Chapter 2.9
Harnessing the Cloud for Mobile Social Networking Applications

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ABSTRACT

The cloud computing model inherently enables information from social networking services (Twitter, Facebook, LinkedIn, and so forth), context-based systems (location, activity, interests, etc.) and personal applications (call logs, contacts, email, calendar, and so forth) to be harnessed for multiple purposes. This article presents an agent-based system architecture for semantic and semi-automated applications that utilize the cloud to enrich and simplify communication services, for instance by displaying presence information, prioritizing information, and dynamically managing groups of users. The proposed architecture is based on the concept of aggregated social graphs, which are created from harnessed information about how people communicate. This article also presents challenges in achieving the envisioned architecture and introduces early prototyping results.

INTRODUCTION

The Internet has long been used for social interaction, some of the more popular examples being social networking applications such as Twitter, Linkedin, and Facebook (John et al., 2008; Huberman et al., 2008; Miluzzo et al., 2008; Li et al., 2008). These types of applications help users share digital media and have proven successful tools for expanding the social networks and share ideas and knowledge. At the same time a rapid growth

of mobile computing has been made possible through advanced mobile terminals connected through wireless/GSM/3G networks, which has enabled users to be ubiquitously connected and thus be 'always on'.

This rapid development in mobile computing has made social networks almost ubiquitous, where access to them can be done through a multitude of devices such as a PC or a mobile phone as well as through public information displays or pervasive devices. While it is possible to access social networking services from almost anywhere, few services can today take full advantage of the mobility of the users. Therefore we propose a solution using agent-based systems for building flexible and innovative services for the cloud and the mobile semantic Web.

There are a number of challenges for supporting social interaction on mobile devices. Because of distractions from the environment it may be difficult for a user to give full attention to mobile services which suggests the need for functionality that reduces the need for user interaction. Social networking services for mobile devices should therefore work proactively and offer advice and recommendations to the user. Semantic information about users' location, context (such as what terminal they use) and situation (such as the current activity) can also be used to prioritize information from social networks to support novel mobile applications. For social networking applications it means that social interaction can be supported on a new level, where a recommender system can take advantage of current contexts as well as knowledge about activity in different social networks to improve and simplify a service.

This article explores possibilities for developing a new framework for services which use reasoning on context and social data to provide relevant functionality for the user's current situation. The purpose of this framework is to simplify services and reduce the need for user interaction by aggregating data from a number of different sources, both sensors and social networking services, and then applying semantic reasoning on this data to provide aggregated social graphs. These aggregated social graphs can then be used for different recommender systems to improve and simplify services in the cloud and mobile devices. This includes providing automatic support for group discovery, message processing, communication prioritization, as well as protecting the user by maintaining a desired level of privacy.

The rest of this article is organized as follows. First a background to the research area is presented. This is followed with a description of our proposed framework together with accompanying features and concepts. The type of framework we are proposing raise a number of challenges which are described in the subsequent section. Finally we discuss the vision and concept, ending with conclusions and future work.

BACKGROUND

Tim-Berners Lee already in 1995 defined the Web as a platform of collective intelligence. The viral growth of social networks today can be explained through both societal developments and technological advancements that together have enabled new types of applications where users today co-create content. 'The cloud' is the current paradigm of computing, building on this notion of co-creating both content and services (Lytras et al., 2008). Thus, Lee's vision of a collective intelligence is becoming true. This is in particular true for social networking applications, as users feed the services with personal information and also contribute to the development of services.

The decentralized design techniques where end users participates in creating content provides a basic model for designing social networking applications. Creating, sharing, tagging and commenting on content while building social networks (communities) are therefore central, as social needs are one reason for the viral growth of these services. However, mobile devices are