NeOn Highlights

October 2009

www.neon-project.org

EU-IST-2005-027595

SIXTH FRAMEWORK PROGRAMME

From the Co-ordinator

The NeOn project started in March 2006 with the aim of delivering a major advance in the state of the art of semantic technologies, in particular by developing robust solutions, which would improve both the technological and the economical viability of large-scale, network-aware, ontology-based applications.

Three and a half years later, the project is entering its final six months and it now is a good time to reflect on our original tenets and goals and assess what we got right and what we did not. In particular, the key assumption at the basis of the project was essentially that the Semantic Web was not a transient fad, but a key technological development, which is going to stay with us and will eventually dramatically inform the way web applications are created in the future.

Well, I would say that there is little doubt we got this one right. Although the Semantic Web still has a long way to go, the picture has dramatically changed over the past few years: key players, such as Yahoo! and even Google (until recently seen as 'anti-Semantic Web'), have embraced

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Robust ontology development in NeOn

by Mari Carmen Suárez & Asunción Gómez Pérez

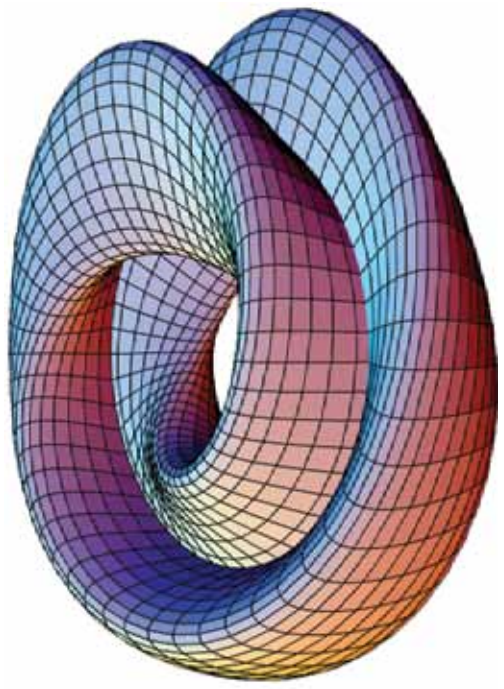
Expert ontology engineers are a scarce resource and, as ontology engineering enters the mainstream, there is now a strong need for practical methodologies, which can assist a variety of user types with ontology design tasks. To address this need NeOn proposes a scenario-based methodology ("The NeOn Methodology"), which provides guidance with respect to all key aspects of the ontology engineering process, e.g., including collaborative ontology development, the reuse of ontological and non-ontological resources, and the evolution and maintenance of networked ontologies. Crucially, this methodology is tightly coupled with the NeOn Toolkit - http://neon-toolkit.org, which provides several plugins to support concretely the various activities characterising the ontology engineering process.

In contrast with other approaches to providing methodological guidance for ontology engineering, the NeOn Methodology does not prescribe a rigid workflow, but instead suggests pathways and activities for a variety of scenarios. These scenarios cover commonly occurring situations, e.g., when existing ontologies need to be re-engineered, aligned, modularised, or integrated with non-ontological resources, such as databases, folksonomies, or thesauri. As can be expected from an international project involving six European nations, the NeOn Methodology also supports ontology localisation, to facilitate the adaptation of an ontology to different languages and cultures.

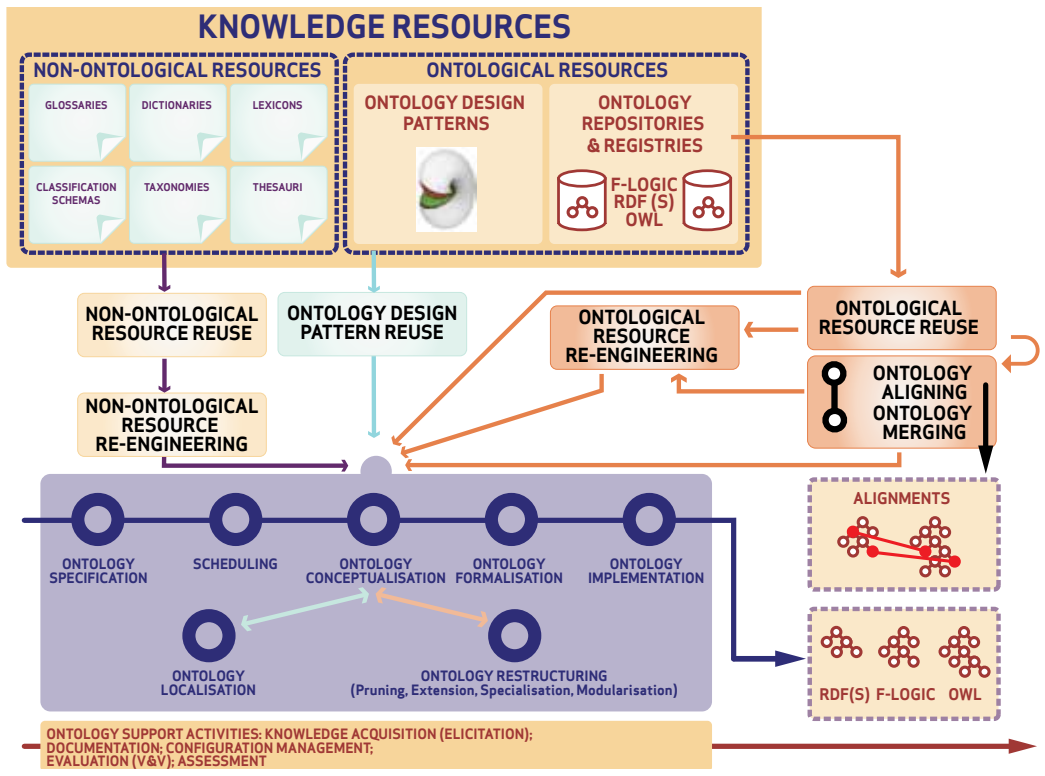
Another important aspect of the NeOn Methodology is its provision of a library of ontology design patterns (ODPs) and associated methodological guidance, to assist with ontology development. Patterns have been used for a long time in several areas of design and are meant to define understandable and reusable 'templates' characterising best practices in a particular design area. In particular, ontology design patterns provide modelling solutions which can be applied to solve recurrent ontology design problems.

