A Pragmatic Approach to Agent Societies

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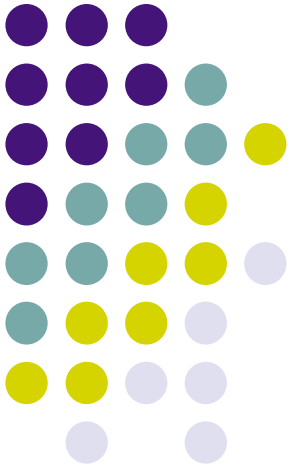

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Ackowledgments

I. Germana Da Nobrega, « Une approche dialectique à la formation de théories : aspects conceptuels, formels et pragmatiques dans le cadre de l'apprentissage humain » LIRMM PhD thesis: Un. Montpellier 2, 2002

II. Abdelkader Gouaich, « Movement, Interaction, Calculation as Primitives for Everywhere & Anytime Computing » LIRMM PhD thesis: Un. Montpellier 2, 2005

III. Nik Nailah Binti Abdullah, « Activity States: a theoretical framework for the analysis of actual human collaboration on the Web » LIRMM PhD thesis: Un. Montpellier 2, 2006

IV. Clément Jonquet, "Dynamic Service Generation: Agent interactions for service exchange on the Grid," LIRMM PhD Thesis, Un. Montpellier 2, Nov. 2006

V. Philippe Lemoisson, « Collaborative theory construction: towards a conversational abstract machine » LIRMM PhD thesis: Un. Montpellier 2, Dec. 2006 thesisPhilLemoisson

VI. Pascal Dugénie, "Espaces collaboratifs ubiquitaires sur une infrastructure à ressources distribuées," LIRMM PhD Thesis: Un. Montpellier 2, Dec. 2007

VII. Maria Augusta Silveira Netto Nunes, "Recommender Systems based on Personality Traits" LIRMM PhD Thesis: Un. Montpellier 2, Dec. 2008

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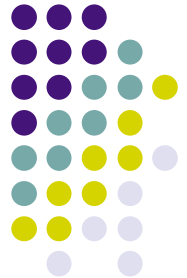
Foreword: our position



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- EU IST ELeGI project 2205 final report, 80p, June 2007

Foreword: Other's position

- **Foster, N. R. Jennings, and C. Kesselman**, "Brain meets brawn : why Grid and agents need each other," in *3rd International Joint Conference on Autonomous Agents and Multiagent Systems, AAMAS'04*, 2004, pp. 8-15. Also in: *Towards the Learning GRID: advances in Human Learning Services*. vol. 127, P. Ritrovato, C. Allison, S. A. Cerri, T. Dimitrakos, M. Gaeta, and S. Salerno, Eds. Amsterdam, NL: IOS Press, 2005, pp. 28-40.
- **N. Singh**, The Pragmatic Web: Preliminary Thoughts
  - We can achieve the vision of the semantic web by first concentrating on services rather than data and second by modelling services as *agents* rather than as distributed objects and viewing service providers and consumers as participating in rich multiagent systems.
- The Pragmatic Web site & Conferences

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Foreword: other's *recent* position

John F Sowa(Oct08) Dynamic Ontology, A Wittgensteinian Method of Relating Language to the World …This talk compares Wittgenstein's ideas to trends in artificial intelligence. Monolithic frameworks similar to his early approach have had limited success, but his later ideas suggest promising ways of developing, relating, and using *dynamically evolving ontologies*. <<omissis>>

Alan Bundy (Feb07) Cooperating Reasoning Processes: More than just the Sum of their Parts Using the achievements of my research group over the last 35+ years, I provide evidence to support the following hypothesis: By complementing each other, *cooperating reasoning process* can achieve much more than they could if they only acted individually.

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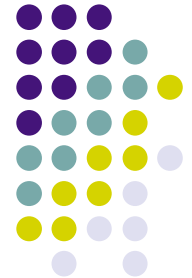
Foreword: Recent results



- P. Dugénie, S. A. Cerri, P. Lemoisson, and A. Gouaich, **"Agora UCS: Ubiquitous Collaborative Space**," in *Intelligent Tutoring Systems*. vol. 5091 LNCS, B. P. Woolf, E. Ameur, R. Nkambou, and S. Lajoie, Eds. Montréal, Springer Verlag, 2008, pp. 696-698.
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- P. Dugenie, C. Jonquet, and S. A. Cerri, **"The Principle of Immanence in GRID-Multiagent Integrated Systems**," in *AWESOME 2008*, *Agents and Web Services Merging in Distributed Environments,* Monterey, Mexico, 2008 (invited paper, in press LNCS).

