Customized Mashups for Improved Reputation Visualization

Nicolas Spycher  
University of Fribourg  
Boulevard de Pérolles 90  
CH-1700 Fribourg  
Switzerland  
nicolas.spycher@unifr.ch

Edy Portmann  
University of California, Berkeley  
443 Soda Hall  
Berkeley, CA 94720-1776  
United States of America  
portmann@eecs.berkeley.edu

Abstract
This document describes a possible use for the YouReputation API. A mashup combining the YouReputation and the Flickr APIs attempts to improve the visualization of reputation. First, this paper gives an introduction to Web services and APIs and further explains the developed prototype. This paper introduces an API that can be easily combined with other APIs to improve the representation of reputation terms and therefore enhance usability and design.

1. Introduction

In recent years, the World Wide Web has changed significantly and is affecting more and more people every day. An increasing number of real-life actions have been transferred into the Web: from telecommuting to ever-newer ways to keep in touch with friends (e.g., Facebook¹ and Twitter²), including performing daily routines to streaming music (e.g., Spotify³ and Grooveshark⁴). The integration of Web services and functions into real life is growing faster than ever before [1], a development based on a fundamental shift in perception. Despite its humble beginnings, the Web is no longer just a simple platform for displaying content. The next step in the evolution of the Web is its change into a more social Web, often termed Web 2.0 [2]. However, no consensus exists concerning a unified definition or design. While some experts think of it as a natural evolution, others define the uniqueness of Web 2.0 broadly as the increasing human participation in the Web [3].

As businesses changed the way they connect to customers, another phenomenon called social computing emerged, referring to the intersection of social behavior and computational systems. Examples of social computing websites are social networks, RSS, weblogs, search engines and wikis, all of which provide networked communication systems for communities of people with one or more shared goals [4]. Used in a stronger sense, the term social computing refers to supporting computations carried out by groups of people, including those involved in reputation systems [5]. The main goal of reputation systems is to bring more rigorous structure into the enormous pool of organizations’ online reputations [6].

Another field vital to reputation systems is knowledge representation, the study of employing symbols to represent facts within a knowledge domain. Often it is not possible to represent every fact within a domain. As a result, human reasoning is needed to bridge the gap between representations and beliefs [7].

The following section traces the evolution of the Internet, leading towards a social Semantic Web. In addition, the YouReputation prototype is briefly introduced, and Web Services and Web APIs also receive an extensive explanation. Section 3 presents the YouReputation API and a mashup with the Flickr API ⁵, illustrating a possible application of YouReputation. Moreover, Section 3 concentrates on important features of the API that significantly enhance the usability and design of software built with it. In the last section, the conclusion and outlook for the future are presented.

2. Background

2.1 Towards a social Semantic Web

The social Semantic Web merges the social Web and the Semantic Web, combining technologies of both [8]. In the pre-Semantic Web, most of the Web’s content was designed for humans to read and not for computers to process. Now, Berners-Lee, Hendler and Lassila proclaim that new forms of Web content should be designed for computers to read, as

¹ http://www.facebook.com/  
² http://twitter.com/  
³ http://www.spotify.com/  
⁴ http://grooveshark.com/  
⁵ http://www.flickr.com/services/api/
well, and that this will unleash a landslide of new possibilities. In this way, the Semantic Web should structure the vast amount of meaningful content [9]. Web services, which are designed to support interoperable machine-to-machine interaction over a network [10], can be used for this purpose. They feature an interface described in a format easily able to be processed by machines so that they can serve functional purposes without human intervention.

A social Web is less about technology and more about mediated forms of cooperation, collective opinion formation, and cultural exchange between social groups [11], and the term is often used interchangeably with Web 2.0. The notion of the social Web evolved over time with the continuous development of social software, which centers on connecting individuals virtually with others [11]. For Hippner, the social Web comprises “web-based applications for people, who support information exchange, relationship building and communication in a social context” [12]. Examples include online shopping, gaming, education, and social networking websites.

However, Gruber argues that the social Web and the Semantic Web should be combined to form a social Semantic Web [13], thereby creating collective knowledge systems that contain user-contributed content as well as machine-gathered data. Binding these two Web can lead to something greater than the sum of its parts. Specifically, Semantic Web applications will be richly enhanced by user-generated content.

2.2 The YouReputation Prototype

The YouReputation prototype allows searching the social Web to find useful information regarding online reputation. It enables high-level scanning of social media elements in order to determine topic classes with related tags and, thus, to detect further valuable information [14]. Using today’s social Web is simple, which is why spreading information through online social interaction is easier than ever. With the rise of blogs, microblogs, and social networks, opinions are shared easily and are consumed by an ever-growing audience [15].

