Thesis descriptions for OpenIRIS

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1 Semantic Desktops

Semantic Desktops aim to bring semantic annotations and intelligent reasoning capabilities to computer desktop environments. In several projects under way, researchers bring together theoretical concepts inherent in the semantic web as well as state of the art search and index tools such as Google Desktop. By using semantic desktop environment, researchers envision that users should reason about the objects or relations of their domain, rather than reasoning about the representations of these objects. As an example, a staff officer in a military planning scenario may be interested in reaching the author of a plan document that describes available resources. The object of concern is then a *person*, who may be represented in a document as a meta tag denoting the author of the document, or in an address book denoting a contact. Both these representations describe the same object of concern from the user's point of view, and a semantic desktop environment would not see these two representations as different concepts. In a military planning context, this is accentuated by the amount of documents used and the intense communication among members of staff.

2 Military Planning

Military planning at the operational level is a highly regulated activity, with documents such as the NATO Guidelines for Operational Planning (GOP) [5] that regulate the work process, responsibilities and final products of the planning process. However, it is also a creative process in which staff work together to hypothesize future events and possible scenarios. Also, planning is not only or even primarily an activity aimed at creating a final plan but is just as much a process for visualizing options and exploring possible courses of action.

Apart from doctrine prescribing how planning should be performed, several scientific models have been developed to describe the process of planning military operations, notably the Recognitional Planning model by Schmitt and Klein [8], the Recognition-Primed Decision Model [7] by Ross, Schmitt, Klein and Thunholm, and the Swedish model Planering under Tidspress (PUT) by Thunholm [9].

These models describe planning somewhat differently compared to the NATO GOP since they aim at describing rather than prescribing work procedures,

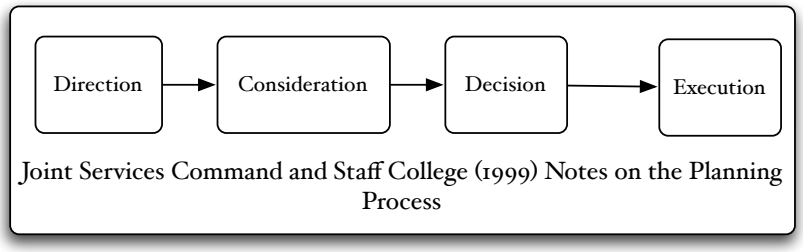

Figure 1: The planning process divided in four distinct phases

but a common theme in both models is the use of several phases during planning, in which commanders assemble intelligence information to build a good appreciation of the situation, produce outlines of courses of action, evaluate these through mental or computer-supported simulations of events, and begin the operation with an initial course of action, which may later be revised.

In Figure 1 we see a sequence of four activities that describe planning in the British military at the operational level, and captures the spirit in other similar planning descriptions such as the NATO GOP. Apart from such descriptions, and models such as the Recognition-Primed Decision Model which give a broad working definition of planning, there are other, more formal models of planning which have been described directly in ontology languages such as OWL or Loom. They are primarily targeted at the AI planning domain, where an automated planner is provided with state and operator descriptions, and should then find a logically sound plan which performs the transition from the start to the goal state. One of those models is PLANET by Gil and Blythe [4] which describes planning in terms of the concept inherent in *a plan*. PLANET was specifically intended for modeling planning with computers, although not restricted to fully automatic planners. Another ontological description, which seem better developed, is the one developed by Rajpathak and Motta [6]. Both these ontological descriptions fit well within the AI concept of planning as partially ordering a set of operators to enable the transition from a start state to a goal state. However, for situations where adaptations and re-formulations of the basic assumptions underlying the planning problem are necessary and integral parts of the planning process, these models may not be enough or even relevant to describe what actually needs to be modeled. As a reaction to this, Gil describes how various taxonomies can be used in planning to reason about the modification and adaptation of plans to real world situations, most notably for mixed-initiative planning. Gil presents the concepts of action taxonomies, plan taxonomies and goal taxonomies to describe how plans can relate to each other and how they can be transformed by using information on how actions, plans and goals can be manipulated [3].

