FRAMEWORKS FOR IMPROVING INTERACTIONS ON SOCIAL NETWORKS USING SEMANTIC FILTERING

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ABSTRACT
Semantic filtering has become more important in the domain of social media usage as users daily experience challenges with information integrity, inability to validate the source of information (non-repudiation) as well as other vices on social networks such as cyber stalking, site hacking and cyber espionage. This research presents a framework that can be used to investigate and improve human computer interaction by appealing to semantic filtering as a tool for making social networks safe and more useful to the teeming enthusiast. .

Keywords: Social media, information integrity, non-repudiation, networks, cyber stalking, site hacking and cyber espionage

1. INTRODUCTION

Human Computer Interaction (HCI) is the study of interaction between users and computers. It is also involves the study, planning and design of the interaction between users and computers. This is regarded as the intersection of computer science, behavioral sciences, design and several other fields of study. The term HCI was coined by Card, Moran and Newell in their seminal book titled “The Psychology of Human-Computer Interaction”. The term connotes that, unlike other tools with only limited uses, a computer has many affordances for use and this takes place in an open-ended dialog between the user and the computer. Interaction between users and computers occurs at the user interface, which includes both software and hardware.

An often sought facet of HCI is the securing of user satisfaction, although user satisfaction is not the same thing as user performance by most meaningful metrics. HCI studies a human and a machine in conjunction, it draws from supporting knowledge on both the machine and the human side. On the machine side, approaches in computer graphics, operating system, programming languages and development environments are relevant.

On the human side, communication theory, graphic and industrial design disciplines, linguistics, social sciences, cognitive psychology and human factors are also relevant (Adigun et al, 2012). The goals of HCI are

1) to improve the interactions between users and computers by making computers more usable and receptive to the user’s needs
2) to design systems that minimize the barrier between the human’s cognitive model of what they want to accomplish and the computer’s understanding of the user’s task.

Human Computer Interaction Filtering (HCIFilter) is the study of interaction between humans and computers to improve the usability of collect content relevant to your event in real-time from major social networks features in end user applications (Lee, 1999). HCIFilter is a nascent field of study by comparison. Semantic filtering is anything that has to do with the meaning process of asking around when looking for information on the Internet (Goldberg et al, 1992).

Semantic filtering utilises existing social networks instead of creating artificial connections. There is no need to evaluate an algorithm for creating a social network, as the social network is given explicitly. Social Networks is defined as the collection of a huge amount of growing implicit knowledge about people and domains of interest (Gregorio and Antonio, 2012). The social network perspective provides a clear way of analyzing the structure of whole social entities (Wasserman and Faust, 1994), (Freeman, 2004)

1.1 Problem Scenario.

Issues of semantic filtering occur when users experienced a lack of integrity with the information provided for use on social networks. Issues such as non-repudiation, cyber stalks, social site hacking and other vices that now pervades social sites is creating enormous concerns among scholars in this domains of references.(Basu et al, 1998; Maltz and Ehrlich, 1995; Fukui, 2003; Goldberg, et al, 1992; Resnick et al, 1994; Sebastian and Stefan, 2012). This leads us to investigating the process of improving Human Computer Interaction Semantic filtering for Social Networks with a view to encouraging users for the use of social networks. When information is not adequately filtered, it may be compromised. The possibility of making addition or deletion of information in the social networks environment will be proved easy for users. The fact that the semantic filtering will be considered, users can be aware of the possible divergence of opinion or representations. The possibility of reimplementation of the new must be considered at each semantic filtering's attempts.

1.2 Research Objective

The aim is to develop a model that can be used to maintain the integrity of Human Computer Interaction social networks system platforms. Specifically, the model will be designed to ascertain and achieve the following objectives:

1. Provide a basis for measuring the confidence of the users when making use of social networks system, thereby enhancing the usability and integrity of data in the social networks,
2. Ascertain the quality assurance of data in the social networks database by promoting the degree of symmetry in the human computer interactions performed by the semantic filtering.