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Introduction:

"If that is the solution, then … what was the problem?"

1. Optimization of the existing
2. Products
3. Centralized architectures
4. Formal learning
5. Static
6. Client server
7. Objects
8. Synchronous communication
9. Algorithms
10. Compilation
11. Web
12. Individual
13. Rationality
14. W3C XML « standards »

1. Paradigm change
2. Services
3. Distributed architectures
4. Informal learning
5. Dynamic
6. Peer-to-Peer
7. Agents
8. Asynchronous communication
9. Interaction
10. Interpretation
11. Grid
12. Social
13. Emotions
14. Ontologies

Introduction: Three paradoxes

- Gap between “social” and “technological”
  - Co-adaptation (Scanlon & O’Shea, 2007) *… We take a strong position that we now have new topologies for learning which have no direct analogues in past educational practice…*
  - spiral model
  - human activities in focus (Clancey, 2005)
- Gap between “available” and “used”
  - Learning - Doing (Eisenstadt, 2007) *…Advanced learning technologies have been touted for six decades as either a cost-effective or an exciting new way to provide real benefits to a wide audience. Yet, even given some stellar exceptions, the broader promise is demonstrably false. This paper attempts to disentangle the good from the bad, pointing out examples of what works, what fails, and why….*
- Gap between “academy” and “industry”
  - Brain - Brawn; Agents - (Web and Grid) services; Ontologies - Standards …

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Introduction: two meanings of "pragmatic"

- Pragmatic #1 : concrete
  - *"If that is the solution, then … what was the problem?"*

  Practical, concerned with making decisions and actions that are useful in practice, not just theory
- Pragmatic #2: related to Pragmatics
  - **Pragmatics** is the study of the ability of natural language speakers to communicate more than that which is explicitly stated.
  - Another perspective is that pragmatics deals with the ways we reach our goal in communication.
    - Speech Acts
- The Pragmatic Web

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Introduction: Agent Societies

- Interaction-> Human and Artificial Agents
  - HA-AA; HA-HA, HA-HA mediated; AA-AA
- Communication-> collaboration and competition
- Foundations-> sharing "meanings" in context
- Central role of Ontologies-> but also of other standards
- Human in the loop-> first of all Learning *(who can help me NOW? ->presence and trust !)*
- Asynchronous (eg: Wiki, Protegé, Neon …) and Synchronous (eg: Skype, Flashmeeting, Agora …)

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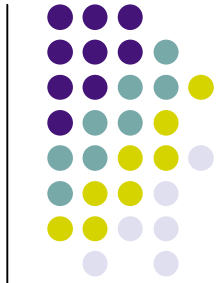
Collaboration and Sharing



- Collaboratory
  - NeON
  - Collaborative Protegé
  - BPEL4People
  - CYC
- Access Grid
  - Collabvis
- Agora - GSD
  - Current use
  - Comparing Agora with Access Grid

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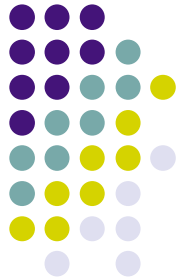
What IS Interaction?

D. Goldin, S. A. Smolka, and P. Wegner, "Interactive Computation: The New Paradigm," Berlin: Springer-Verlag, 2006



- *Problem solving*
  - ☺ **Performing a task - providing a service**
  - ☹ Algorithmically producing outputs from inputs
- *Observable Behavior*
  - ☹ Functional transformation from input to output
  - ☺ Interaction steps
  - ☺ Interleaved inputs and outputs modeled by **dynamic streams**
  - ☺ Future input values depend on past output values
- *Environment*
  - ☺ Is part of the model
  - ☺ Supplies inputs, consumes outputs
  - ☺ Cannot be static or effectively computable
  - ☺ **May include humans**
- *Concurrency*

Concurrent, distributed, reactive, embedded, component-oriented, agent-oriented, service-oriented systems exploit INTERACTION AS A FUNDAMENTAL PARADIGM

