

Multiagent Approach for the Representation of Information in a Decision Support System

Fahem KEBAIR & Frédéric SERIN
University of le Havre, France

Laboratoire d'Informatique, de Traitement de
l'Information et des Systèmes (LITIS)
Computer Science, Information and Systems
Processing Laboratory



Plan

- Research Framework
- Decision Support System
- Information Representation MultiAgent System
- Conclusion

Need of Intelligent Systems in an Emergency Situation ?

- Constraints of an emergency situation
 - limited time and resources
 - important mass of information

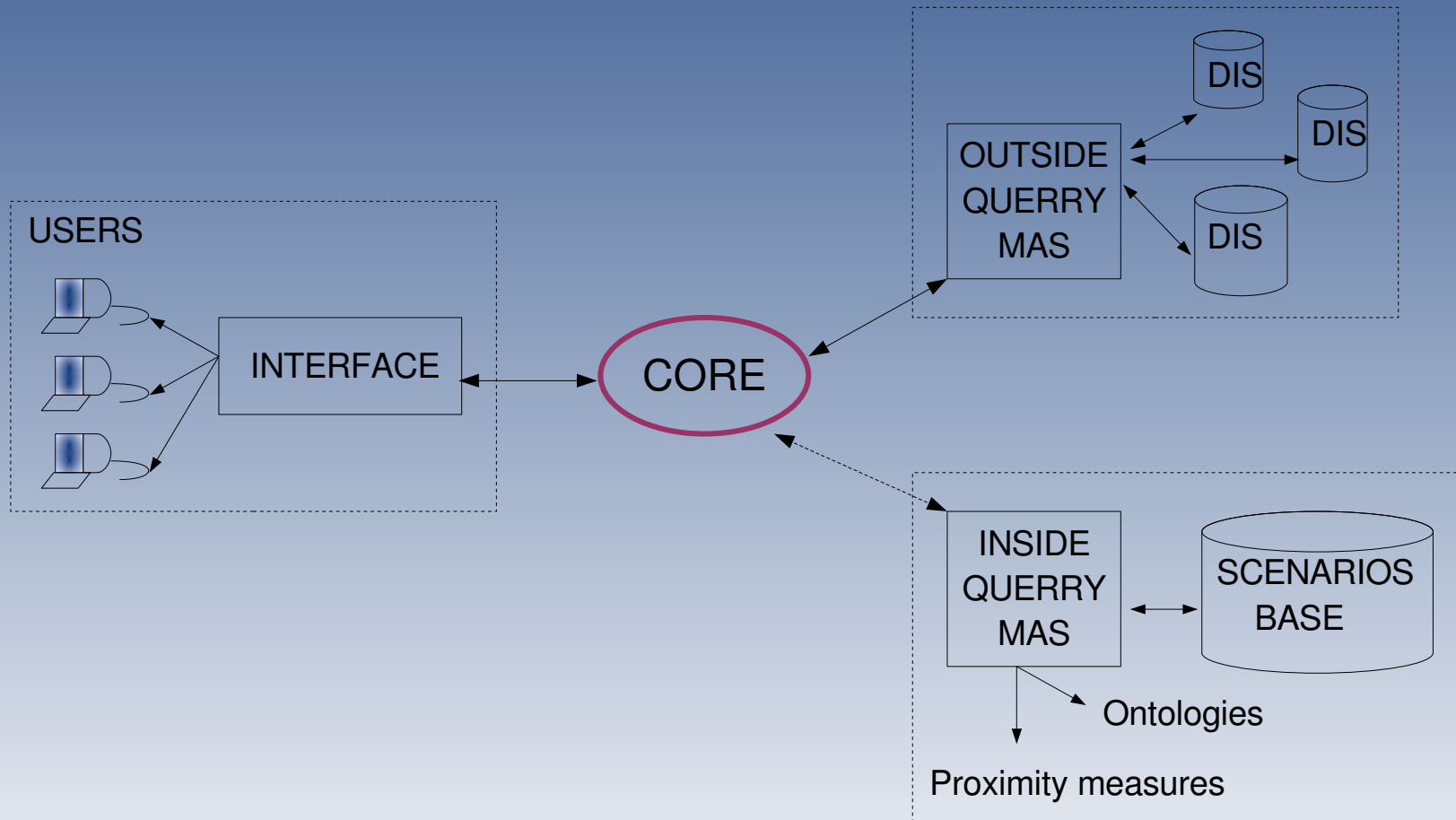
Crisis Management Support System

- Role
 - helps actors manage crisis cases
 - deals with situation change in real time
- Characteristics
 - intelligent: autonomous and adaptive
- How we construct it ?
 - intelligent agents and multiagent systems

