Request for Information (RFI)
DARPA-SN-09-08: Experience-based Narrative Memory (EN-Mem)

The Defense Advanced Research Projects Agency (DARPA) Information Processing Techniques Office (IPTO) is requesting information on areas of research concerning decision support from the standpoint of a learned memory of experiences that drive the understanding of complex information streams using narrative processes.

Given the torrent of information available to a decision maker, how can a system organize and store such input as knowledge for current and future use? Too much information at too many levels of detail typifies the input stream provided by modern decision-support systems. Combat sensors, newswire feeds, video reports, and ISR platforms all provide both undigested and structured data concerning the current situation, its history, and future predictions, all without coordination or provenance. Thus, this investigation seeks to develop a means to distill and transform these complex, multi-source, heterogeneous data sources into a form that is more suitable for human consumption. To do this, it is necessary to combine relevant data from this massive stream of information into a cohesive story that is germane to the goals of a decision-maker.

Making sense of a complex situation is like understanding a story; one must construct, impose and extract an interpretation. This interpretation weaves a commonly understood narrative into the information in a way that captures the basic interactions of characters and the dynamics of their motivations while filling in details not explicitly mentioned in the input stream. It uses story lines with which we all have experience as analogies, and it simplifies the detail in order to communicate the crucial aspects of a situation. The story lines it uses are those the decision maker should be reminded of, because they are similar to the current situation based upon what the decision maker is trying to do. Like people, an Experience-based Narrative Memory system can retrieve and reuse stories to construct an appropriate interpretation of events, not because the stories have the most detail, but because they convey the aspects of a situation that are most important in determining a decision.

DARPA/IPTO is requesting approaches and methodologies for examining the related problems of situation assessment and decision management with the objective of building an intelligent system that can:

- interpret complex information streams by using a library of schematic structures;
- reorganize the information into actionable advice; and
- store its interpretations and recommendations into a dynamic memory of experience that improves the capability of the system for understanding future input streams.

Specifically, DARPA/IPTO is interested in descriptions of current or proposed research that examines how people understand complex events through narrative memory, as well as research that applies those findings to the improvement of similar memory-based functions in command, control, and communications tasks using technologies such as case-based reasoning and context-aware computing. The desired outcome of this research is a mixed-initiative system through which complex situations are made simple, understandable, and solvable.

DARPA/IPTO welcomes white paper contributions from the fields of Cognitive Science and Artificial Intelligence. Of particular interest are approaches that focus on the intelligent interpretation, storage, and reuse of information. Areas for consideration include, but are not limited to: (1) case-based reasoning and machine learning; (2) story understanding, explanation and context-aware computing; (3) intelligent information retrieval and other memory-based approaches; (4) psychological theories of narrative understanding and story telling, and; (5) knowledge-based sensor fusion.

WORKSHOP

A DARPA-sponsored workshop is being planned for early February 2009 for the purpose of reviewing on-going cognitive science and artificial intelligence research relevant to this RFI. Information presented at this workshop may assist in the formulation of possible future areas of DARPA research with the objective of creating prototype mixed-initiative systems through which complex situations could be made simple, understandable, and solvable.

Space for the workshop is limited and attendance will be by invitation only. **Invitations will be based on white papers submitted, per the instructions below, no later than 1200 noon (ET), 22 December 2008.** In addition to being invited to the workshop, some authors may be invited to provide a 10 - 15 minute (with five minutes for questions), unclassified, non-proprietary presentation on related work and on-going research activities associated with research topics relevant to this RFI. Accepted authors will be notified via email by mid-January 2009, and at that time will be given further details on the workshop (times, location, etc.). All attendees will be encouraged to participate in general discussions and to make recommendations for future research in the area.

WHITE PAPER SUBMISSION INSTRUCTIONS AND FORMAT

DARPA will employ an electronic upload process for responses to this RFI. To respond to the RFI, interested parties must complete an online cover sheet for each white paper response, which will include the information outlined below. The coversheet submission site is https://www.csc-ballston.com/rfi/rfiindex.asp?RFIid=09-08. Upon completion of the online cover sheet, a confirmation screen will appear, along with instructions on uploading the white paper. If more than one white paper is being submitted, a new coversheet with a unique userid MUST be created for each submission.

Since candidate authors may encounter heavy traffic on the web server, they SHOULD NOT wait until the day submissions are due to fill out a coversheet and submit the white paper!

DARPA will acknowledge receipt of submissions via email within 3 business days of the deadline.

White papers should briefly summarize approaches and not exceed 5 pages, including figures but not including references. Format specifications include 12 point font, single-spaced, single-sided,

8.5 by 11 inches paper, with 1-inch margins in either Microsoft Word or Adobe PDF format and zipped with either Winzip or PKZip.

1. Cover Page (1 page)
    a. Title of paper
    b. Organization
    c. Respondent's technical and administrative points of contact (names, addresses, phones and fax numbers, and email addresses)
    d. Indication of willingness to attend the Workshop
    e. Indication of willingness to present at the Workshop
2. Technical Ideas (up to 4 pages)
    a. Executive summary
    b. What the seed knowledge for such a project will be
    c. What the basic technologies would be
    d. How progress would be measured

Respondents are encouraged to be as succinct as possible while at the same time providing actionable insight.

ELIGIBILITY

DARPA invites participation from all those engaged in related research activities and appreciates responses from all capable and qualified sources including, but not limited to, universities, university-affiliated research centers, federally-funded research centers, private or public companies and Government research laboratories.

DISCLAIMERS AND IMPORTANT NOTES

This is an RFI issued solely for information and new program planning purposes. The RFI and workshop do not constitute a formal solicitation for proposals. In accordance with FAR 15.201(e), responses to this notice are not offers and cannot be accepted by the Government to form a binding contract. Submission of a white paper, and/or attendance at the workshop, is voluntary and is not required to propose to subsequent Broad Agency Announcements (if any) or research solicitations (if any) on this topic. DARPA will not provide reimbursement for costs incurred in responding to this RFI or participating in the RFI workshop. NO PROPRIETARY OR CLASSIFIED INFORMATION SHALL BE INCLUDED IN THE RFI RESPONSE. Respondents are advised that DARPA is under no obligation to acknowledge receipt of the information received or provide feedback to respondents with respect to any information submitted under this RFI.

Submissions may be reviewed by the Government (DARPA and partners); Federally Funded R&D Centers (such as MIT Lincoln Laboratory); and Systems Engineering and Technical Assistance (SETA) contractors (such as Schafer Corporation, Science and Technology Associates, CACI International, and System Analysis, Inc.).

POINT OF CONTACT

Dr. Michael Cox, IPTO Program Manager, DARPA, Email DARPA-SN09-08@darpa.mil. ANY INQUIRIES ON THIS RFI AND/OR WORKSHOP MUST BE SUBMITTED TO DARPA-SN09-08@darpa.mil. NO TELEPHONE INQUIRIES WILL BE ACCEPTED.