2. RELATED WORKS

"Models" in the semantic filtering for social networks field have generally been constructed as an aid in analyzing Hybrid filtering (Basu et al, 1998), (Sebastian and Stefan, 2011), which is the combination of content filtering and social filtering. This is used to maximise precision with a recall still above specified limit. There are two basic semantic filtering for social networks: Active Semantic Filtering and Passive Semantic Filtering. The difference between the two is based on the activeness of the user that receives information. While passive semantic filtering is the information about the user is utilised. Active semantic filtering implements two models of information retrieval: user pull model and user push model. User pull model is where a user generates a query to the network of other users. User push model is where the answers on previously stated questions or information filters are feed to the user.

Active semantic filtering solutions concentrate on utilising the existing social networks provided explicitly. One of the approaches (Maltz and Ehrlich, 1995), (Sebastian and Stefan, 2011) is built on the common practise where users collect bookmarks on the interesting World Wide Web pages that they have found. Sugiyama et al. (2004) describes a social networks filtering system where users have direct impact on filtering process. The changes in the users interests are exploited to provide thorough relevance feedback to the system..

To format and distribute collections of bookmarks several simple system will be developed. With this simple system users can create "subject spaces" which are lists of hypertext links to the WWW pages with annotations on them. One of other possible solutions is to find a personal referral that can answer the given query. The network of relationships can also help in exploring the hidden web, the part of the Internet that is not indexed by search engines (Kautz et al. 1997), (Sebastian and Stefan, 2011) as some of the information is deliberately not accessible outside the intranets (Maltz and Ehrlich 1995), (Kautz et al. 1997).

3. RESEARCH FRAMEWORK

The research intends to solve the system semantic filtering for social networks problem by making use of Active Semantic filtering technique. (Sebastian and Stefan, 2012). Active semantic filtering model is constructed around semantic filtering architecture, semantic filtering coding, semantic filtering application and semantic filtering testing (Adigun et al., 2012).

The framework of the models, which provides algorithms for discovering and analyzing structure in semantic filtering and extract the unstructured information, allows them to be constructed and utilized effectively (Koller, 2009). Applications of graphical models include information extraction, speech recognition, computer vision, decoding of low-density parity-check codes, modeling of gene regulatory networks, gene finding and diagnosis of diseases, and graphical models for protein structure.

A graphical model is a probabilistic model for which a graph denotes the conditional dependence structure between random variables. They are commonly used in probability theory, statistics—particularly Bayesian statistics—and machine learning. Two branches of graphical representations of distributions are commonly used, namely, Bayesian networks and Markov networks. Both families encompass the properties of factorization and independences, but they differ in the set of independences they can encode and the factorization of the distribution that they induce (Koller, 2009).

4. SEMANTIC FILTERING MODELLING

Semantic filtering models are used in evaluation, sometimes for proofs of security. In reality, physical devices can also be used to measure semantic filtering for social networks; for example, changing of original semantic filter to a personal semantic filter and receive the information needs. Ade can be changed to Aade. The Semantic filtering model based on workflow models which were primarily constructed around three concepts which are known as the three Rs—Roles, Routes, and Rules:

(i) Role (R1):- assigned action or activities
(ii) Route (R2):- Path
(iii) Rule (R3):- Logic or sequence

The three Rs are used to measure the effectiveness of semantic filtering for social network in a social media (Adigun et al., 2012).

a) **Roles:-** The actions and activities assigned to or required or expected of a person or group. Role has the sense of "a part one has to play." The word 'role' in its earlier history (Old French rolle) had meant "a roll, as of parchment," particularly with reference to a manuscript roll. The word could also mean "a legal document" or "a list or register." From such uses it also came to refer to the text from which an actor learned a part. This use brought the word into the world of the theater where it has played an important role ever since. However, in the context of this dissertation, a role is the logical representation of a person or an application in a workflow process. Roles can change dynamically depending on who is involved in the particular workflow process. Roles allow one to easily filter the different functions word perform in a workflow process. Every words in the database plays a certain role within the semantic filtering system.

