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EXPECT: Intelligent Support for System Construction and Documentation

Quarterly R&D Report

9/12/91 – 12/11/91

1 Description of Progress

During this period, our effort concentrated on further integrating the EES framework, on which EXPECT is based, with the LOOM knowledge representation system, on getting acquainted with the TRANSCOM domain, and on improving the text planner that will be used in this project.

We have now completed the specification and re-implementation of how goals are to be matched to plans. As we now make use of the LOOM classifier capabilities, our goal matching algorithm is more powerful and faster than the original algorithm in EES, and the organization of plans in the knowledge base more compact. More specifically, plans capabilities and goals are all represented in LOOM, thus yielding to an expressive and uniform representation. The matching of goals to plans is done with the LOOM classifier, which allows for efficient semantic matches, resulting in a more robust and efficient system. The matching of goals to plans makes use of the knowledge in the domain model. Such semantically oriented approach to this matching problem together with the resulting plan organization is a new approach in planning. It is described more fully in the first of the attached technical reports: *'Organizing Plan Libraries in Subsumption Hierarchies: Specificity Based Plan Selection'*.

The more uniform representation and more efficient and robust system we now have will benefit knowledge acquisition.

Work on the text planning aspect of the project is being conducted in cooperation with the Penman project at ISI. We are investigating how the different sources of knowledge necessary to plan a multi-sentential text can be represented declaratively and distinctly. This will result in a planner that is more maintainable and generalizeable. We have already identified several sources

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of knowledge that need to be represented separately (i.e., rhetorical relations, discourse goals, and text types) and have a small prototype of the resulting architecture. This is described in the second attached technical report: *'Employing Knowledge Resources in a New text Planner Architecture'*.

We have also been conducted other work related to the text planning activity: Vibhu Mittal, a Ph.D student from USC is working on generating good examples to include in a text. This will obviously be useful in the documentation aspect of this project. A technical report of this work is also enclosed: *'Generating Effective Tutorial Descriptions that use Examples'*. Dr. Béatrice Cahour is visiting from the French research institute INRIA. Her stay is financed by INRIA Together with Dr. Paris, she is studying how the links between user models and discourse strategies vary as a dialogue proceeds. This is crucial for a generation system to be adaptive. At this point, she has completed a survey of the existing explanation strategies and their associated user model.

Finally, we have started to study the TRANSCOM domain, through meetings with the experts and readings of documents. We have designed a scenario that our system is intended to handle. This scenario was presented to Steve Cross during his visit at ISI last october.

2   Planned Activities for the Next Quarter

During the first quarter of 1992, the EXPECT project will re-design and implement the automatic program writer, to take advantage of the new matching algorithm and the LOOM knowledge representation language. We will also start modeling the TRANSCOM domain. We are anticipated a move to SUN workstations, and this will mean porting the system to the new machine. Finally, we will continue our work in the other areas mentioned above.

3   Equipment Purchased or Constructed

None.

4   Changes in Key Personnel

As of December 1991, we have added a programmer to the project. Jeff Sullivan will now be working 100 % on EXPECT. This was discussed with Steve Cross during his visit at ISI and approved by him. Dr. Swartout's involvement in the project has been reduced to 21 % (instead of the planned 30 %) because of his duties as the leader of Intelligent Systems Division. On the other hand, Dr. Patil has been involved in this project at 25 % and will remain at that percentage for the major part of 1992.

5   Trips and Meetings

None.

6   Problems and Areas of Concern

As the domain in which our research is to be conducted has been switched from local area networks to the TRANSCOM domain, some initial learning period is now necessary to get acquainted with the domain and put in place a new prototype of the system which will then enable us to conduct our research. As a result, we have scaled down the work to be performed on documentation. We will now concentrate on the coupling of the documentation with knowledge acquisition.

We are in the process of hiring a new researcher to conduct the research on knowledge acquisition. The job announcement has been out for a while. We had already interviewed some candidates last year but did not hire anyone. We believe that it is now better to hire someone in the spring, so that the framework will be fully integrated in LOOM by then and a domain model for TRANSCOM will also be in place. Therefore, by the spring, the framework will be ready for investigating knowledge acquisition issues. We have re-advertised the job and have already received applications. We will be reviewing them in January and interviewing applicants in the spring. We expect to hire someone by the summer.

7   Accomplishments

- Specification of how plans and goals are to be represented in LOOM;

- Redesign and re-implementation of the matching algorithm;

- Major changes to the organization of the text planner; small prototype in place;

- Specification of a scenario for the TRANSCOM domain.