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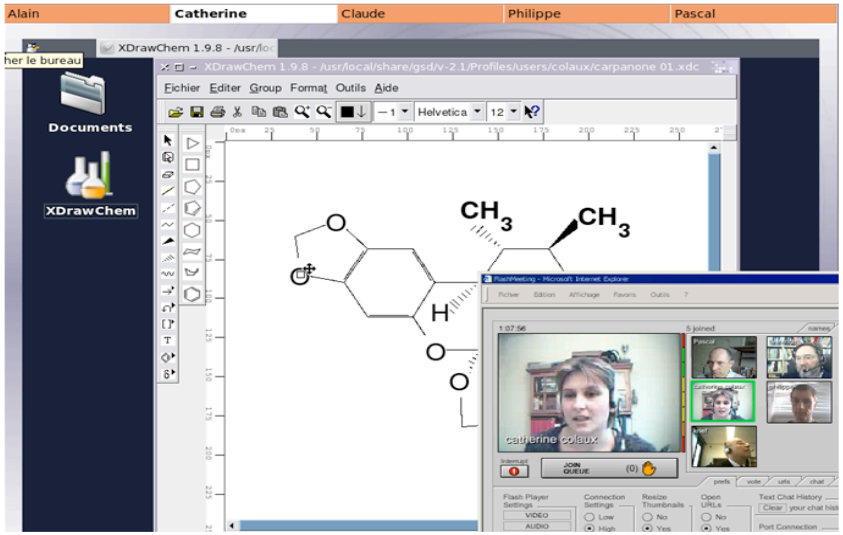
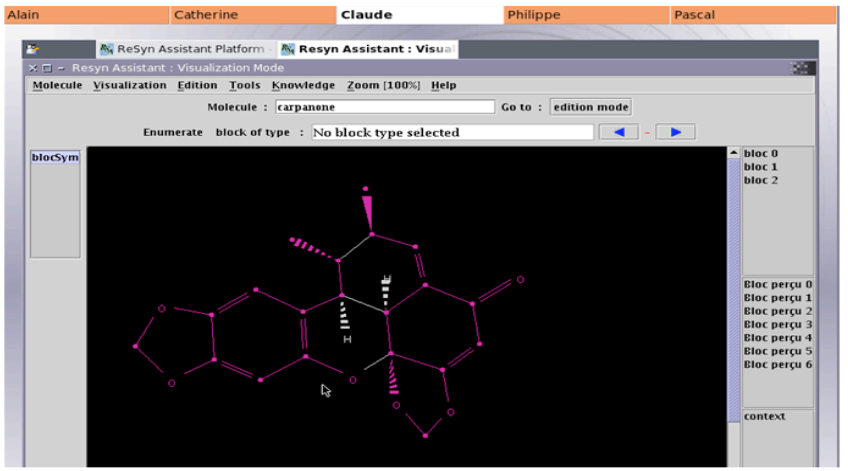
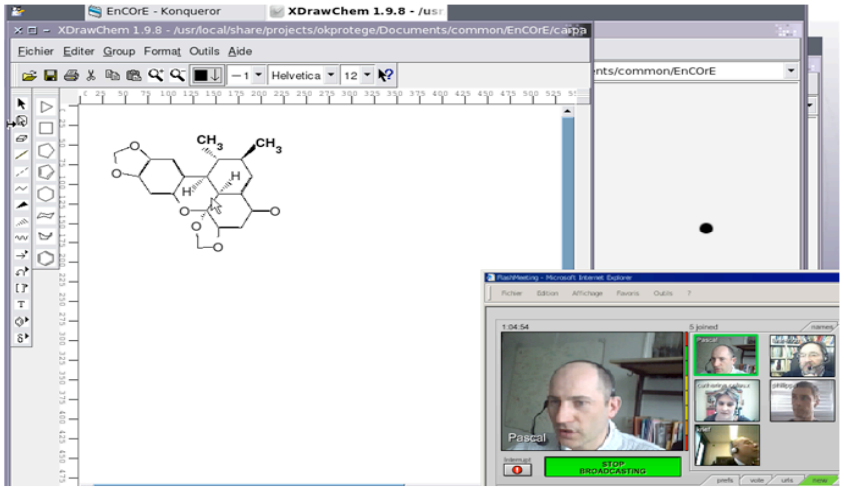
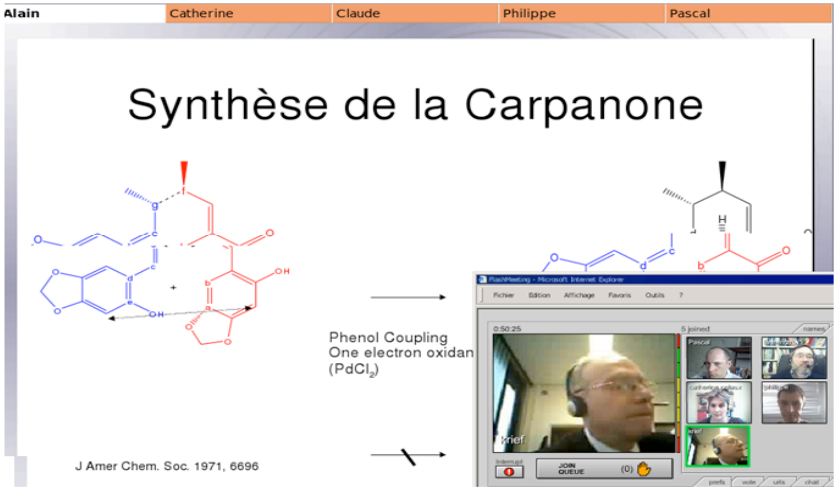
From Products to Services in Human-Human Interaction:
Computer mediated human communication#3: GSD in action