In our project, we intend to support planners not by presenting them with automated tools for simulating events or generating actions, but rather to intelligently assemble information inherent in the documents and work flow they already work with. As an example of documents used in planning, Figure 3 shows a set of documents normally found in an operational plan (OPLAN) in NATO, where one set of the documents relate to a desired goal state and

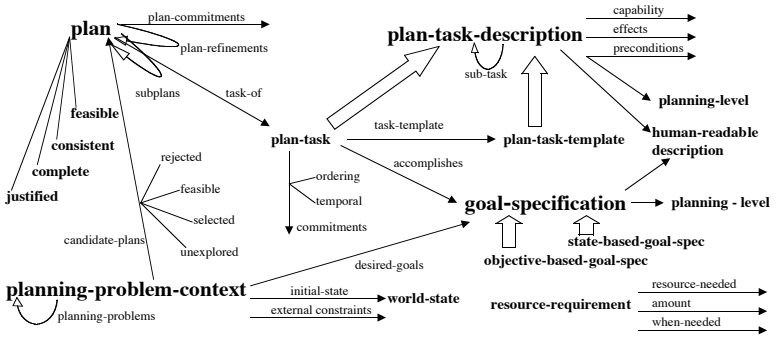

Figure 2: An overview of the PLANET plan ontology as described by Gil and Blythe (from [4])

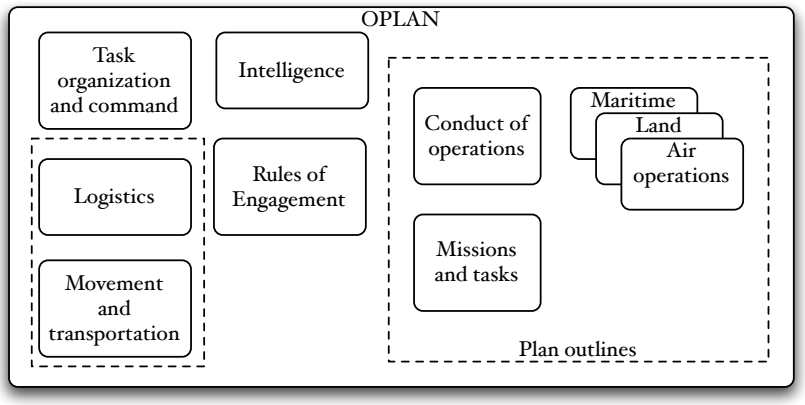

Figure 3: An operational as described by the comprising documents

desired plan actions for reaching that goal state, which is the information at the core of plan ontologies for automated planning. However, for military planning there is are many more documents involved in describing the background situation and restrictions. One document describes general preconditions (*Rules of Engagement*) which are in effect during the entire operation, and another describes the forces available (*Task organization and command*).

The planning process can be loosely coupled to the plan documents, in the sense that ...

3 Open IRIS

OpenIRIS, the open source release of IRIS [2], is a ontology-based semantic desktop tool developed by Stanford Research Institute (SRI). It consists of a number of independent, ontology-driven plugins that, through the use of ontological descriptions, describe services available to the rest of the system or the user. Some of these services are graphical components of the user inter-

face, whereas others are information gathering services that collect semantic information from the working environment within IRIS. When using IRIS as the desktop environment for a user, there are both embedded and stand-alone applications available. Those applications that are embedded within IRIS enable the system to have a close coupling to those applications and respond immediately to, for instance, a user opening an e-mail conversation. Other applications are merely launched from IRIS but run separately, and are therefore only integrated through the documents they operate on.

For information gathering, the IRIS project uses SEMEX, an open architecture for information extraction from different document types, to extract the contents of various text documents in a workspace [1]. However, until now no domain-specific ontologies have been developed within the IRIS community to specifically support work within a domain such as military planning. Such domain-specific tools could potentially be very useful assets in information-intensive environments, where they could help staff with analyzing possible communication lapses, identifying correct information sources quicker and more accurately.

3.1 Technical instructions

CVS information:

1. Set your CVSROOT to `:ext:r_only@cvs.openiris.org:/home/cvs/iris`
2. If using command line CVS, set the environment variable `CVS_RSH=ssh`
3. `cvs co iris`, the password is `r_only`

3.2 Support

The mailing list "Calo Iris calo-iris@calo.sri.com" goes to all CALO/IRIS developers, and feel free to use it. You can also subscribe to this list by sending an email to "The CALO Support Team calo-support@calo.sri.com"

Make sure to check out the documentation resources at `openiris.org`.

4 Critiquing

One of the goals of our work with Semantic Desktops is to provide domain-specific feedback to staff officers with the information provided by the IRIS environment, with the additions and modifications we make. Here are a few examples of the kinds of questions a critiquing engine could ask of the user:

- Do assumptions stated in the operational plan hold? Where and how is such information represented?
- Are the correct people involved in communicating documents?

References

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