Instantiation of a Sensemaking Agent for Use with ELICIT Experimentation

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ELICIT Overview

• Introduction/ELICIT Base Experiment
• Sensemaking Agent
  Motivation for Agent
  Objectives
  Instantiation Approach
  New Avenues of Experimentation Supported
ELICIT Introduction

• ELICIT-Experimental Laboratory for Investigating Collaboration, Information-sharing, and Trust

  • Part of the Command and Control Research Program (CCRP)’s network-centric warfare initiative
  • Engaged in developing and testing principles of organization that transfer power and decision rights to the edge of the organization
  • Needed to frame testable hypotheses about the relative effectiveness of edge organizations in comparison to other methods of organization through a series of real-world simulations
  • Facility was created to run these experiments
Base Experiment

- Hypothesis testing experiment
- Live subjects, multi-user
- Run in edge or traditional hierarchy mode
- Experiment software records all actions for analysis
Experiment Task

- Identify the who, what, where and when of an adversary attack
- Task scenarios are anonymized
- Participants are anonymized
- Participants periodically receive factoids about the situation
- No one person has all the information needed
- Task success requires communication
- All communication is through the experiment software
Motivation for Agent Processing

- Flexibility in staffing experiments (hybrid runs)
- Ability to run many, many more experiments in less time for less $$$
- Theories of behavior and performance can be validated by constructing agents with specific capabilities (personalities) and confirming the resulting outcome by running experiments using agents with those personalities
Sensemaking Agent

- Plugs into ELICIT web server agent harness
- Humans and agents look the same to the server
- Able to perform all human actions
  - Click **Ready** button after receipt of instruction URL
  - **Post** factoid to website
  - **Pull** factoid(s) from websites
  - **Share** factoid
  - Add factoid to **MyFactoids** list
  - **Identify** adversary attack

- Configurable
## Loading Agent Configuration Files

### Configuration files

Select configuration file to upload onto server.
File name should begin with factoidset, names, counties, organization or agent-batch and end with .txt

<table>
<thead>
<tr>
<th>Factoid Sets</th>
<th>Names</th>
<th>Countries</th>
<th>Organizations</th>
<th>Agent Conf Files</th>
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Objectives of Sensemaking Agent

- Able to take place of human participant
- Forms mental model of situation
- Behavior varies with scenario
- Looks like a human to human participants
- Has configurable personalities
Instantiation Approach

- Agent’s view of the world
- Basic functions
- Process logic flow
High-level Sensemaking Agent Logic Flow

Message Queue

Select Message

Consider sharing before processing?

State Data

Information Processing

Awareness Processing

Social Processing

Outgoing Messages

If no message fits selection criteria

Web request

If no high value

ID? Message to share? Web request?

If not previously

State Data

Outgoing Messages

If high value

P A R I I T Y

11
Message Selection

- LIFO or FIFO
- Size of Inbox
- Memory
- Speed
Message Screening

- Is this a duplicate factoid?
- Task focus area(s)
Share or Process First?

- Communicate information first?
- Process information first?
Information Processing

• Agent constructs state tables
  • Situation
  • Team
  • Task status
  • Modeled after structures on human participant scratch paper

• Processing a sample factoid
  The Azure, Brown, Coral, Violet or Chartreuse groups may be planning an attack.
Awareness Processing

- Making sense of information in state tables (multiple iterations)
- Does the agent know any answers?
- Does it need more info?
Social Processing

• Communicating information
• Identifying the adversary attack
• Seeking additional information
• Does the agent know any answers?
• Does the agent need more info?
Sensemaking Agent Configuration

- About 4 dozen total variables
- Deterministic
- Stochastic
- Time delay
New Avenues for Experimentation

• Greatly expands the number of experiments
• Insights from human runs can be modeled and validated
• Agents can be used to explore effects of certain personalities and training on team performance
Sensemaking Agent

Q&A