12TH ICCRTS

"Adapting C2 to the 21st Century"

Title:
Creating and Capturing Expertise in Mixed-Initiative Planning

Track 4: Cognitive and Social Issues
Track 1: C2 Concepts, Theory, and Policy
Track 8: C2 Technologies and Systems

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ABSTRACT

Compared with prior engagements, commanders today are exposed to a battlespace that is more dynamic and less predictable. With increasing frequency, commanders are confronted with an array of problems whose solution requires knowledge beyond their military training. In these novel situations, decision makers often rely on their past experiences incorporating a process best described in research as analogy-based reasoning and/or recognition primed decision making. While the relevancy of the experience is based on the individual, a key goal would be to capture and exchange relevant experiences between individual decision makers. The shocking events of 11 September 2001 may have been less shocking to anyone with experience serving in the Pacific theater of operations toward the end of World War II and experienced Kamikaze warfare. This paper describes work in progress at the USAF Research Laboratory Information Directorate to capture, develop, and provide an experience-based reasoning system to commanders during mixed-initiative planning. The objective of this work is to provide a rich database of experiences for the commander to compare to the current situation. The research described in this paper is aimed at developing a computational representation for episodic models, and reasoning on those models for retrieval and experience extraction.

Outline: Creating and Capturing Expertise in Mixed-Initiative Planning

I. Introduction
    a. Case-Based, Episodic, Analogy-Based, Recognition Primed decision making (a brief overview)
    b. Relevance to modern military decision makers
II. Experience Base
    a. Capture
        i. What details are important?
        ii. What is capture-able? What is definable and/or quantifiable?
        iii. How much is too much? Not enough?
        iv. What is the proper time for an 'episode'?
    b. Develop
        i. What common traits define a cohesive experience base?
        ii. How will episodes be stored?
        iii. How is a commander's intent represented?
        iv. Where can we represent information in a meaningful way?
    c. Provide
        i. What basic information is useful for drawing analogies?
        ii. What advanced, structural information is useful for drawing analogies?
        iii. How will the experience base be queried in a quasi-efficient way?
III. Develop a Computational Representation
    a. CPR overview
    b. Adapting CPR to an Episode Representation
        i. New classes
        ii. New ideas in data representation
        iii. Bringing together knowledge engineering with episodic reasoning
IV. Reasoning upon Episodic Models
    a. Meaning and analogy
    b. Getting away from just free text and simple numbers
V. Summary and Future Work