physical territories, and tacit mutual defense agreements [6]. Note that in many MMOGs guild membership is an exclusive relationship, in which players can only belong to a single guild. Since the players are forced to choose, an examination of guild membership in these games can be highly revealing of the players’ internal assessment of the relative advantages of different social situations.

In this paper, we analyze the composition of guilds in Game X, a browser-based exploration MMOG [7]. Game X features player-led guilds who vie for physical and economic control of the fictional game world. Although nation-level conflict exists in Game X, unlike games such as Everquest (EQ) and World
of Warcraft (WoW), guilds are not primarily an enabler for player vs. player raiding activities. Our aim is to develop a computational model of the processes driving group formation and evolution within Game X and their interaction with in-game conflicts.

In this paper, we present results from the first part of our research agenda—the creation of an agent-based simulation for modeling group formation in Game X. The simulated players make guild membership decisions in a game-theoretic way by calculating the relative utility of joining vs. switching guilds. To evaluate our model, we compare the output of the simulation to the ground truth guild membership from a stable time period prior to the first nation-level conflict. Seeding our algorithm with a small number of known guild members provides the largest performance boost, particularly when the players have a high centrality. Since the leadership of guild is highly predictive of guild membership in Game X, we suggest that semi-supervised community detection approaches to community detection are likely to be particularly fruitful in this domain for a static analysis of network structure.

2 Related Work

To use virtual worlds for social science research, it is necessary to validate the “mapping” of group behavior in virtual worlds to real-world analogs [2, 8]; a topic of key importance is understanding how models of MMOG guild membership relate to group formation in the real world. A second question is whether these models generalize to guilds in a different MMOG setting. In this paper, we use Game X, a turn-based massively multiplayer online game, as our research testbed; Game X requires players to strategize how to make effective use of limited actions rather than encouraging “grinding” gameplay in which the players perform repetitive activities to gain wealth and experience in a low-risk way. Guilds in Game X provide one way of overcoming the action limitations, since multiple players can coordinate their action budgets toward the same mission.

A clear dichotomy between research approaches is whether they seek to recover the static guild membership structure [3, 10] or create a process-oriented model of group formation [3, 5]. For instance, Shah and Sukthankar showed that even transient groups from different regions in Second Life possess a group “fingerprint” that can be recognized by examining a combination of network and topic features [9]. Static models of community detection based on network structure have been employed within virtual worlds without attempting to understand the process by which these communities were created [10]. Our approach is based on a modification of a stochastic community-detection algorithm, NGGAME [11]; since NGGAME separately models the decision-making actions of individual agents rather than optimizing a measure of network partitions, it is well suited for modeling the dynamics of group formation and evolution. Similar to our work, the group formation model proposed by Ahmad et al. [5] also uses a stochastic