While ontology engineering is often considered an art, the availability of a library of ontology design patterns is an important step towards achieving the ultimate goal of turning ontology design into a structured and reproducible engineering process.

At the time of writing, the ODP portal, found at http://ontologydesignpatterns.org, contains 67 patterns divided into six main categories: Structural, Correspondence, Content, Reasoning, Presentation, and Lexico-Syntactic. The portal is meant to define a focal point for the ontology engineering community, and provides support for submitting design patterns, retrieving them from the repository, posting modelling issues, discussing and reviewing existing solutions, and finding educational material on ontology design. Aldo Gangemi and Valentina Presutti serve as Editors-in-Chief, while a Quality Committee ensures the quality of the library.



The integration between the ODP portal and the NeOn Toolkit is provided by the XD plugin, which implements the eXtreme Design method, supporting pattern-based design in ontology engineering. XD knows good practices, and provides them to an ontology developer, in response to a specific modelling issue. XD runs like a wizard, using dialogue and graphical interfaces, and also assists a developer in adding annotations and publishing the resulting ontology in a repository.



New release of the NeOn Toolkit

by Michael Erdmann

The NeOn Toolkit provides a state of the art ontology engineering environment, implemented as an open and modular architecture on top of the Eclipse platform. Thanks to this architecture, third party developers can easily implement, publish and integrate additional functionalities into the Toolkit via plugins. 45 plugins are already available on the NeOn Toolkit homepage (www.neon-toolkit.org) and can be installed directly from the NeOn Toolkit through a specific update functionality. This set of plugins provides comprehensive support for the ontology engineering lifecycle, addressing a variety of activities including ontology reuse, alignment, evolution, visualisation, evaluation, diagnosis and repair, versioning, modularisation, automatic population, and several others.

Since its initial launch back in 2007, the NeOn Toolkit has gone through various releases and it is now better than ever! In particular, the latest version is built on top of the (Manchester) OWL API, providing full support for the latest version of the Web Ontology Language, OWL 2, as well as compatibility with other Semantic Web software tools. The OWL API is available under the open source LGPL licence and has emerged as a widely used benchmark for implementing OWL based applications. It has an active user community promising a high degree of standard compliance, and it is therefore attractive to third party developers.

With this new release, the NeOn Toolkit is now available under the open source Eclipse Public License (EPL). This opens up the toolkit to a wider audience and facilitates uptake in both commercial and non-profit environments.

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Semantic Web standards; we have witnessed the rapid growth of the Linked Open Data movement; major data release initiatives have been announced both by the US and UK governments, and as well as by major media outlets, such as the New York Times and the BBC. Of course, one could list many other key developments, all of which point to the same conclusion: the Semantic Web is quickly evolving from an academic aspiration to a commercial reality, with significant commercial breakthroughs likely to occur over the next three years.

I am pleased to say that within this extremely exciting global context, the NeOn team has produced many important technological innovations, positioning the project at the forefront of R&D in semantic technologies. Our methods for managing networks of ontologies define the state of the art in the area and they include solutions for ontology alignment, modularisation, evolution, inconsistency resolution, navigation and visualisation, to mention just a few. In addition, tools such as Cupboard, provide organisations with the complete solution for publishing and managing ontology spaces, while we can also offer several tools to support the integration of non-ontological resources in ontology engineering projects, such as legacy databases and Web 2.0 data.

All these technologies are nicely integrated and accessible within the NeOn Toolkit and provide concrete technological support for the NeOn Methodology, a resource which is especially important for organisations with relatively little experience in semantic technologies. Our case studies in both the fishery and the pharmaceutical domains provide concrete applications of our technologies and address problems of great societal and/or economic importance.