Role

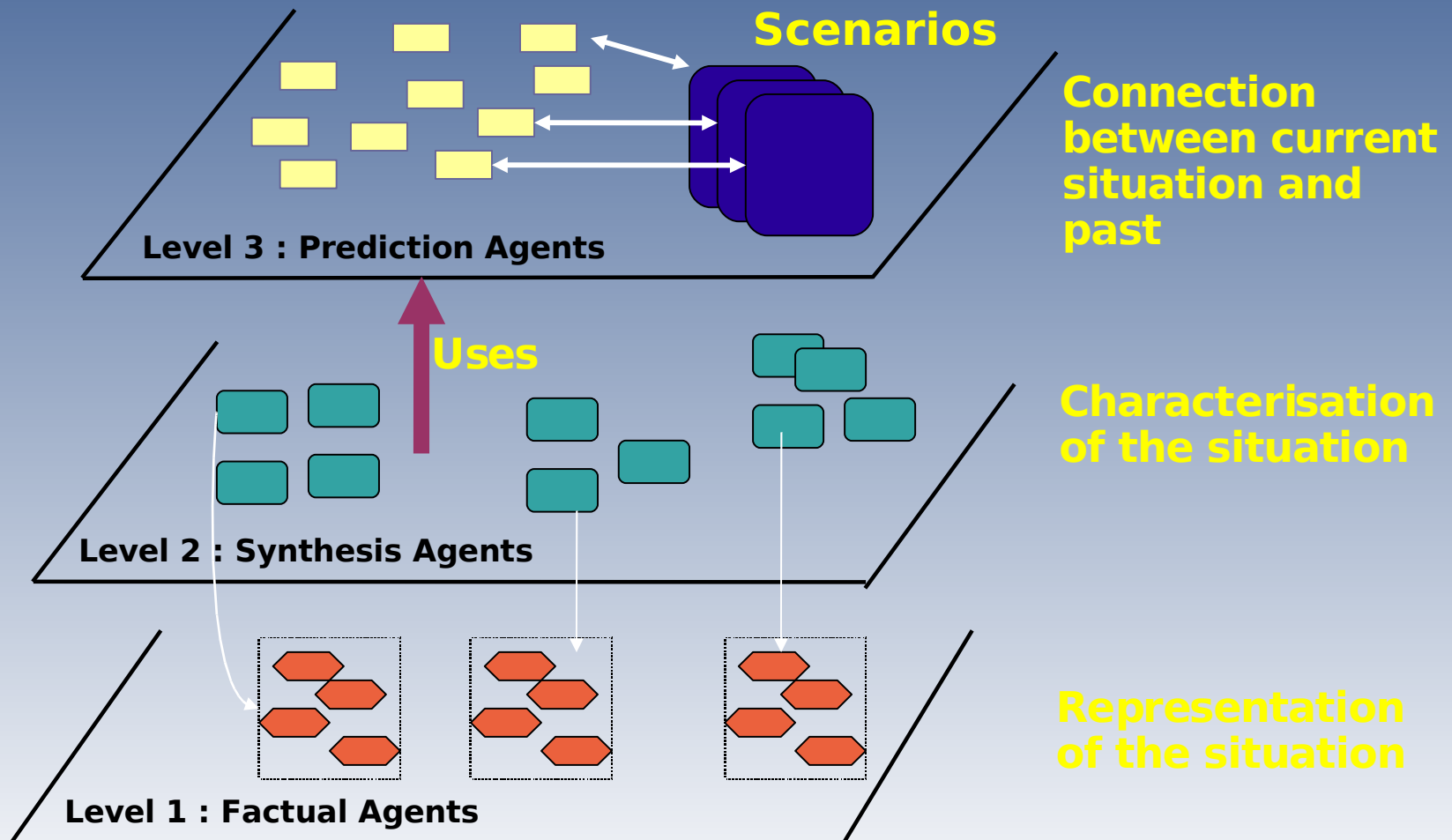
- Provides a decision-making support
- Anticipates the occur of potential incidents

