<I-N-C-A> and the I-Room
Cut down Version of “Train for Success” Talk – 13-May-2010

An intelligent environment which acts as a knowledge aid to support collaborative operations rooms and team meeting or training spaces

OpenVCE and CoSAR Projects
Open Virtual Collaboration Environment
US Army Research Lab HRED
USJFCOM/JPRC
AIAI, University of Edinburgh
Carnegie Mellon University
University of Virginia
Open University
IHMC, University of West Florida
Perigean Technologies
EADS Innovation/Airbus Industries
Glenkier Distilleries
Metaforic/Slam Games

Austin Tate
AIAI, Informatics, University of Edinburgh

https://blog.inf.ed.ac.uk/atate/i-room/

I-Room: A Virtual Space for Intelligent Interaction

Operations Centres, Brainstorming Spaces, Team Meeting Rooms, Training and Review Areas
Sensing and Situation Analysis
Planning, Evaluation Option Argumentation
Briefing and Decision Making
Central Meeting Area
Sensing and Situation Analysis
Acting, Reacting and Communication
<I-N-C-A> Framework

- Common conceptual basis for sharing information on processes and process products
- Shared, intelligible to humans and machines, easily communicated, formal or informal and extendible
- Set of restrictions on things of interest:
  - I Issues e.g. what to do? How to do it?
  - N Nodes e.g. include activities or product parts
  - C Constraints e.g. state, time, spatial, resource, …
  - A Annotations e.g. rationale, provenance, reports, …
- Shared collaborative processes to manipulate these:
  - Issue-based sense-making (e.g. gIBIS, 7 issue types)
  - Activity Planning and Execution (e.g. mixed-initiative planning)
  - Constraint Satisfaction (e.g. AI and OR methods, simulation)
  - Note making, rationale capture (QOC), logging, reporting, etc.
- Maintain state of current status, models and knowledge
- I-X Process Panels (I-P²) use representation and reasoning together with state to present current, context sensitive, options for action

Mixed-initiative collaboration model of “mutually constraining things”
I-P\textsuperscript{2} aim is a Planning, Workflow and Task Messaging “Catch All”

- Can take ANY requirement to:
  - Handle an issue
  - Perform an activity
  - Respect a constraint
  - Note an annotation

- Deals with these via:
  - Manual activity
  - Internal capabilities
  - External capabilities
  - Reroute or delegate to other panels or agents
  - Plan and execute a composite of these capabilities (I-Plan)

- Receives reports and interprets them to:
  - Understand current status of issues, activities and constraints
  - Understand current world state, especially status of process products
  - Support the modification of the plan
  - Explain or help users control the situation

- Copes with partial knowledge of processes and organizations
I-Room: Mixed-initiative Collaboration

Truly distributed mixed initiative collaboration and task support is the focus of the I-Room, allowing for the following tasks:

- situation monitoring
- sense-making
- analysis and simulation
- planning
- option analysis
- briefing
- decision making
- responsive enactment
Underlying the use of the I-Room for collaboration and its ability to link human participants to a range of computational services and intelligent systems support are the following concepts:

- A mixed-initiative collaborative model for refining and constraining processes and products;
- Principled communication based on sharing issues, activities/processes, state, event, agents, options, argumentation, rationale, presence information and reports through the <I-N-C-A> ontology;
- The use of the <I-N-C-A> ontology also for representing the products that are developed during meetings and through the collaborative process;
- The use of I-X Technology and its suite of tools to provide task support;
- The use of issue-based argumentation, through the use of the Questions-Options-Criteria (QOC) methodology and links to sense-making tools;
- The use of agent presence models as in instant messaging;
- The use of I-X “I-Space” to support awareness of agent context, status, relationships within an organisational framework, capabilities and authorities;
- The use of an “I-World” of discovery of relevant agents and services, along with their capabilities, authorities and availability;
- The use of the “Beliefs-Desires-Intentions” (BDI) model of agents and their relationship to world state, context and other agents.
- The use of external shared repositories of processes, products, media and other resources.
- These technologies, methodologies and ontologies will form the platform on which the research can be based.