In summary, I feel we can be proud of the work realised in the project so far and indeed we are not yet done: more innovations are planned for the final six months of the project and in particular, with the new release of the NeOn Toolkit, we aim to greatly expand our user base.

This edition of NeOn Highlights illustrates some of the things we have produced and I hope that, like me, you will be impressed by the excellent job done by the NeOn team.

Happy reading!

Cupboard: sharing and reusing networked ontologies

by Mathieu d'Aquin

Ontology engineers need a place to host their ontologies, as well as tools that can allow them to manage them and, ultimately, to make them available to others. As ontology users, we need tools that can help us to locate ontologies that are relevant to our task. In order to be able to make an informed choice, users also need information about the quality, provenance and key characteristics of the ontologies available for reuse. Finally, application developers need infrastructure components, which can support the exploration and querying of both standalone and networked ontologies.

Cupboard is an online ontology hosting system that intends to address the needs of these three categories of users. Each user of Cupboard is provided with his/her own Ontology Space, where ontologies and alignments can be uploaded and stored. An ontology space provides a summary of the networked ontologies it includes, as well as means to review and attach rich metadata to them. Moreover, advanced search mechanisms are provided so that users can easily find, inspect and explore ontologies available online. In addition to this user 'façade,' an Ontology Space also provides a virtual infrastructure for Cupboard users to build applications exploiting ontologies and alignments, as well as ontology ratings and metadata. A number of services and APIs are deployed to handle tasks such as ontology search, exploration and querying.

While Cupboard is still a young system (currently in beta testing) a number of uses and applications have already been identified and realised. For example, a Cupboard Ontology Space has been synchronised with the catalogue of design patterns on OntologyDesignPatterns.org. We have also developed a plugin for the NeOn Toolkit, providing a tool for ontology development by reuse, which exploits in particular the ratings users have given to ontologies. Experiments have shown that this plugin effectively facilitates the tasks of finding, selecting and integrating existing formal knowledge structures in an ontology development project.

Web 2.0 gets semantics

by Sofia Angeletou

The rapid establishment of the social networking and content sharing principles of Web 2.0 has led to a plethora of user-friendly web applications, such as Flickr, YouTube, and Delicious. Indeed, these are only a few of the many web applications that allow users to upload their content and annotate it with freely selected keywords, i.e. tags, with minimal effort.

This paradigm of content sharing has led to a content intensive web with billions of user-contributed resources and tags. However, the loose and unstructured nature of the annotations that currently describe the content, combined with the lack of efficient query mechanisms, hamper the retrieval and navigation of the resulting tagged resource spaces. For example a query for "aquatic plants" in Flickr will only retrieve resources explicitly tagged with these two keywords and not those tagged with lotus, water-lily etc., which indeed are aquatic plants.

FLOR (http://flor.kmi.open.ac.uk) aims to enrich the user-contributed content with formal semantics in order to overcome the above limitations. It utilises the loose semantics emerging from folksonomies, as well as formal knowledge resources. In particular, a key innovation in FLOR lies in the reuse of not one but all the ontologies made available by the Watson semantic gateway. FLOR analyses the context surrounding both tags and resources to determine their correct sense, and then assigns them to formal semantic web structures retrieved through Watson. The result is a semantic layer that imposes a clearly defined structure on the set of tags and resources. As a result, it becomes possible to perform formal queries and intelligent search on the original resource space.

A FLOR plugin for the NeOn Toolkit is currently being developed and will be available before the end of the project.

Visualising and navigating large ontologies

by Martin Dzbor

The user studies carried out at the beginning of the NeOn project clearly indicated that the user interaction metaphors used in ontology engineering toolkits are largely inadequate, especially for those users with limited experience. Hence, a key challenge in our work on Human-Ontology Interaction concerns overcoming these problems and developing novel interactive frameworks for visualising and navigating large and complex ontologies. To this purpose we designed and implemented an innovative solution, based on the idea of identifying 'key concepts' in ontologies and using them as landmarks for exploring and making sense of large ontologies.