Architecture



Core

Multilayer Architecture



Presentation

- Semantic description of the current situation
- Factual agents organisations for information representation
- Environment description based-upon object paradigm
- Information structuring in the form of semantic features

Semantic Features

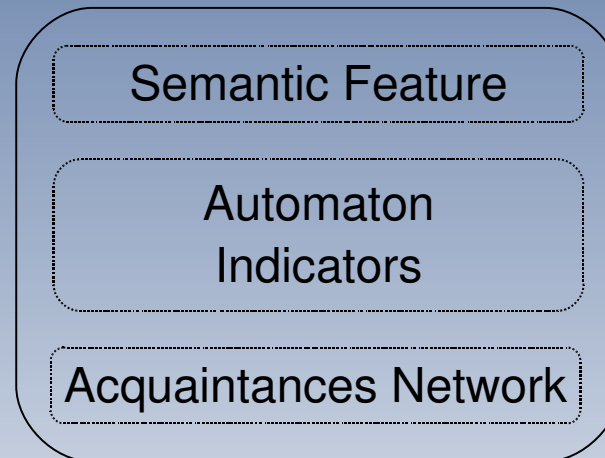
- Elementary piece of information
- Each semantic feature is related to an object
- Form: (key, (qualification, value)⁺)
- Example: (phenomenon#1, type, fire, location, #45, time, 9:33)

Ontologies and Proximity Measures

- Agents communication is based on specific ontologies according to FIPA communicative acts
- Proximity measures to compare between two semantic features: time, spatial and semantic proximities
 - ↳ use of an ontology of the domain

