Position Paper

AAAI Fall Symposium—AI Applications in Knowledge Navigation and Retrieval

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Understanding a user's task can provide helpful constraints in building knowledge navigation systems. Unlike a general-purpose database, one which is to be used primarily in support of a specific task can use knowledge about that task to (1) make retrieval and navigation easier for the user and (2) provide important constraints on user interfaces for zooming and browsing and (3) scaffold the process of indexing the knowledge base.

With support from an ARPA CAETI grant, we're currently building a tool for creating educational software which incorporates a large database of information. This tool is designed to create Evidence-Based Reporting Goal-Based Scenarios (GBS). In an evidence-based reporting GBS, the student is given the task of preparing a report. One of the applications we're building with this tool is "Advise the President: Cuban Missile Crisis" in which the student's job is to prepare a report advising President Kennedy about what course of action to pursue (e.g. invasion, airstrike, blockade or negotiation). In addition to expressing his opinions in the report, the student must support these opinions with evidence taken from a large database of information about the crisis. The program is designed to encourage the student to spend a good deal of time browsing the database in search of material to include in his report.

For the student's experience to be engaging and educationally effective, then, the knowledge base must be indexed so that retrieval and browsing facilitate the preparation of the report. This means the indexer (human or computer) must understand the process of preparing a report. In the specific case of evidence-based reporting, the student evaluates several plans that are under consideration and chooses one. Since we know that the student will be evaluating plans, the indexing of our database should allow queries that are likely to arise during this task. One of the entries in our database, for example, is a video in which Robert McNamara (then Secretary of Defense) states that an airstrike on Cuba would require 1000 sorties. A student might use this information to support a claim that, say, pursuing the airstrike plan will be costly. The video should therefore be indexed so that it can be retrieved when the student wants to know about the cost of the airstrike plan. Without prior knowledge of the task it is unlikely that McNamara's information would be indexed in a way which would allow it to be retrieved in this circumstance. Similar issues arise in navigation. The "1000 sorties" information should be linked to a variety of other items in the knowledge base including other information about the cost of the airstrike plan, other aspects of the airstrike plan and the cost of the other plans under consideration. Again, these relative links are unlikely to be created (either automatically or by a human) unless knowledge about the task is considered.

Because the evidence-based reporting tool is intended to allow non-computer professionals to design and build software, it is especially important to get as much leverage as possible out of the constraints imposed by the task. It is unrealistic to assume that the user of such a tool will be able to generate the appropriate indexes. Task knowledge can be useful here to help the software designer index entries in the knowledge base. Since the tool knows that the student will use the knowledge base to form and support opinions about specific plans, it can prompt the designer to index items in the knowledge base with respect to those plans. Without this task knowledge the designer would need to develop an indexing scheme on their own; a job which is as much art as it is science even for experts.