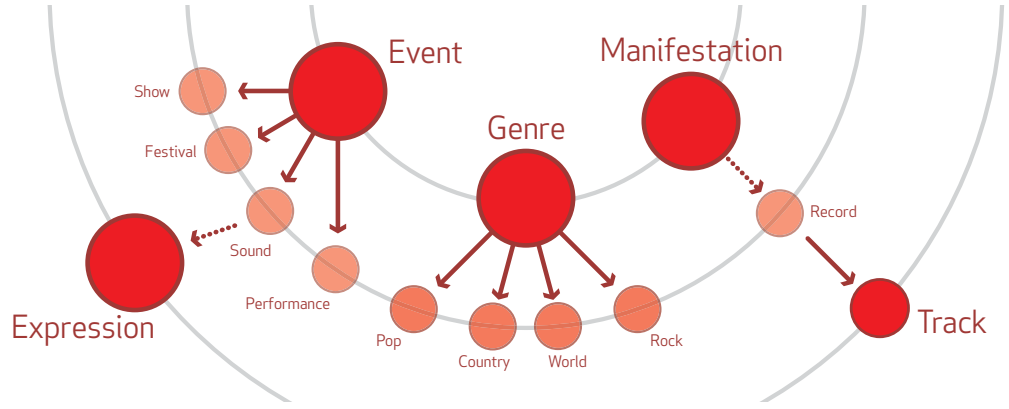
Key concepts can be seen as a limited number of descriptive ontology elements that best characterise what a particular ontology is about. In our work we elaborated and grounded this informal notion in cognitive models of so-called natural categories, and developed an automatic ontology summarisation technique based on this idea. As a result, it becomes possible for a user to get a quick understanding of an ontology of, say, one thousand concepts, simply by being presented with 15-20 key concepts. This work has been received very well by the Semantic Web community to the extent that, when first reported at the 2008 Asian Semantic Web Conference, it earned its authors a best paper award.

This approach to ontology summarisation has provided the basis for developing an innovative approach to visualising and navigating ontologies. In particular, it enables 'middle-out ontology browsing', where it becomes possible to move through complex information spaces from the most valuable nodes (i.e., key concepts) and then to unfold larger chunks of the ontological graph to inspect specific sub-parts of an ontology. This approach is similar to map-based visualisation and navigation in Geographical Information Systems, where, e.g., major cities are displayed more prominently than others, depending on the current level of granularity.

Another innovation, called 'conceptual zooming', offers the user the opportunity to calculate ontology summaries, taking into account both the content and the topology of the underlying model. Drawing upon a visual metaphor familiar to Web 2.0 users, where tags with greater popularity are depicted more prominently, our KC-Viz framework allows the user to distinguish between several layers of key concept importance, thus realising the notion of key concepts at different levels of granularity.

KC-Viz has been implemented as a NeOn Toolkit plugin and can be downloaded using the 'update' feature on the NeOn Toolkit.

Once deployed, it can process either OWL ontologies loaded locally in the NeOn Toolkit or remote ontologies known to the Watson ontology search engine and identified by their URIs.



RECENT AWARDS

First prize at the Billion Triples Challenge at ISWC 2008
NeOn partners scooped the first and second prizes at the very first Billion Triples Challenge, which was held at ISWC 2008. The first prize was awarded to the "Semaplorer" system, developed by the University of Koblenz-Landau, while the second prize went to SearchWebDB, a joint development between the University of Karlsruhe and the APEX lab at Shanghai University.

Best paper at ASWC 2008
This award went to the paper entitled "Identifying key concepts in an ontology through the integration of cognitive principles with statistical and topological measures", authored by Silvio Peroni, Enrico Motta, and Mathieu d'Aquin of the Open University. A paper by Guilin Qi (University of Karlsruhe) was also ranked among the top three ASWC 2008 papers.

Best paper at EKAW 2008
Awarded to Johanna Völker from the University of Karlsruhe for her paper entitled: "Learning disjointness for debugging mappings between lightweight ontologies". The paper was co-authored together with Christian Meilicke and Heiner Stuckenschmidt.

Honorary mention award at ESWC 2009 PhD Symposium
This prize was awarded to Fouad Zablith from the Open University for his paper entitled "Evolva: a comprehensive approach to Ontology Evolution."

Honorary mention at the ISWC 2008 PhD Symposium
This was presented to Sofia Angeletou from the Open University, for her paper entitled "Semantic enrichment of folksonomy tagspaces."

NeOn Plugin Developer's Contest winners
The first NeOn Plugin Developer's Contest was held in December 2008 and the 1st prize went to the "OBDA Plugin for NeOn" developed by Mariano Rodriguez-Muro. The 2nd prize went to the "OWL-Diff Plugin" developed by Petr Kremen, while the 3rd prize was awarded to the "Inconsistency Handler" by Steffen Stadtmüller.

A GATE-way into NeOn

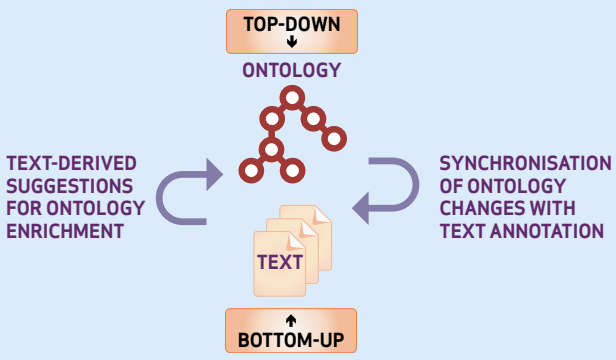
by Wim Peters & Diana Maynard


In principle, ontologies are in constant flux. At any time they can be extended on the basis of new information, which can be obtained, e.g., from domain experts or textual data. In particular, this relation between ontology and a corpus of documents is especially important in knowledge management scenarios, where ontologies are used to facilitate intelligent search in a corporate intranet.