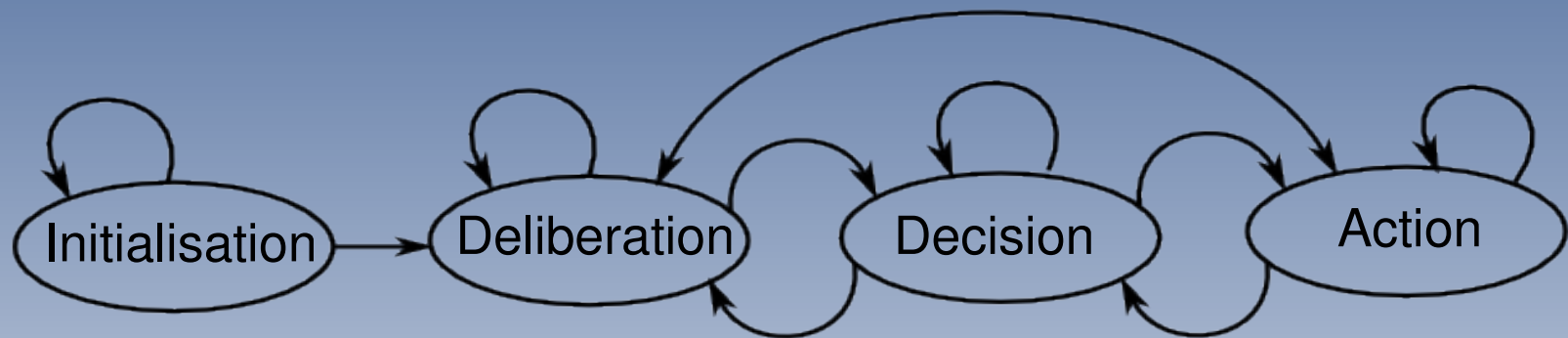
Factual Agents Structure

Intelligent agents



Factual Agents Behaviour

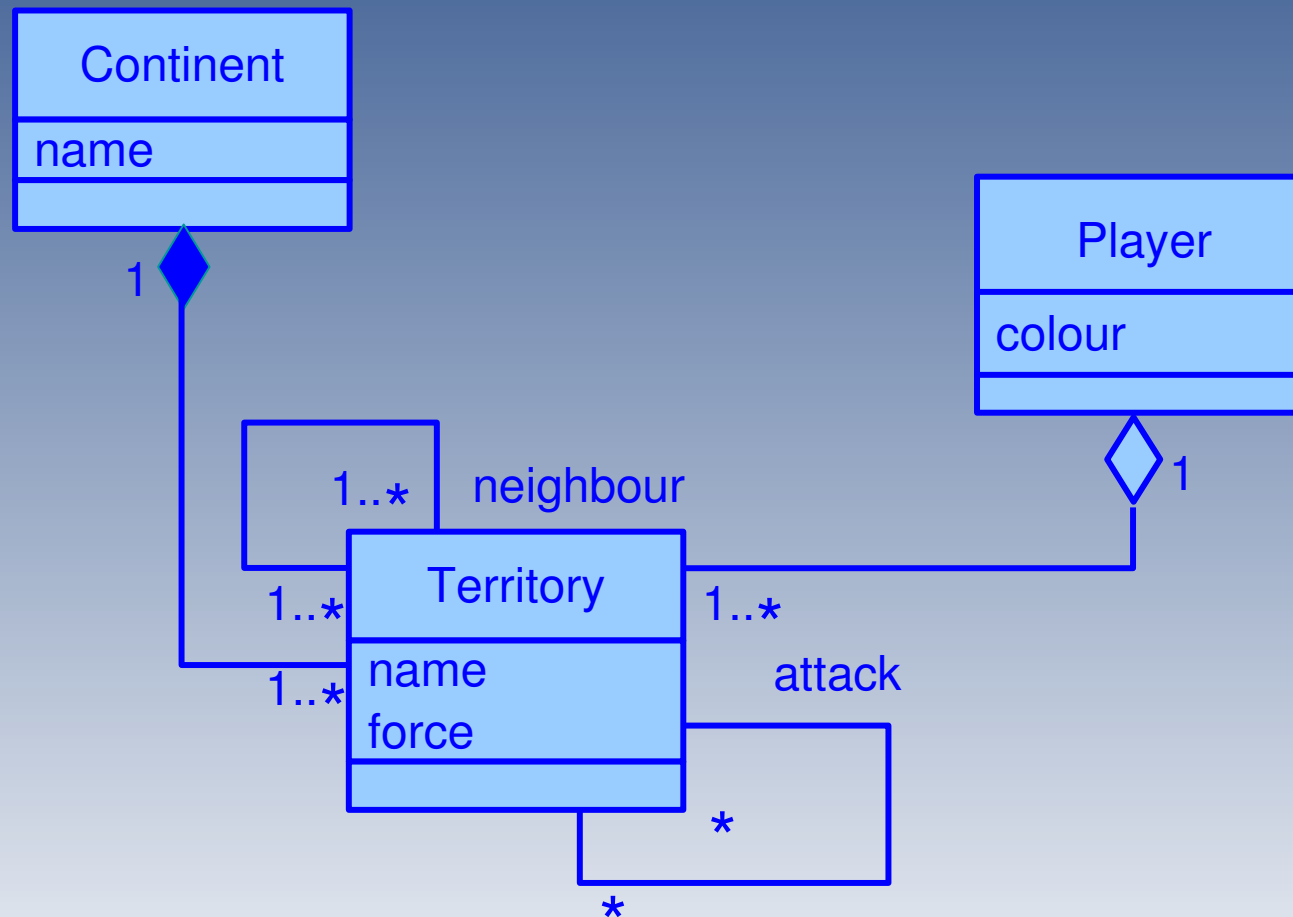
- Automaton: ATN (Augmented Transition Network)



- Indicators: pseudoPosition, pseudoSpeed, pseudoAcceleration, satisfactory and constancy indicators

Game of Risk Use Case

Game UML Representation



Game of Risk Use Case Representation MAS

Two types of semantic features:

