

Instantiation of a Sensemaking Agent for Use with ELICIT Experimentation

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P A R I T Y

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, countries, organization or agent-batch and end with .txt

ELICIT Configuration Agent Configuration Agent JAR File

File name

Factoid Sets	Names	Countries	Organizations	Agent Conf Files
Del	Del	Del	Del	Del
<input type="checkbox"/> ehpowley@nps.edu/factoidset2-15.txt	<input type="checkbox"/> ehpowley@nps.edu/names15.txt	<input type="checkbox"/> countries1.txt	<input type="checkbox"/> cfredette@schulich.yorku.ca/organizationE-15.txt	<input type="checkbox"/> SenseMaking_AgentEAC-104.txt
<input type="checkbox"/> ehpowley@nps.edu/factoidset2m-14.txt	<input type="checkbox"/> names17.txt	<input type="checkbox"/> countries2.txt	<input type="checkbox"/> cfredette@schulich.yorku.ca/organizationE-16.txt	<input type="checkbox"/> SenseMaking_AgentEAC-176.txt
<input type="checkbox"/> ehpowley@nps.edu/factoidset2m-15.txt		<input type="checkbox"/> countries3.txt	<input type="checkbox"/> cfredette@schulich.yorku.ca/organizationE-17.txt	<input type="checkbox"/> SenseMaking_AgentEAC-196.txt
<input type="checkbox"/> ehpowley@nps.edu/factoidset2r-14.txt		<input type="checkbox"/> countries4.txt	<input type="checkbox"/> ehpowley@nps.edu/organizationB-14.txt	<input type="checkbox"/> SenseMaking_AgentEAC-203n.txt
<input type="checkbox"/> factoidset1-1.txt			<input type="checkbox"/> ehpowley@nps.edu/organizationB-15.txt	<input type="checkbox"/> SenseMaking_AgentEAC-203w.txt
<input type="checkbox"/> factoidset1-17.txt			<input type="checkbox"/> ehpowley@nps.edu/organizationE-14.txt	<input type="checkbox"/> SenseMaking_AgentEAC-205-1.txt
<input type="checkbox"/> factoidset1-1EAC-187.txt			<input type="checkbox"/> ehpowley@nps.edu/organizationE-15.txt	<input type="checkbox"/> SenseMaking_AgentEAC-207-1.txt
<input type="checkbox"/> factoidset1-5.txt			<input type="checkbox"/> marco.manso@edisoft.pt/organizationType-N2C2M2-level1.txt	<input type="checkbox"/> SenseMaking_AgentEAC-207-2.txt
<input type="checkbox"/> factoidset1a5-17.txt			<input type="checkbox"/> marco.manso@edisoft.pt/organizationType-N2C2M2-level2.txt	<input type="checkbox"/> SenseMaking_AgentEAC-207-3.txt
<input type="checkbox"/> factoidset1m-15.txt			<input type="checkbox"/> marco.manso@edisoft.pt/organizationType-N2C2M2-level3.txt	<input type="checkbox"/> SenseMaking_AgentPlaceholder1.txt
<input type="checkbox"/> factoidset1m-16.txt			<input type="checkbox"/> marco.manso@edisoft.pt/organizationType-N2C2M2-level4.txt	<input type="checkbox"/> SenseMaking_Agent_1.txt
<input type="checkbox"/> factoidset1m-17.txt			<input type="checkbox"/> marco.manso@edisoft.pt/organizationType-N2C2M2-level5.txt	<input type="checkbox"/> SenseMaking_Agent_10_1.txt
<input type="checkbox"/> factoidset1PT-17.txt			<input type="checkbox"/> organizationE-11.txt	<input type="checkbox"/> SenseMaking_Agent_10_10.txt

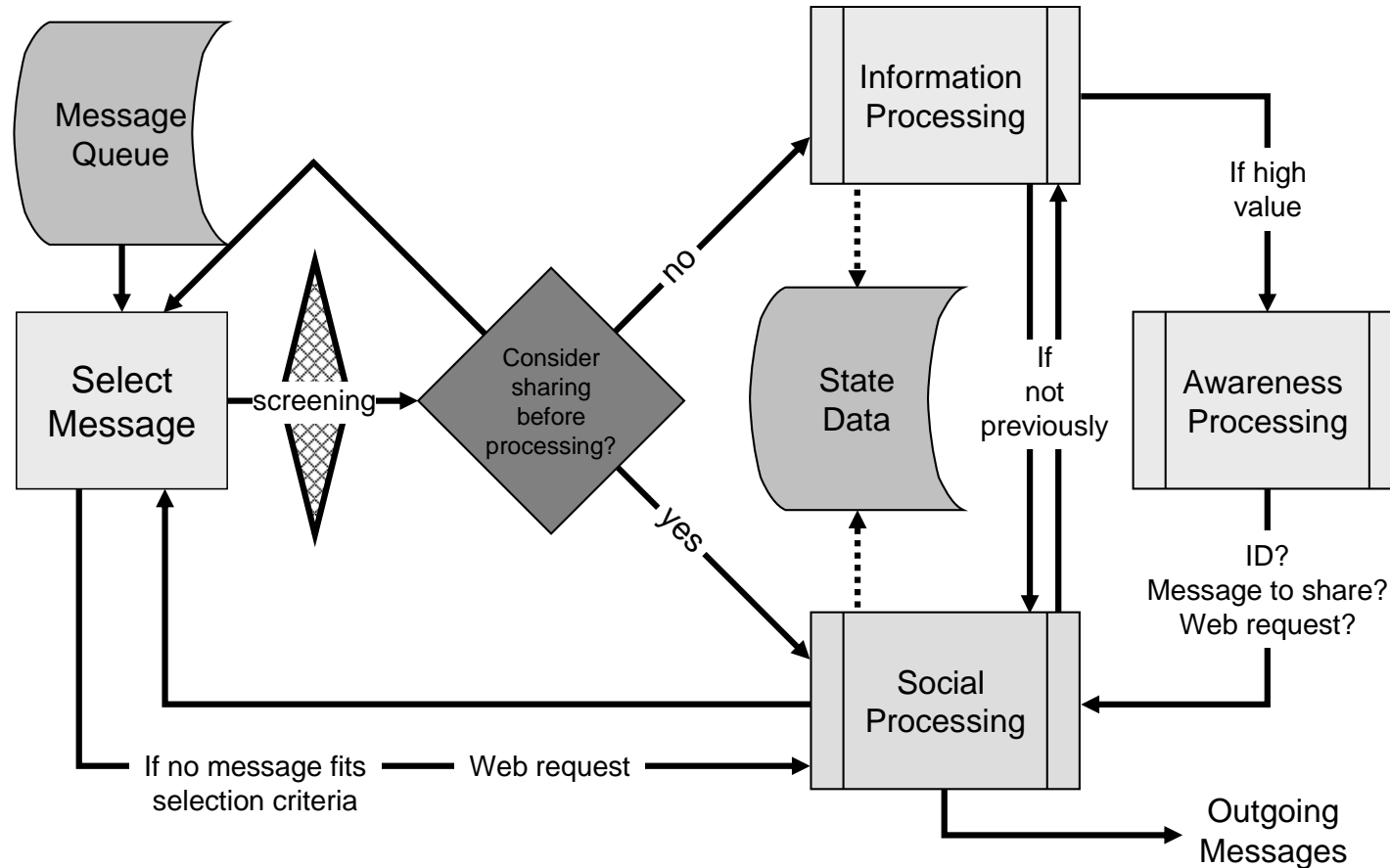
Objectives of Sensemaking Agent

- 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 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