GATE, which is one of the most widely used and well known natural language processing (NLP) architectures, has now opened yet another of its many doors towards interoperability with the NeOn ToolKit. As a result, it is now possible for ontology changes to be propagated in two directions, which we call the top-down and bottom-up approaches to ontology change.

In the top-down approach, changes to an ontology lead to changes in conceptual indexes associated with texts. This is important for GATE, which takes care of the production and management of textual metadata in the form of annotations. Texts are annotated with ontology classes, and the textual elements function as instances of these classes. For example, if a concept is deleted, all textual instances of this concept will either need to be deleted or moved to the superclass of the deleted class. If a user adds new concepts to the ontology, then it may be necessary to return to the text to check whether additional instances can be found that should be used to populate these new concepts in the ontology.

In the bottom-up approach, change may be initiated from the text side. NLP techniques can assist in the development of Semantic Web technology by imposing a linguistically motivated structured order on unrestricted natural language use within documents. By proposing changes in an ontology on the basis of textual evidence, NLP techniques provide the link between unstructured text and an ontological representation of facts. Furthermore, not only are ontologies dynamic and subject to structural change, but so are the texts and instances from which the ontologies may be derived. If we obtain additional relevant textual material and/or find new instances in that text, it may be necessary to modify the ontology to take into consideration this new information. This could include adding new concepts or new relations between existing concepts in the ontology.



For this purpose we have developed a generic GATE application called SPRAT (Semantic Pattern Recognition and Annotation Tool). It uses ontology-based information extraction techniques to generate ontological information from unstructured text. This extraction consists of identifying the key terms in the text (such as named entities and candidate terminology) and then relating them to concepts in the ontology. Typically, the core information extraction is carried out by linguistic pre-processing, such as tokenisation and POS tagging. It is then followed by a named entity recognition component and a rule-based grammar for the identification of relations within the text. At the moment, the lexico-syntactic patterns used for this identification cover class, subclass and some property relations. On the basis of this information SPRAT either creates a new ontology from scratch or augments an existing ontology with new entities by means of a chain of atomic ontology editing operations. These operations are associated with identifying patterns through NEBOnE, a specially developed ontology modification plugin for GATE. The resulting enriched ontology can then be validated by a human expert, and its accepted enrichments can then be merged with the initial seed ontology. Another specific version of this tool, SARDINE, has also been developed, which is tuned specifically towards the fisheries domain.

This two-way approach to change propagation ensures that the dynamic relation between ontologies and texts can be exploited and investigated through the gateway between GATE and the NeOn Toolkit. Our top-down approach enables changes made to the ontology to be propagated to the textual metadata, while our bottom-up approach enables an existing ontology to be augmented as a result of new textual data. Text annotations are fully synchronised with new versions of ontologies (whilst the link with older versions is maintained), and new textual evidence offers suggestions for ontology enrichment for expert evaluation within the Toolkit. A change log management system ensures full interoperability between GATE and the NeOn Toolkit and enables collaborative distributed ontology modification via both architectures.

Repairing ontologies with RaDON

by Guilin Qi, Qiu Ji & Peter Haase

As the complexity of semantic applications increases, more and more knowledge is embedded in ontologies, typically drawn from a wide variety of sources. This new generation of applications also tends to rely more and more on networks of ontologies, rather than isolated, monolithic ones. One of the major challenges in managing these networked and dynamic ontologies concerns the handling of potential inconsistencies, which can occur both in individual ontologies and, more importantly, when integrating multiple distributed ontologies that have been created independently from each other.

For inconsistency handling in single, centralised ontologies, several approaches have been proposed in recent years and a number of tools have been developed. However, there are few tools around which can diagnose and repair inconsistencies in networked ontologies.

The goal of the RaDON system is to provide support for repairing and diagnosing not only within single ontologies, but also in networked ones. It supports novel strategies and consistency models for distributed and networked environments and only assumes a very loose degree of co-ordination between publishers of ontologies in a network. RaDON extends the capabilities of existing reasoners with the functionalities to deal with all kinds of logical contradictions. Specifically, the functionalities provided by RaDON include: (1) debugging an incoherent or inconsistent ontology to explain why a concept is unfulfilling or why the ontology is inconsistent; (2) repairing an ontology automatically by computing all possible explanations for a logical contradiction; (3) repairing an ontology manually based on the debugging results (for the manual repair, the user can choose the axioms to be removed for restoring the coherence or consistency); (4) coping with inconsistency based on a paraconsistency-based algorithm.

RaDON supports OWL-DL and is implemented in Java as a plugin for the NeOn Toolkit. It is freely available at http://radon.ontoware.org. The RaDON plugin has already been applied in the FAO case study in the context of diagnosing and repairing automatically learned ontologies. Results of these applications have been reported in the NeOn Deliverable D1.2.2. available on http://neon-project.org.