Due to its importance, social media drastically affects the public perception of an organization. Organizations need to closely watch what is being said about them, especially if the statements are negative. Listening to online buzz enables organizations to act upon and control their online perception [15]. The main goal of the YouReputation prototype is to help organizations monitor their online reputation with a straightforward graphical user interface. It can answer queries with detailed information gathered from the social Web and creates an interactive visualization, such as a topic map [14]. Using YouReputation’s automatically generated knowledge base, organizations can retrieve real-time semantic context for their reputation terms and systematically mitigate potential harm to organizational reputation [14, 15].

With YouReputation, the structures underlying semantic fuzzy grassroots ontology will be enhanced to allow automatic machine reasoning to bridge the gap between what is actually in the maps and what is meant, thus creating a clearer picture.

2.3 Web Service and Web API

Distributed information systems that form the social Semantic Web can be divided into three layers: [Presentation Layer, Application Logic Layer and Resource Management Layer]. While sometimes this structural abstraction may only exist in the minds of developers, most of the time the layers are clearly identifiable, and they serve as a useful reference:

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Client

Presentation Layer

Application Logic Layer

Resource Management Layer

Information System
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Figure 1 Layer Abstraction Of Information System

- **Presentation Layer**: This layer provides the needed interface for the information system to communicate with external entities, such as human users and other computers. It allows users of the system to interact with it and to receive responses to user-directed queries.
- **Application Logic Layer**: This layer represents the core of the information system. It processes received user data as requested and returns appropriate responses.
- **Resource Management Layer**: Information systems need data with which to work, and such data must be stored in databases, file
systems, or other information repositories [16].

This conceptual construct tries to logically separate the functionality of an information system. Web services are based on this architectural abstraction and are the latest response to technology changes [16]. They have an interface described in a machine-processable format known as WSDL. Other systems may interact with the Web service using SOAP messages [17].

As stated by the World Wide Web Consortium (W3C), two major classes of Web services can be identified [18]: 1. REST accordant Web services that manipulate XML representations of Web resources using a set of stateless operations, and 2. Web services that use a set of arbitrary operations.

Even though the terms Web API and Web service are often used synonymously, Web 2.0 applications have moved away from SOAP-based Web services towards a REST-style architecture [19]. A Web API is a set of defined HTTP request messages with a defined response structure, usually expressed in JSON or XML. For an API to be RESTful, it must adhere to REST architecture constraints [20]. The YouReputation API follows these constraints and is therefore RESTful.

3. YouReputation and Flickr Mashup

In the following subsections the reader should receive an idea of the new YouReputation REST API and what can be achieved with it. After an introduction of the API itself, the section explains the concept of customized mashups and proposes a possible use of the API in combination with Flickr.

3.1 The YouReputation REST API

The YouReputation API will allow developers to combine the functionality of the prototype with their own creative ideas. It enables retrieving relevant terms based on a provided keyword, which can then be used to build graphical representations term accumulation based on the keyword. Graphical representations will provide intuitive visual clarity over the sometimes ill-arranged reputation pool.

The decision to build the API RESTful is based on the increased scalability of REST Web services. REST enables Web APIs to be fully based on well-known Web architectures and therefore be very lightweight [21]. Furthermore, REST services present a lower barrier to entry, which means it requires less structural development than other Web services. Ease of creation and use supports the creative combination of different Web services into valuable mashups.

REST requires HTTP and is format-agnostic, meaning that the Web API does not depend on any particular syntax for displaying content [21]. In the case of the YouReputation API, content can be viewed in JSON, XML or CSV. At the moment, the YouReputation API provides two basic resources with several attributes that can be adjusted by the developer:

1. The GET search resource: It builds the API core and allows users to search for particular keywords in the requested return format. Furthermore, users can provide a value between 0 and 100 for the attribute percentage that defines the relevance of the proposed terms to the provided keyword.
2. The GET download resource: It builds directly upon the GET search resource and adds the ability to download the found results. If users select CSV as the return format, downloading search results becomes particularly useful because CSV can be directly imported into third-party spreadsheets.

3.2 Customized Mashups

The goals of the YouReputation prototype are to enhance the clarity of the reputation pool and to support the communication operatives in decision-making regarding their organization’s reputation. The prototype draws a topic map [15] of proposed terms and arranges them around the initial keyword. The distance between the term and the keyword determines the relevance of the term to the keyword.

The topic map structures the assorted pool of relevant terms, and users can precisely determine the relevancy of each term in relation to the keyword.

With the introduction of the YouReputation API, developers can now build their own customized mashups and reputation visualizations with others’ or their own APIs. The functions of the YouReputation prototype hold a vast array of opportunities for alternative visualization that may even improve the current representation.

3.3 A Possible Use of the YouReputation API

Communication operatives should be able to actually see their search terms in the form of an image, so they can understand their terms even better. Their job is to present an organization’s reputation. Using YouReputation, operatives can choose a product or a specialized field and easily retrieve corresponding reputation data. Viewing YouReputation’s visual representation of reputation data, both operatives and their target audience can easily understand the often complex relationships inherent in reputation monitoring. Furthermore,
operatives can zoom into one particular term and trigger new searches based on it.