b) **Routes:-** Route is a Python re-implementation of the Rails routes system for mapping Uniform Resource Locators (URLs) to application actions, and conversely to generate URLs. A route makes it easy to create pretty and concise URLs that are useful with little effort. A route allows conditional matching based on domain, cookies, HTTP method, or a custom function. Sub-domain support is built in. Routes come with an extensive unit test suite. A route defines information sent, the information path and the receiver of the information. Routes can be sequential, parallel, conditional, or any combination of these.

c) **Rules:-** A rule is a conditional logic that assesses the status of the workflow process and determines the next steps. A rule can be based on the properties of a request or on some other data source.

A workflow consists of a sequence of connected steps. It is a depiction of a sequence of operations, declared as work of a person, a group of persons, an organization of staff, or one or more simple or complex mechanisms (Alan and Heumann, 2005; Adigun et al., 2012). Workflow may be seen as any abstraction of real work. For control purposes, workflow may be a view on real work under a chosen aspect (,Stellman and Greene, 2005; Adigun et al., 2012),thus serving as a virtual representation of actual work. The flow being described often refers to a document that is being transferred from one step to another. A workflow can also be defined as a model that represents real work for further assessment, for example, a model that describes a reliably repeatable sequence of operations.

More abstractly, a workflow is a pattern of activity enabled by a systematic organization of resources, defined roles and mass, energy and information flows, into a work process that can be documented and learned.(Berenbach et al 2009; Koousholt 2007; Adigun et al., 2012) .Workflows are designed to achieve processing intents of some sort, such as physical transformation, service provision, or information processing. Workflow concepts are closely related to other concepts used to describe organizational structure, such as silos, functions, teams, projects, policies and hierarchies. Workflows may be viewed as one primitive building block of organizations. The term workflow is used in computer programming to capture and develop human-to-machine interaction (Adigun et al., 2012).

The concept of workflow is closely related to several other fields in operations research and other fields that study the nature of work, either quantitatively or qualitatively, such as artificial intelligence (in particular, the sub-discipline of AI planning) and ethnography. The term workflow is more commonly used in particular industries, such as printing, and professional domains, where it may have particular specialized meanings. Flow control is a control concept applied to workflows to divert from static control concepts applied to stock, that simply managed the buffers of material or orders, to a more dynamic concept of control, that manages the flow speed and flow volumes in motion and in process. Such orientation to dynamic aspects is the basic foundation to prepare for more advanced job shop controls, as just-in-time or just-in-sequence. In transit visibility is a monitoring concept that applies to transported material as well as to work in process or work in progress, that is, workflows.

This model allows us to extract relevant data as well as to exclude useless and misleading contents from an HTML document. Essentially, it combines ontology reasoning with an approximate pattern-matching engine which searches for patterns in a flexible way i.e. modulo renaming, insertion, and deletion of HTML items. The filtering process is guided by the syntax as well as the semantics of the HTML documents, since it relies on both the document structure and the ontological information to which the document is related. Such information is retrieved by querying ontology reasoners.

Bayesian Network:- If the network structure of the model is a directed acyclic graph, the model represents a factorization of the joint probability of all random variables. More precisely, if the events are $X_1, \ldots, X_n$ then the joint probability satisfies

$$P[X_1, \ldots, X_n] = \prod_{i-1}^{n} P[X_i|pa_i] \quad \text{......................(1)}$$

where
pa_i is the set of parents of node X_i. In other words, the joint distribution factors into a product of conditional distributions. For example, the graphical model in the Figure shown above consists of the random variables A, B, C, D with a joint probability density that factors as:

$$P[A, B, C, D] = P[A]P[B]P[C|B, D]P[D|A, B, C]. \quad \text{...............(2)}$$

Any two nodes are conditionally independent given the values of their parents. In general, any two sets of nodes are conditionally independent given a third set if a criterion called *d*-separation holds in the graph. Local independences and global independences are equivalent in Bayesian networks.

