

ERCIM “Alain Bensoussan” Fellowship Scientific Report

Fellow: Manuel Maarek
Visited Location: CRP Henri Tudor, Luxembourg
Duration of Visit: 12 months

I - Scientific activity

During my ERCIM “Alain Bensoussan” Fellowship period, my main research activities were focused on the elaboration and prototyping of a processor for the semantic Web. Additionally, I collaborated on a pre-project for model-based e-services regulation compliance.

The research project proposed by the host institute, the Centre d'Innovation par les Technologies de l'Information (CITI) of the CRP Henri Tudor, was my main focus during my fellowship. The ambition was to define a generic processor for the semantic Web for addressing factual, behavioural and actionable knowledge. The work was done in collaboration with Yannick Naudet, Patrick Plichart, and Thibaud Latour (my scientific contact). The semantic Web research field being new to me first objective was to become familiar with the notions and concepts of this field, and to investigate existing researches results. I identified some major related work, the goals of which are similar to the one of a processor for the semantic Web. These related works fit into three categories: (1) dynamic Web data with *Xdπ*, *ActiveXML*, and *ObjectGlobe*, (2) programming languages for the semantic Web with *ActiveRDF*, *Ripple*, and *PiDuce*, and (3) services for the semantic Web with W3C's *OWL-based Web Service Ontology (OWLS)*. Following this investigation, we have started to define a formal model for ontologies addressing factual, behavioural and actionable knowledge. Paper [1] describes this original idea.

Informal discussions within the Centre led to my involvement, together with Slim Turki and Marija Bjekovic-Obradovic, in the submission of a research proposal to CORE research call of Luxembourg's research funding body FNR. The project described in this proposal is concerned with the definition of e-Service compliance specification, for those e-Services whose business domain is conditioned with regulations and/or norms.

II- Publication(s) during your fellowship

- [1] Manuel Maarek, Yannick Naudet, Patrick Plichart, and Thibaud Latour. Ontologies, règles et Services : vers une Connaissance Actionnable. In ACM Digital Library, Actes des deuxièmes Journées Francophones sur les Ontologies (JFO 2008), 1-3 décembre 2008, Lyon, France, 2008. To appear.

Original abstract in French:

Les ontologies représentent une composante principale du Web sémantique. En soi, leur rôle est purement descriptif. Lorsqu'il s'agit de les utiliser dans un processus de raisonnement, elles doivent être associées à un ensemble de règles. Cette association est implicite quand les règles sont implémentées dans un moteur d'inférence mais elle est explicite lorsque les règles sont formalisées dans un langage dédié.

Dans la pratique, ces bases dynamiques de connaissances formées d'ontologies et de règles sont souvent associées à des opérations, actions, ou exécutions qui sortent d'un cadre purement descriptif et de raisonnement. Or, au sein du Web sémantique où les machines sont censées, à terme, pouvoir traiter les connaissances de manière autonome, il serait souhaitable que ces connaissances actionnables leur soient accessibles de manière explicite via un langage dédié. Ce manque est à combler pour atteindre une représentation complète d'un domaine donné.

Dans ce papier, nous discutons de la combinaison ontologies, règles et actions pour l'atteinte du but du Web sémantique: des machines autonomes capable de traiter les informations du Web et d'agir en conséquence. Nous postulons que ce but ne peut être atteint qu'en considérant les connaissances actionnables et montrons en particulier que les services Web peuvent contribuer à fournir celles-ci.

Abstract in English:

Ontologies, Rules and Services: Towards Actable Knowledge.

Ontologies are the main component of the semantic Web. Their role is purely descriptive. When used in a reasoning process, they are associated with rules, implicit rules in case of inference engine, and explicit rules when formalized in a dedicated language.

In practice, these databases of dynamic knowledge (composed of ontologies and rules) are always associated with operations, actions and executions diverting from purely descriptive reasoning. Nonetheless, within the semantic Web where machines are ultimately supposed to treat knowledge independently,actable data should be made explicitly accessible via a dedicated language. This lack should be solve to reach complete representation of a given domain of knowledge.

In this paper, we discuss the links between ontologies, rules and actions in an attempt to reach the semantic Web goal: autonomous machines capable of computing Web data and act accordingly. We show in particular that Web services could contribute in the formation ofactable knowledge.

III -Attended Seminars, Workshops, and Conferences

- Seminar in the host institute: CITI, Centre de Recherche Public Henri Tudor, Luxembourg, October 26, 2007. I presented my PhD work and my ongoing work within the host institute.
- Seminar during my first research exchange visit: INRIA Rhône-Alpes, Grenoble, France, June 10, 2008. I presented my PhD work and my ongoing work within the host institute.
- I attended some international lectures during my second research exchange visit: "Embedded networked Systems: Theory and Applications", the 2008 Lectures in Computer Science, the Onassis Foundation Science Lecture Series, Heraklion, Crete, Greece, July 21-25, 2008.

IV – Research Exchange Programme (12 month scheme)

- INRIA Rhône-Alpes, EXMO team, Jérôme Euzenat, Grenoble, France, June 9-13, 2008.
During the visit I had the opportunity to meet and discuss with Jérôme Euzenat and the members of his EXMO team. On the second day of my visit they invited me to present my work at a team seminar which gave us a good opportunity for discussion.
- FORTH, Dimitris Plexousakis, Heraklion, Crete, Greece, July 17-23, 2008.
During the visit I had the opportunity to meet and discuss with Dimitris Plexousakis, Martin Doerr, Dimitris Kotzinos and Vassilis Christophides, and to be introduced to the capabilities of RDFSuite developed at ICS-FORTH. My visit took place simultaneously with the Onassis Foundation Science Lecture Series on “Embedded networked Systems: Theory and Applications”. I therefore had the opportunity to attend some lectures.