The YouReputation API provides all the necessary functionality to retrieve relevant terms in reference to a particular keyword. For added figurative visualizations, the API must be combined with other APIs, thus creating a mashup9. A mashup seamlessly combines existing Web services and in so doing creates a standalone application [22]. In the present paper, the mashup between the YouReputation API and the Flickr APIs10 is examined.

3.4 Reputation Visualization Mashup

The functions of the mashup between the YouReputation and Flickr APIs are basic, but they introduce a new way of seeing proposed terms. As with the YouReputation prototype, the user first has to provide a keyword. Then, via the YouReputation API, the four most relevant terms are retrieved and returned. The mashup only returns four terms because the “percentage” attribute has a relatively high value; therefore, the results have to be exceedingly relevant to the keyword.

Next, the mashup addresses the Flickr API and retrieves one image under the Creative-Commons license11 per term. The found images belonging to the particular term are then displayed in four predetermined squares. Users can look up the terms by hovering over the displayed pictures, thus displaying an improved overview of the terms.

Here the user has two possibilities: either type a new keyword into the search box, or click an image. When clicking an image, the corresponding term itself becomes the initial keyword and a new search is triggered, retrieving four new terms with associated images. In this way, users can advance deeper into the pool of terms. In addition to these two core functions—searching by keyword and searching by clicking a picture—the mashup contains a detailed help page accessible from anywhere on the page.

At the moment, users cannot move back or forward within the search results and can only view the current search. Despite this shortcoming, the mash-up’s primary disadvantage is the inadequate tagging of Flickr images, resulting in irrelevant images and confusion within the graphical representation.

3.5 Advantages of the YouReputation API

The YouReputation API introduces a new possibility for reputation visualization by providing the data needed for a user-customized representation.

The main advantage of the YouReputation ecosystem is that users have very few restrictions regarding the representation of their reputations. Though the YouReputation prototype suggests a topic map visualization, it can be combined with any other meaningful API, increasing the creative personalization and potential clarity of the reputation search.

While other reputation presentations focus on one snapshot, YouReputation allows users to endlessly dive deeper by using found reputation terms as an initial search keyword, allowing users to understand the results of reputation searches more profoundly.

3.6 Usability and Design with the API

According to Nielsen, almost 50% of all program code is devoted to the user interface [23]. Even though this number is from 1993, the fact remains that the first impression and inherent usability of a program are grounded in the user interface.

In Web development, users’ first impressions determine how many people will stay on the website and use it. In a related fashion, usability determines the number of satisfied and returning users. If these two areas are not properly implemented, a website’s success is dubious.

The YouReputation prototype provides the basic functionalities for proper reputation research. YouReputation incorporates good design and usability by providing an API that can be easily combined with others, allowing users to create their own representation of found reputation terms.
The mashup between the YouReputation and Flickr APIs demonstrates a model user interface optimized for good first impressions and long-term usability. The simple, intuitive, and deep search design attests to the usability of YouReputation. Additionally, if users need help, a help button is easily accessible from anywhere on the site and always has the same appearance, a design that further improves the usability of the mashup.

4. Conclusion and Outlook

This article provides a possible use for the YouReputation API and illustrates its potential. YouReputation introduces a new way of displaying reputation in order to improve the retrieval and analysis of increasingly important reputation data. With the evolution towards a social Semantic Web, the social Web plays a growing role in the field of organizational reputation management. Whether people tweet, comment, or blog, the YouReputation prototype makes sense of the virtually infinite pool of customer opinion [16].

Third-party developers are encouraged to tap the full potential of YouReputation’s Web API, thereby creating customized mashups and as yet unheard-of combinations. As in the model mashup between YouReputation and Flickr, mashups have the potential to increase the clarity and offer additional functionality to advance deeper into reputation pools.

Considering the ongoing success of mobile platforms, the next step for the YouReputation prototype should be the introduction of a mobile application, preferably in the gamut of mobile operating systems, such as iOS, Android, and Windows Phone. Using YouReputation on mobile devices would allow users to constantly monitor reputation data and to react remarkably faster to negative online buzz.

Further afield, the YouReputation API can be expanded to support an even broader palette of possibilities. A potential feature would be location-based search terms, which could easily be combined with map services, such as Google Maps or Apple Maps, to allow users to assign reputation terms to specific locations.

The overall goal of the YouReputation prototype is to constantly improve a user’s ability to monitor and influence the reputation of selected keywords in the social Web.

5. References

[9] Berners-Lee T, Hendler J, Lassila O. The Semantic Web - A new form of Web content that is meaningful to computers will unleash a revolution of new possibilities. Scientific American. 2001 May; May issue

12 https://maps.google.com/