A Model of Almost Everything: Norms, Structure and Ontologies in Agent Organizations

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The OMNI Framework

OMNI (Organizational Model for Normative Institutions) is an integrated framework for modelling a whole range of MAS, from closed systems with fixed participants and interaction protocols, to open, flexible systems that allow and adapt to the participation of heterogeneous agents with different agendas.

Abstract Level

The Abstract Level defines
• the statutes of the organization,
• the values that direct the fulfilling of this objective,
• the context where the organization performs its activities.

Concrete Level

The Concrete Level specifies the analysis and design process, starting from the abstract values and objectives defined in the previous level, refining their meaning in terms of norms and rules, roles, landmarks and concrete ontological concepts.

Implementation Level

The Implementation Level describes the implementation of the design in a given multi-agent architecture, including
• the mechanisms for role enactment,
• the mechanisms for norm enforcement,
• the implemented ontologies.

The norm enforcement

The normative dimension provides both the low-level protocols and the related rules that enable agents to comply with organizational norms.

Social Model

Agent populations of the organizational model are described in the Social Model in terms of social contracts (commitments regulating the enactment of roles by individual agents). The Interaction Model describes the specific interactions such as agreed upon by agents in interaction contracts.

The ontologies

Specific Communication Acts cover the communication languages actually used by the agents as they agree in the interaction contracts. Specific communicative acts implement the content ontologies defined at the Concrete Level.