Supporting Social Networks With Agent-Based Services

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ABSTRACT

Current approaches to build social networking systems are based on a centralized architecture because it allows a simple browser-based user experience and makes easier and more efficient to implement many algorithms used in a social networking site (e.g., friend suggestion). However, this kind of architecture has many drawbacks for its users, e.g., lack of privacy, lack of anonymity, risks of censorship and operating costs. This paper presents a system, called Blogracy, which uses widespread and stable peer-to-peer technologies, such as distributed hash tables and BitTorrent, for coping with intrinsic defects of centralized architectures and for being the basis of solid distributed social networking platforms. Moreover, Blogracy takes advantages of multi-agent systems for simplifying the implementation of social network services in a decentralized setting.

Keywords: Information Pushing, Information Retrieval, Multi-Agent Systems, Peer-to-Peer Computing, Social Network

INTRODUCTION

Current approaches to build social networking systems are based on a centralized architecture, because such an architecture allows a simple browser-based user experience and makes easier and more efficient to implement many algorithms used in a social networking sites (e.g., friend suggestion). However, this kind of architecture has many drawbacks for its users, e.g., lack of privacy, lack of anonymity, risks of censorship and operating costs. Moreover, it makes social networking platforms vulnerable to many kind of attacks: masquerading, which occurs when a user disguises his identity and pretends to be another user, unauthorized access; denial of service; repudiation, eavesdropping; alteration of data; copy and replay attacks; and, in general, attacks making use of social engineering techniques.

In order to overcome both the intrinsic defects of centralized architectures and the general vulnerabilities of social networking platforms, many different approaches have been proposed, both as federated (i.e., consisting of multiple entities cooperating to provide the service, but
usually distinct from users) or peer-to-peer systems (with users directly cooperating to provide the service). This paper presents a system, called Blogracy, which uses widespread and stable peer-to-peer technologies, such as distributed hash tables and BitTorrent, for being the basis of solid distributed social networking platforms, and which uses multi-agent systems for simplifying the implementation of services in a decentralized setting. The next section describes the Blogracy system and show how multi-agent systems have been used for the implementation of a set of pervasive and information retrieval services. The following section presents relate work on decentralized social networks, on the use of multi-agent systems for the development of social networking platforms and on agent-based implementations of information sharing services. Finally, the last section concludes the paper by discussing the main results of our work and by introducing the directions we are following for its improvements.

**BLOGRACY**

Blogracy is an anonymous and uncensorable microblogging platform, built incrementally over BitTorrent (Cohen, 2003), a popular and resilient file-sharing service. The architecture of the platform is modular and is built around a module for basic file sharing and DHT operations, possibly exploiting an existing implementation, and another module providing a set of social services to the local user through a Web interface. Moreover, the platform provides two additional agent based modules respectively providing a set of pervasive services and a set of information retrieval and pushing services. In particular, the current prototype of Blogracy takes advantage of:

- Vuze (Vuze, 2013), a popular BitTorrent client implemented in Java and available as open source software, for implementing the file sharing and DHT operations;
- Open Social (OpenSocial and Gadgets Specification Group, 2013), a set of APIs supporting the sharing of social data, for implementing the social services;
- JADE (Bellifemine et al., 2008), probably the most known agent development environment enabling the integration of agents and both knowledge and Internet-oriented technologies, for implementing the agent-based services. Figure 1 shows the Blogracy system architecture.

**Peer-to-Peer Module**

For its basic operation, Blogracy exploits a peer-to-peer file-sharing mechanism and two
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