This type of graphical model is known as a directed graphical model, Bayesian network, or belief network. Classic machine learning models like hidden Markov models, neural networks and newer models such as variable-order Markov models can be considered special cases of Bayesian networks.

Markov random field:- A Markov random field, also known as a Markov network, is a model over an undirected graph. A graphical model with many repeated subunits can be represented with plate notation**.**

Semantic filtering Architecture:- This can be defined as the design artifacts that describe how the semantic filtering controls are pronounced and how they related to the overall information technology architecture. These controls serve the purpose of maintaining the system's quality attributes of confidentiality, integrity, availability, accountability and assurance.

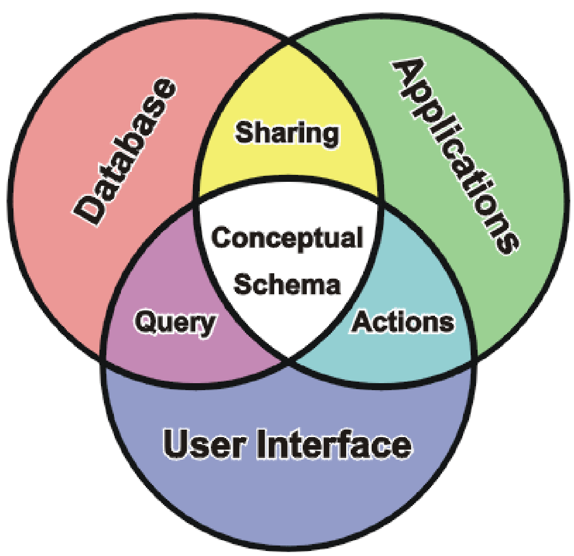

Fig. 1: The Conceptual Schema for Semantic Social Collaborative Filtering

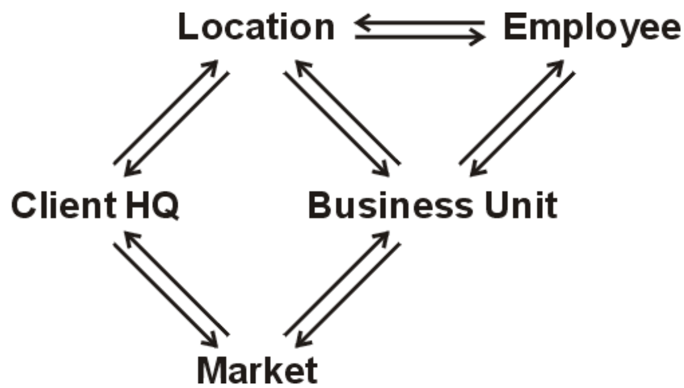

Figure 2: Semantic Social Collaborative Filtering in an Organizational Context

Semantic filtering coding:- This is the practice of writing programs that are resistant to accuracy of finding the right path to an expert, and responsiveness factor of the found expert. The referral chaining (Kautz et al. 1997) has two strong dependencies: accuracy of finding the right path to an expert, and responsiveness factor of the found expert. The backward referral chaining inverses the process of finding an expert.

```
<html>
        <track>
                <timestamp>1236521223</timestamp>
                <text>
                        Ade:Aade
                </text>
        </track>
</html>
```

Source (Field work)

```
boolean acceptValue(IlrBRLSemanticContext context,
                        IlrSyntaxTree.Node node,
                        IlrConcept concept);
boolean acceptConceptInstance(IlrBRLSemanticContext context,
                IlrSyntaxTree.Node node,
                IlrConceptInstance conceptInstance);
boolean acceptSentence(IlrBRLSemanticContext context,
                IlrSyntaxTree.Node node,
                IlrSentence sentence);
boolean acceptConcept(IlrBRLSemanticContext context,
                IlrSyntaxTree.Node node,
                IlrConcept concept);
boolean acceptVariable(IlrBRLSemanticContext context,
                IlrSyntaxTree.Node node,
                IlrBRLVariable variable);
boolean acceptExpression(IlrBRLSemanticContext context,
                IlrSyntaxTree.Node node,
                IlrBRLGrammar.Node expression);
```