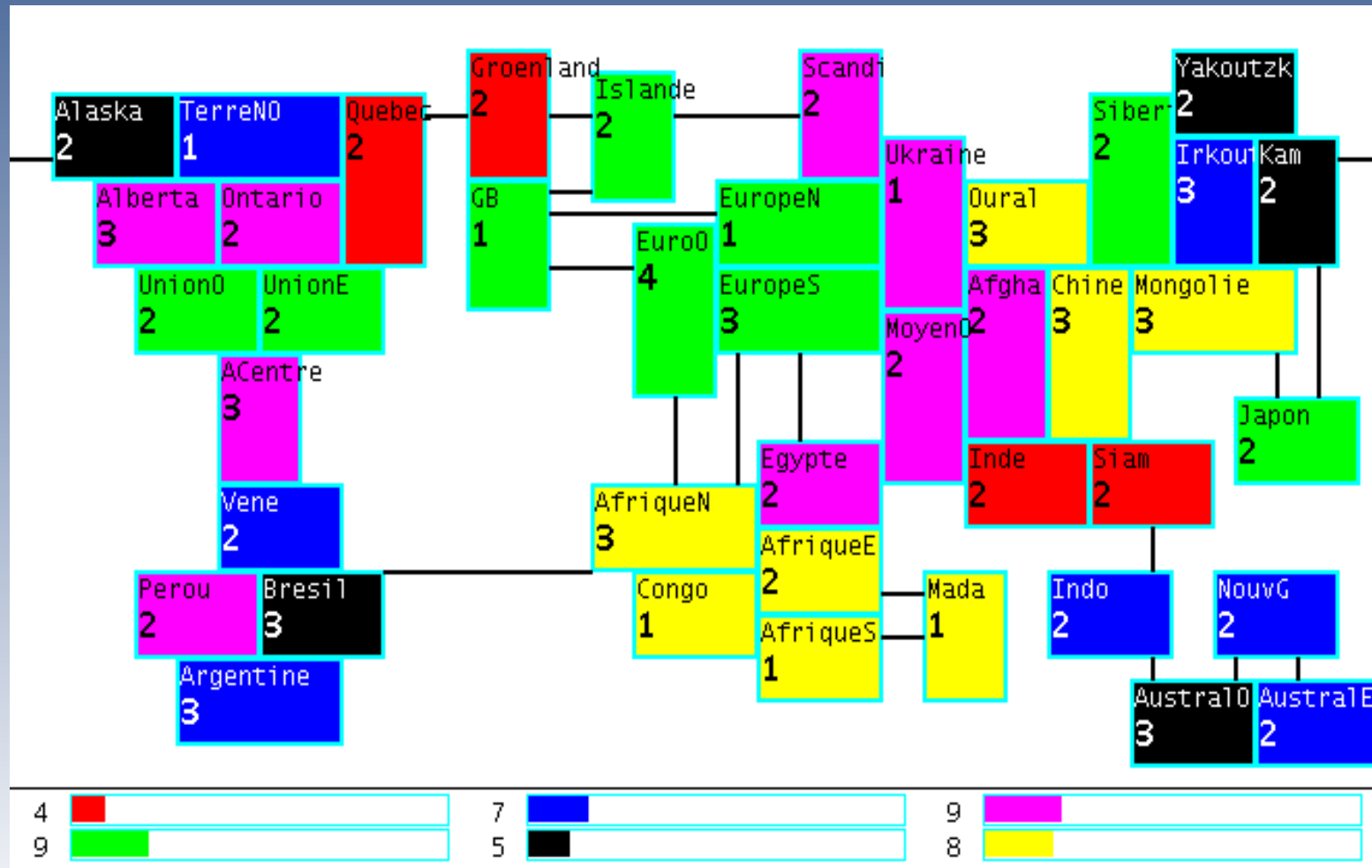
- territory type: (Quebec, player, green, nbArmies, 4, time, 4)

- player type: (blue, nbTerritories, 4, time, 4)

↳ two types of factual agents: territory agent and player agent

(Person 2005)

Game of Risk Use Case Representation MAS Static View



Conclusion

- Results
 - semantic dynamic representation of the current situation
 - generic and specific parts composing the system
- Perspectives
 - connexion with characterisation MAS
 - e-learning
 - emergency logistics (RoboCup Rescue)

Thank you for your attention

For more information contact us on:

fahem.kebair@univ-lehavre.fr