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Web2Touch 2017

Semantic technologies in smart information sharing and web collaboration

Olga Nabuco, Rodrigo Bonacin
CTI Renato Archer
Campinas, SP, Brazil
{olga.nabuco, rodrigo.bonacin}@ cti.gov.br

Riccardo Martoglia
Università degli Studi di Modena e Reggio Emilia
Modena, Italy
riccardo.martoglia@unimo.it

***Abstract*— This report presents Web2Touch 2017, a Track at the 26th IEEE WETICE Conference. This year Web2Touch completed 10 editions focusing on scientific and practical works about semantic web as a support for collaborative platforms in their need for sharing knowledge. Web2Touch is an open forum for studies in multiple application domains including, for example, web science, health systems, collaborative learning, smart cooperative systems, and web collaboration and communication in general. Web2Touch 2017 includes five full papers and one short paper. The overall focus of the contributions is on the research of how semantics can improve information sharing, services, and collaboration on "the new web".**

Keywords- semantic web; knowledge representation; collaborative web; linked data; ontology

I. SEMANTIC TECHNOLOGIES APPLIED

The Web2Touch 2017 is a Track at the 26th IEEE WETICE Conference focused on semantic technologies and their applications; it completed 10 editions this year. The Web2Touch has participated in WETICE since the 2012 Conference in Toulouse. Previously, the Web2Touch workshop was hosted by several different conferences, since 2007. From the start, Web2Touch has had an original proposal of work with semantic web as a support for collaborative platforms in their need for sharing knowledge. Web2Touch continues to be the track that brings semantics to its core, by using ontologies and various Knowledge Organization Systems (KOS). Our aim is to increase knowledge of the subject by stressing different methods and algorithms. Semantics is all about meaning. The semantic technologies are able to add context to pieces of information, bringing a common understanding for those involved in sharing and collaboration activities.

The 2017 edition of the Web2Touch investigates the semantic technologies in smart information sharing and web collaboration. The track brings together researchers and practitioners to develop new models and techniques to deal with changes in how to keep information/representation consistent, reliable, manageable and retrievable.

The fast increase of web capabilities brings new opportunities and challenges for semantic technology research. Web is no longer static or "single" device oriented (e.g., a personal computer). Nowadays, many activities are dynamic and take place in real time as well as they encompass multiple computational devices on ubiquitous interactive systems. This imposes complex issues for semantic web research.

The papers of this edition aim at presenting alternatives to deal with the following practical issues:

- Developing better semantic-based recommendation systems, by calculating the distance between open linked data resources through a proposal that expands the coverage of current semantic distance approaches;
- Dealing with complexity, variety and dynamics of current malware by exploring a crowdsourcing platform for evolving ontologies about malware behavior;
- Developing heterogeneous IoT healthcare monitoring systems by using message oriented middleware and ontology to represent semantic sensors networks and experts knowledge;
- Managing the scientific shared knowledge by supporting researchers in the classification and annotation tasks using ontologies and natural language processing techniques;
- Improving communication, and knowledge management and sharing by recognizing intentions on natural language sentences using a multidimensional framework for the classification of illocutions;
- Improving the quality of services offered by educational institutions by supporting the real-time personalization and adaptation of learning business processes using ontologies.

Papers come from areas such as knowledge engineering, linked data, knowledge evolution, natural language processing, health systems, education, web science, and security. The overall focus is on the research of how semantics can improve information sharing, services, and collaboration on "the new web".

SELECTED PAPERS

Full Papers

The paper "PLDSD: Propagated Linked Data Semantic Distance", by Sultan Alfarhood, Susan Gauch and Kevin Labille, introduces a novel approach for measuring the

semantic distance between Linked Open Data resources. It is called Propagated Linked Data Semantic Distance (PLDSD) and it expands the coverage of current semantic distance approaches which are typically inapplicable to resources that are located more than two links away. An all-pair shortest path algorithm, the well-known Floyd-Warshall algorithm, is used and the experiments demonstrate that, by increasing the reach of semantic distance calculations, PLDSD increases the accuracy of the recommendations over other approaches.

The paper "A Flexible Architecture for Cognitive Sensing of Activities in Ambient Assisted Living" by Rita Zgheib, Antonio De Nicola, Maria Luisa Villani, Emmanuel Conchon and Rémi Bastide discusses the authors' experience with the design, implementation, deployment and evaluation of a Human Activity Detection application. The application relies on a software architecture for IoT-based monitoring in Ambient Assisted Living (AAL) and manages the heterogeneity challenge in IoT healthcare systems by ensuring semantic and technical interoperability, handling data acquisition for a variety of devices, and providing a novel reasoning mechanism. Sensor data and observations are annotated using an extended version of the Cognitive Semantic Sensor Network (CoSSN) ontology, thus supporting semantic detection of activities.

The paper "Enhancing the Creation of Detection Rules for Malicious Software through Ontologies and Crowdsourcing" by Antonio Carlos Marchi, André Gregio and Rodrigo Bonacin tackles the problem of analysing malicious software (malware). The proposed approach has the aim of exploiting an ontology and architecture for the development of a crowdsource-based framework and platform, in which crowdsourcing mechanisms are used to collaboratively evolve ontologies. In particular, users can propose new classes and rules that increasingly identify potential malicious programs. Eight domain experts evaluated this platform with the goal of validating and identifying its potentials and limitations.

The paper "A Web-based Knowledge Management System for Scientific Research Team" by Abir Masmoudi, Emna Mezghani, Hatem Bellaaj, Khalil Drira and Mohamed Jmaiel introduce a knowledge management system offering an annotation service that includes natural language processing techniques. This goes beyond manual annotation of the research team's papers, which is often a time consuming and labor-intensive task, especially in case of complex annotation schemas. The provided service process comprises the semantic enrichment of a domain ontology, the automatic generation of candidate categories, the forwarding of the pre-annotated papers to a web-based system and the human revision of the generated annotations. Evaluation results show its advantage in reducing human effort but also in improving annotations quality.

The paper "Recognizing Intentions in Free Text Messages: Studies with Portuguese Language" by Julio Cesar Dos Reis, Rodrigo Bonacin and Cecilia Baranauskas proposes a technique for user intention analysis in natural language sentences based on the matching with representative key phrases and semantic extension of terms. This enables to take into account domain related specificities and cultural language aspects which often hamper their machine representation and interpretation. More specifically, the authors explore a multidimensional framework of illocution categorization to structure the distinct intention classes. The conducted experiments with Portuguese datasets reveal the potentialities of the method over state-of- the-art text-mining techniques.

Short Papers

The paper "An Ontological Approach for Semantic Modeling of Learning Pathways" by Omiros Iatrellis, Achilles Kameas and Panos Fitsilis presents the EDUC8 (EDUCATE) system, which aims at providing a new approach concerning real-time personalization and adaptation of learning business processes. The system consists of a learning process execution engine supported by a semantic framework; the framework is based on an ontology enclosing the knowledge and it provides decisions and recommendations for the next steps of the learning process. These adaptive learning schemes allow to support the constant changing of a student status and conditions inside an institution.

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