Ontologies the modular way

by Mathieu d'Aquin

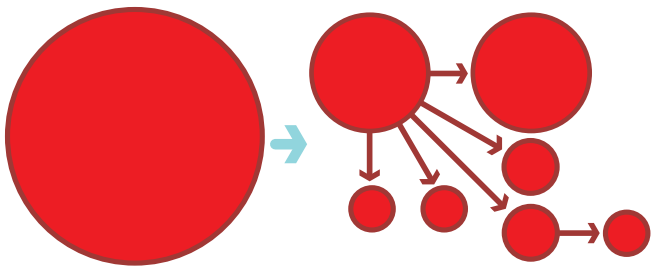
Modularity is generally considered as a good feature for any piece of engineering. In software engineering, modular design concerns the development of software programs using components that are independently realised and maintained. Such architecture facilitates the management and evolution of the program, as well as the reuse of components from one program to another.

Similarly, modularity in ontologies is recognised as having many advantages, including reusability and performance. This is because taking care of a set of small and focused modules is easier then handling a large, monolithic ontology. However, to make such a modular approach feasible for ontologies, both tool support and methodological guidelines are required.

The NeOn Toolkit is the only ontology engineering environment that includes a complete framework for the creation and manipulation of modular ontologies. First, following best practices in software design, ontologies are encapsulated in components that specify their interfaces, i.e., the elements they expose for other modules to reuse, and the ones they reuse from other modules. Modular ontologies can then be completely specified in terms of these ontology components.

In addition, the NeOn Toolkit also includes algorithms for decomposing ontologies into a set of modules, and also for extracting specific modules from ontologies, on the basis of users' specifications.

Finally, whether they are manually specified or automatically extracted, modules can be combined using simple set-based operations. For instance, new modules can be created simply by merging two modules or by removing a set of definitions from a module.



The set of modularisation plugins included in the NeOn Toolkit provides all the necessary support to adopt a modular approach to ontology design and reuse. However, such an approach requires some experience and knowledge on the part of the ontology engineer. For this reason, the NeOn Methodology also provides guidelines for the modularisation activity, thus facilitating the construction of modular ontologies by relatively inexperienced ontology engineers.

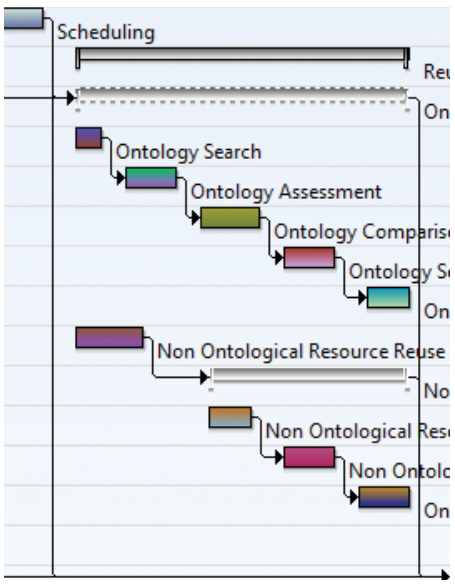
Scheduling ontology network development projects with gOntt

by Mari Carmen Suárez & Asunción Gómez-Pérez


Project scheduling refers to the activity of identifying the different processes and activities to be performed during a project, their interdependencies, and the time and resources needed for their completion. In particular, when defining a concrete schedule for an ontology development project, four important questions need to be answered:

Which life cycle model is the most appropriate for the project in hand? Which specific processes and activities need to be carried out? What are the dependencies between processes and activities? What resources are needed for the development of the ontology?

In NeOn we have developed a project management tool, gOntt, which provides project management support specifically tailored for ontology engineering projects. In particular, gOntt is able to guide the schedule generation process and the ontology engineer can use wizards to assist in selecting an appropriate ontology life-cycle model, as well as specific processes and activities. In addition, predefined templates can be used to automatically generate an initial plan for an ontology project, in the form of a Gantt chart. The embedding in gOntt of the key elements of the NeOn Methodology, and its ability to provide guidance tailored to ontology engineering projects, makes this a better choice for scheduling ontology engineering projects than existing general-purpose tools.



NeOn People

My name is Eva Blomqvist, I currently live in Rome, and I have a "fresh" PhD from April this year. I am originally from Sweden but moved to Rome in January 2009, where I am currently doing a post-doc at STLab (CNR). My PhD was in cooperation with Linköping University and Jönköping University, in Sweden. I started working with Aldo Gangemi at STLab after meeting him at the Semantic Web summer school in 2006. We then extended our collaboration to an institutional cooperation between CNR and Jönköping University. This is how I got involved in the NeOn project two years ago, even before being employed at CNR.

How did you become interested in ontology engineering?

Actually that was kind of a coincidence. When I finished my Master's degree at Linköping University, Sweden was in the worst phase of the crisis of the IT business sector, and there were no jobs for people without experience. I ended up working half a year in a shop, selling candy and tobacco, in Stockholm before I finally found a PhD position in Jönköping. My supervisor, Kurt Sandkuhl, suggested that I do my research in the ontology engineering area. At that time I had no idea what an ontology was, since my background was in traditional Software Engineering. However, I quickly learned the basics, and it was really interesting, as I found it very different from anything I had worked with previously. It was challenging, and I like challenges!

