A Semantic-Enabled Engine for Mobile Social Networks*

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Abstract. Despite their success in general applications, social networks also present a series of challenges like attracting user signups, keeping a healthy contribution level, user privacy concerns, etc. This paper introduces the Social Core – a social network engine that adds semantic-based functionalities like semantic annotations, semantic search and semantic-enhanced access control; as a way to enhance and answer to the current challenges of social applications. The Social Core was integrated as part of the SmartCampus mobile platform, which is currently being live tested by around one hundred students.

Social Core Overview

Online social networks are Internet-based services that people use for managing their social relations, sharing their content and having access to the content shared by others. Beyond these most common features each social network also offers its own specific features like blogging capabilities or document creation/edition. However, despite the usefulness of their services and their general adoption, several studies have discussed concerns and issues related to them. Some common issues include the lack of clear and easy-to-understand privacy settings, and a wide-spread perception that social networks are more a distraction than useful services to be taken seriously.

To try to address the common limitations of state of the art social networks, the Social Core uses a semantic storage (introduced enabling concept search [1]) in place of a regular database. Furthermore, the Social Core defines users as an extension that allows entities to become a subject of social interactions. These subjects along with the already existing entities used as objects become the two main components for the definition of the semantic-enabled social network backend (as shown Figure 1):

- *Semantic Storage*: the Social Core defines a set of commonly used entity types such as people, places, events and media. Each entity type provides a structured definition of the metadata used to describe entities of the entity type. Note that different entity bases are defined and used as separate containers belonging to users.
- *Users*: each user is linked by id to an entity (a person entity in this version), which allows it to participate in social interactions representing the entity. Some examples of these social interactions include sharing, tagging, commenting and messaging.

The following are some of the semantic-based services provided:

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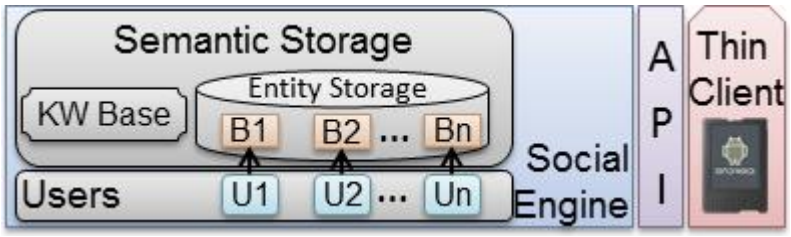

Fig. 1. Social Core as part of the SmartCampus platform.

Semantic Services and Platform

- *Access Control*: based on the RelBAC (Relation Based Access Control) theory [2]. By exploiting the translation from classifications and web directories to lightweight ontologies, we can represent both user networks (subjects) and entity organizations (objects) as lightweight ontologies. This allows computing access control and even suggesting new rules by using Description Logics. Furthermore, multiple subject, object and permission ontologies are made interoperable by Semantic Matching.
- *Semantic Annotations*: Social Core allows its users to annotate entities given that they are granted the necessary permissions to do so. The engine supports three kinds of the annotations: i) text, an arbitrary sequence of characters provided by the user e.g., "party", "xyz"; ii) semantic, a concept from the Knowledge Base that enables automated reasoning (e.g., searching for ANIMAL would find entities annotated with concepts DOG or CAT); and iii) Entity relations, a pointer to other entity (e.g., a photo entity that is annotated with the people entities that appear in it).
- *Live Topics*: a mechanism that allows its users to find and follow entities or concepts. Essentially the live topic is a query based on three main parameters: i) the source or groups of users that may be the source of the news (i.e., from who?); ii) the topic in form of a free text, a concept or an entity reference (i.e., about what?) and; iii) the type of the entities that will be returned (i.e., how is the desired information represented). Examples include: "Pictures shared by my friends from their mountain hiking" and "Tell me when anyone posts a happy hour in bar Ponte"

The Social Core is integrated through an http APIs to each of the more than one hundred Android clients in the hands of students running the SmartCampus Platform applications. The main objective of the project is to harmonize all the existing services available to the students from the University of Trento and initial data obtained from the first months of usage shows promising results.

References

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2. Giunchiglia, F. and Crispo, B., Zhang R.: Access control via lightweight ontologies. Semantic Computing (ICSC), 2011 Fifth IEEE International Conference on, pp.352 (2011).