Source (Shardanand and Maes, 1995))

Semantic filtering

Semantic filtering application:- Active semantic filtering application depends on maintaining the social network by users themselves. Outdated information on list of friends can mislead the person in his quest for an answer. Because the expert in the specific domain can be quite distant from the user, in terms of relationship links, the access to the answer provided dependents on the path to an expert. An expert can restrict the access to some parts of information by applying access control lists.

You associate a semantic filter to an element type of the abstract syntax, with the property semanticFilter. The value of this property must be the name of a class which implements the interface IlrBRLSemanticFilter . This interface defines acceptance methods, for each type of object to be filtered.

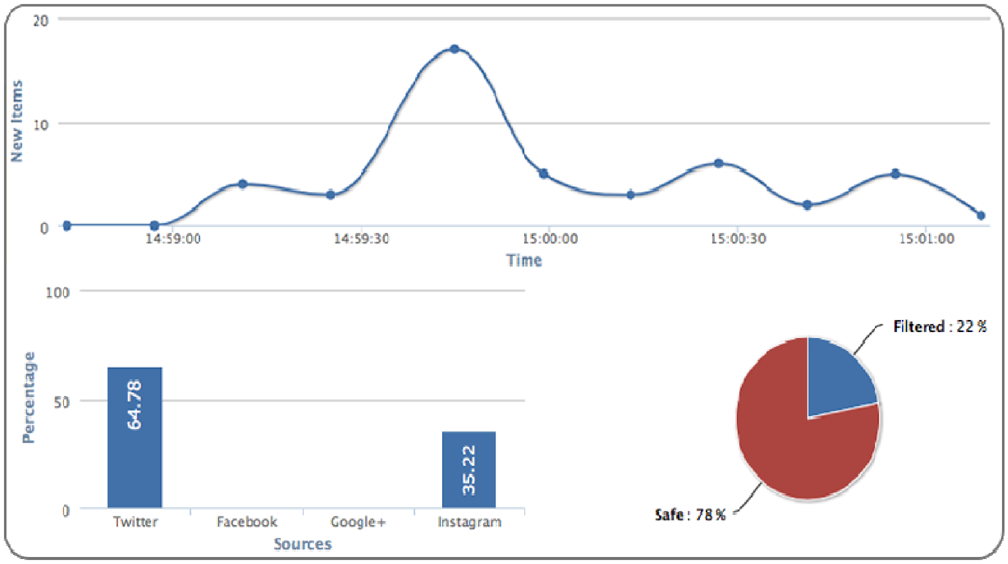

Fig. 2: Crowd convergence for Semantic filtering
Source (2013 Crowd Convergence@crowdconvergence.com)

The logical application of active semantic filtering will be used to measure the effectiveness and functionality of semantic filtering for social networks. A semantic filtering for social networks can engage multiple users from remote locations (Adigun et al., 2012).

Semantic filtering testing:- To test the effectiveness of the Human Computer Interaction semantic filtering for social networks, questions will be made available to users enabling semantic filtering of information in the database to be carried out. Semantic filtering testing allows you to filter which vocabulary elements and which types of expressions are valid for a given abstract syntax element. Choices that are not accepted will not appear in the rule editor drop-down lists. Each method is invoked for the relevant type whenever the rule editor drop-down lists are computed. If it returns false, the object is not proposed in the rule editor drop-down list.

5. CONCLUDING REMARKS

A research agenda is proposed to provide improvement in the method of evaluating semantic filtering for social networks system. The presented frameworks will assist in filtering ideas either in social networks or social media. It will also improve the degree of symmetry in the interactions performed by the semantic filtering system for Social Network.

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