Congratulations on completing your PhD, What was it about?

The title was "Semi-automatic Ontology Construction based on Patterns", which essentially concerns constructing ontologies using automatic methods but enriching the results using ontology design patterns. The problem is that existing automatic methods (often called ontology learning methods) produce quite sparse and diverse results. Hence, we need some way of adding general background knowledge and a better structure to such ontologies, and this is where patterns come in. Content ontology design patterns are small, general, and reusable ontologies, and in my thesis I showed how these can be applied on top of the results returned by existing ontology learning methods, in order to produce better ontologies. The framework I proposed is called OntoCase.

What has been the impact of your work?

So far the method is not widely used, so I cannot say that it had any impact on ontology engineering practices yet. However, it was the first attempt to use ontology design patterns automatically, as building blocks for ontologies, so in the research community this has received some attention. Currently I am working on integrating the method into a suite of tools for pattern-based ontology design called XD that will be part of the NeOn Toolkit plugin family. As soon as the method is publicly available in a tool, I think it will have a wider impact.

How does your PhD research relate to the major themes of the NeOn project (i.e., reuse, collaboration, ontology networks, etc.)?

My PhD research was all about reuse, and especially the reuse of best practices in the form of ontology design patterns, so in that sense it was closely related. However, the work at Jönköping University was more focused on enterprise ontologies, rather than general networked ontologies, hence the application focus was slightly different.

What are you working on at the moment?

Apart from implementing parts of the OntoCase framework to be included in the XD NeOn Toolkit plugin, as I already mentioned, I am working on more general methods for pattern matching and selection. Last year we conducted a series of experiments that showed that a major obstacle to the widespread use of ontology design patterns is the lack of tool support for finding, selecting, and reusing patterns. So my current focus has shifted from the purely automatic methods presented in my thesis, to more interactive methods for supporting users in the selection process. The idea is to be able to use any kind of input the users can produce to specify their requirements - this could be anything, from a set of keywords or competency questions, to an initial ontology and try to match to a catalogue of patterns. Based on this matching, a set of suitable patterns can then be presented to the user. Furthermore, the system can even propose how these could be applied to solve the modelling problem at hand.

With which partners do you primarily collaborate?

On the methodological side, and for experimenting with methodologies, our main partner is the UPM group in Madrid. Earlier this year we held a NeOn training session at FAO, which yielded some valuable initial ideas on how to improve selection and use of patterns. Another close cooperation is with AIFB in Karlsruhe, mainly with Johanna Völker, who is working on novel ontology learning methods, which are closely related to pattern matching and ontology enrichment.

NeOn has a higher percentage of women than most other projects in the ICT area. Is this something you are aware of? Are there concrete benefits that ensue from this fact?

It is not something I have reflected on in the past, but I believe that this is one of the reasons why this project has been a success, not only on the scientific level, but also among the people working in the project. A mix of people, both genders, nationalities, and research backgrounds, is always a key factor for creating an innovative and interesting environment to work in. For a young researcher as myself it is also reassuring to see that the female senior researchers are successfully combining their research career with family life. It is important to have role models like this and not feeling forced to choose between starting a family and working in research.

What do you do when you are not working in NeOn?

I still work a bit for my old institution in Sweden as well helping out with supervising Master students, and I am also involved in a new project at CNR. When not working I like to do sports, such as running and biking, although the traffic situation in Rome sets some limits on the biking at the moment. Then of course there are frequent trips back to Jönköping, since my boyfriend still lives there.

Leaving aside your own work, what is in your view the coolest output of the NeOn project?

Actually there is no single tool or method that is my favourite, but I like the overall picture produced. I think this is the best contribution of the project, putting all the pieces together. There have been a lot of tools and methods around also before NeOn, but no attempt to unify them all and show how they fit together. After NeOn I hope that we can really see that ontology engineering has become a mature engineering field, with well established methodologies and well-functioning tools that fit together.