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The scientific questions of the ENCORE project

- Is it possible to believe today that the construction of ***shared*** meanings in a complex but very focused scientific domain such as *Organic Chemistry* is feasible and under what conditions?
- Assuming the existence of Web 2.0 tools such as Wikipedia, is it just enough to use it also for scientific knowledge or rather we need a more ***professional*** infrastructure?
- In the era of Web X.Y, what are the implications of **humans consuming and producing services** within a ***collaborative context*** on the Net?

- 2.2.3 Matching requirements and tools
  (page 22 of 82)

Collaborative Protegé & WS-BPEL

- A Generic Ontology for Collaborative Ontolology-Development Workflows (2008)
- BPEL for People (2007)
- Modeling Human Aspects of Business Processes …(2008)

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CYC

- CYC
  - Dough Lenat Video, 2006
  - … there is *no "correct"* Ontology … no *"correct"* KB …
  - … 12 different Web sites *disagree* on what the meaning of an employee is …
  - … need to share not just content but ***context*** (who believed it, when, at what level of granularity, … microtheory …)
  - … RDF, OWL: tens of relations; we found you need *tens of thousands* of relations (cq: words in a language) …
  - … the earth is *locally* flat (even if it is globally spherical) …
  - … *if it is raining carry an umbrella* …:
    - Assuming: human being, after the invention of the umbrella, unless you go swimming, …

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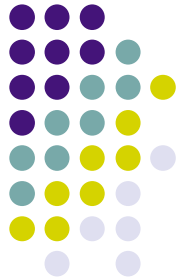
CYC #2



- Dimensions of the **context space** -> context subsumption
  (if p is true in context C and p->q is valid in context k and c and k overlap, when is q true ?)
  - Let's
  - Time
  - GeoLocation
  - TypeOfPlace
  - TypeOfTime
  - Culture
  - Sophistication/Security
  - Topic
  - Granularity
  - Modality/Disposition/Epistemology
  - Argument-Preference
  - Justification

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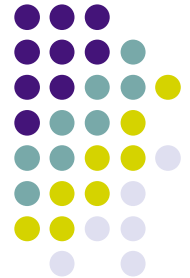
AGORA



- Emerged from ELeGI - Informal Learning Stream
  - Context specific to Human Learning
  - SEES on Learning as a side effect of Building an Ontology
- **Awareness, Ubiquity, Immanence**
- Trust on the Virtual Community
  - **Security, Presence**
- **Immediate learning** to communicate
- Subsequent learning to build Ontologies
  - With the available tools (eg: Protegé, NeON, other ones ..)
- The next scenario: CNFM

AGORA-GSD : ENCORE and CNFM

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Conclusions

"If that is the solution, then … what was the problem?"

Pragmatics, Semantics, Syntax *in the order*

Being *pragmatic* means also being *realistic*

If the goal is Education, then the prerequisite is *motivation*: emotions and rationality

We cannot solve complex problems with simple means; perhaps we may simplify the problems, yet progress …

Happy to be with you! MANY THANKS TO BRAZIL AND YOU ALL for inviting me again !