Personalised Briefing Agents to Improve Situational Awareness

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Abstract. Situational awareness is essential for effective decision making in both military and civilian domains. In order to achieve good situational awareness a decision maker must be able to access information from a number of sources and combine this with his/her current knowledge. The retrieved information must be appropriate to the task and role of the user, and be presented to him/her in an appropriate manner. Our conjecture is that Personalised Briefing Agents can assist users with achieving situational awareness by connecting to an Agent-Oriented Information System and using user models to provide personalised briefings.

Problem Statement

Situational awareness is a ubiquitous term in the military domain but it is equally important in civilian domains where crucial decisions must be made. Three widely accepted critical factors for the development of situational awareness are the perception of available facts, comprehension of the facts in relation to the individual's current knowledge, and the projection of how the situation is likely to develop in the future [1].

When trying to make a decision, a commander or executive will collaborate with other members of the team as well as consulting various information sources. This collaboration and consultation is asynchronous in nature as each member follows his/her own decision-making cycle. Each member of the group can develop his/her own situational awareness from their own interactions and experiences. Briefings are held at staff meetings in order to support the achievement of a shared situational awareness across all members of the group and to align individuals' mental models. Briefings also provide an opportunity to spot conflicts and unexplored opportunities.

The preparation of briefings is a labour-intensive process. The time spent collecting and collating information and the designing a presentation is not available for other tasks – which is as important to the business world as it is to the military. Information overload is an ever-present problem throughout the process. Individuals also have different information requirements that may not be met by a group briefing; indeed, there is a risk of overloading the individual with irrelevant information, particularly if the style of the presentation is inappropriate.

Proposed Solution

A Personalised Briefing Agent (PBA) will provide its user with a portal onto an Agent-Oriented Information System (which can in turn provide links to other systems). The PBA will provide tailored briefings to its user in order to enhance his/her situational awareness. These briefings will be produced in response to requests by the user or by the occurrence of events that will affect the user (as predicted by the user model). A number of PBAs will support the development of shared situational awareness.

The PBA is an interface agent that will interact with the user through multiple modalities such as speech, text and graphical displays. The PBA will employ user modelling to learn about the user and to adapt information filtering/retrieval and multimedia presentation systems accordingly. Factors that can affect situational awareness including cognitive stress, communications and training will be included in the user model.

Research Questions

In order to develop PBAs a number of issues must be considered. Four important categories that we intend to address in our work are given below.

Interacting with the user
* How should the PBA participate in interactions?
* How can the pattern of interaction / dialogue be used to gather information about the user?

Representing the user
* How to capture and represent the information needs of users?
* Which elements of the user model are most important?

Evaluation
* How to judge the effectiveness of the briefing on the situational awareness of the user?
* How to measure the value of personalisation?

Architectural design
* Should the PBA be a single agent or a collection of collaborating specialist agents?
* What benefits can be gained by enabling collaboration between the PBAs belonging to a group of users?

References

[1] Albert A. Nofi. Defining and Measuring Shared Situation Awareness. Center for Naval Analyses. November 2000.

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