Customise your interaction with Kali-ma

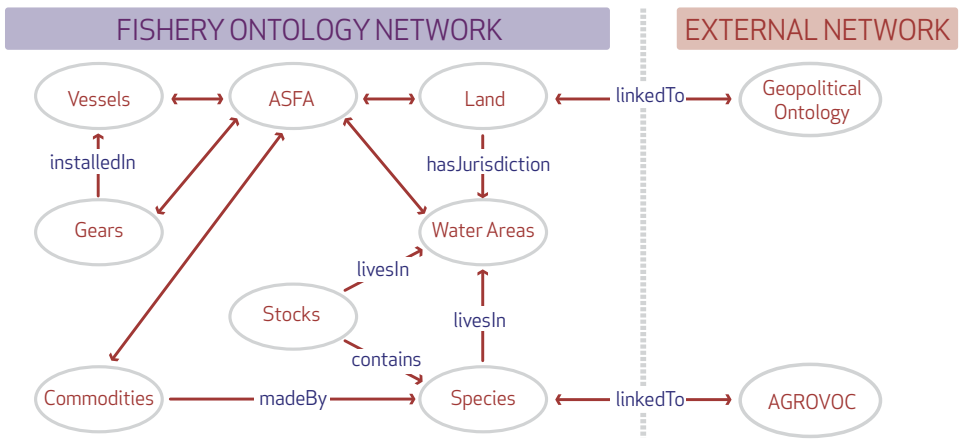
by Aldo Gangemi

Kali-ma comes as a plugin for the NeOn Toolkit providing a conceptual and interface layer to interact with the other plugins installed on the platform.

Thanks to Kali-ma, users are able to organise their favourite tools to execute the tasks involved in their ontology project. Specifically, Kali-ma provides the NeOn Toolkit with a dashboard interface that can be switched on and off from the standard NeOn Toolkit interface with just one click. This dashboard allows users to browse and select installed plugins that are classified with respect to the functionalities they provide. The selected plugins populate the dashboard with widgets that are representatives of the plugins themselves. These provide a means for quickly switching from one tool to another, bypassing the default mechanism provided by the Eclipse architecture. Selected plugins can also be stored within the resource space of an ontology project, so that each project can have one or more custom dashboard profiles associated with it. Users can export these profiles to other systems as well as share them across a collaborative ontology development environment. Kali-ma is also a semantic tool in its own right. The taxonomy of software components on a local NeOn Toolkit installation is generated on the basis of semantic descriptions of these components. In particular, each plugin is described in terms of the concepts defined in the C-ODO Light network of ontologies, a model characterising collaborative ontology design, which has been developed within NeOn.

Managing fish stocks with networked ontologies

by Marc Taconet



The role of the Food and Agriculture Organization (FAO) in the NeOn project is to provide challenging use cases for the technologies developed in the project, as well as providing the NeOn developers with requirements and feedback 'from the front line'. In particular, within FAO we need the NeOn project to provide us with advanced technologies for the management and administration of large quantities of data related to the fishery domain. Fisheries and aquaculture involve non-homogeneous data and systems which need to be integrated in order to provide better services to users. Experts, seafood producers, policy makers, and many other stakeholders need to consult fishery-related data, which may concern, e.g., Aquatic ecosystems, fishing vessels, or natural renewable sources. This information is highly correlated and provides the base for a network of ontologies built with the purpose of monitoring the state of fish stocks. This network of ontologies within the fishery domain is also connected to other ontologies, such as the geopolitical ontology, the ASFA ontology and the AGROVOC Concept Server.

The Fishery Stock Depletion Assessment System (FSDAS) is a prototypical realisation of an information analysis framework. Fishery experts at FAO can use it to assess, for example, which types of fish have been underutilised in the last year in Madagascar. In case these data are not part of any specific statistical report, they can usually be obtained through a manual cross-referenced-analysis of multiple data sources. In FSDAS a single query can retrieve the fishing gears adopted in Madagascar, ranked per total amount of fish reported to be caught. The gears in the last positions can then be explored for all the associated fish species, which can be caught by means of them. Then information on a species in a geographical distribution can be used to cluster the result around the water area of Madagascar. Finally, if the first query is restricted to the last year of fishing activity, fishery experts can then acquire a solid understanding to carry out their underutilised fish assessment for Madagascar.

In a nutshell, making sense of the mass of data available in the FAO intranet is crucial to allow us to improve our management of fishery stocks, and ultimately to prevent hunger and/or resource depletion.

The NeOn technologies, with their emphasis on integration and management of network of ontologies, provide us with a key tool for doing our job.

NeOn in the pharma domain

by Thomas Pariente & Jesus Contreras

NeOn partners are developing a network of interconnected pharmaceutical ontologies, aimed at helping to bridge the gap between different drug terminologies.

Within NeOn, the Semantic Nomenclature case study is developing a number of new ontologies to cover pharmaceutical resources available on the Internet. We are also connecting these new ontologies to other existing ones, such as DrugBank and subsets of SNOMED-CT among others. In this scenario the focus of the Semantic Nomenclature case study is less on developing a final solution for describing pharmaceutical products, than on providing the appropriate infrastructure and guidelines for interconnecting ontologies in the pharmaceutical domain, in the context of an evolving and open environment. To this extent, the ontologies will be hosted in a public space where domain experts will be able to check, validate, rank and enhance the existing network, and create their own queries using SPARQL. The case study will also provide a prototype Web 2.0 application on top of the network.

In the pharmaceutical domain, NeOn is able to improve the quality and reduce the overall cost of invoice management even for small and medium sized companies, where the technology acquisition cost has traditionally provided a barrier. Using Web applications and NeOn software extensions it will be possible to easily create adapters for e-invoice processing and ERP integration.