**LEVEL 0 SUMMARY TEMPLATE**

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* **Paper title:** Business Process Modeling and design - AI Models and Methodology
* **Source (e.g. scholars.google.com):** https://scholar.google.com/
* **Keywords specific to the paper:** Business process models modeling and AI
* **Summary of the main contributions (use text paragraphs, tables and if necessary, figures):**

This article presents a methodology using concepts from artificial intelligence such as objectives, actors and roles to design business processes. They are proposed to us in this article by the authors, a modeling framework composed of 5 sub-models concepts, constraints, organizational, objectives and processes. Key concepts such as actors (a person or a system), roles, and how actors play their roles are defined by the organizational submodel. The actors are held to certain responsibilities and actions by their role in this matter.

Roles can be defined flexibly in many forms.The objectives goals submodel represents enterprise goals as desired states of affairs. Goals are associated with roles, processes, and entities. Explicitly representing goals allows analyzing organizations from an intentional viewpoint - understanding why processes and activities are performed, not just what they involve. The process submodel specifies processes as networks of actions carried out in role contexts to achieve goals. Actions are distinguished as causal or knowledge-producing. Business processes are formally defined structures involving roles, goals, and local procedures for each role.

The concepts submodel formally defines relevant entities, attributes, and relationships using predicates and functions. The constraints submodel encodes restrictions on the enterprise using logical sentences. The methodology has 6 main steps : 1) Identify objectives and initiate goal reduction; 2) Identify roles and match goals to role responsibilities; 3) Specify roles' internal structure; 4) Develop local procedures for each role; 5) Formally verify roles fulfill responsibilities; 6) Derive a complete enterprise model and process specification.

The paper demonstrates the methodology on a hypothetical example of modeling the admission process for a new postgraduate program. High-level goals are identified like maximizing admissions and keeping advertising costs low. Goals are reduced and new roles of postgraduate tutor and secretary are identified. The roles' internal structures are specified, defining available actions and conditions. Local ConGolog procedures are developed for each role formally specifying reactive behaviors. For example, the tutor role handles initial application evaluation and forwarding to faculty. Formal verification techniques are utilized to ensure each role fulfills its responsibilities and that overall constraints are preserved. The full process specification integrates all role procedures to formally capture dynamics.

This complete model can guide implementation and analysis. The proposed framework draws on concepts from other enterprise modeling approaches like F3 and EKD but emphasizes formality using situation calculus and ConGolog. This allows more expressive specification and enables formal verification of properties.The paper discusses related work in areas like goal-oriented requirements engineering (e.g. KAOS), process modeling (e.g. GEM), and intentional frameworks (e.g. i\*).

Commonalities and differences are outlined, demonstrating similarities in overall methodology while contrasting representation and analysis techniques.The authors argue formal modeling can provide significant advantages for process design compared to informal approaches. Current and future work focuses on further applying the techniques to larger examples and extending verification to all ConGolog features like concurrency. Overall this research aims to demonstrate practical benefits of applying formal logic to real business problems.

In conclusion, this paper presents an innovative and rigorous methodology for developing business process specifications using concepts and logics from artificial intelligence. The proposed modeling framework integrates multiple perspectives on an enterprise and supports formal representation and analysis not seen in other approaches. The demonstration of applying the methodology to design an admission process shows promising potential for analyzing redesigned or new processes. Future work expanding the scope and validation through industrial applications could further establish the methodology's value. For those interested in applying formal methods or logical modeling in business context, this research provides a compelling example of how intentional perspectives on goals and roles can enhance traditional process models. The emphasis on formal verification also sets this work apart in ensuring specifications are logically consistent and constraints are preserved.

* **AI model used (e.g. Neural network, etc.) :**

The AI Model are not really used but the Congolog framework are noticed in this article

* **Introduce the AI models :**

The ConGolog framework supports reasoning about the dynamics of processes under incomplete knowledge. It is described as suitable for declarative modeling language for business processes and is used to model business process dynamics.

* **How do they contribute to the idea proposed by the paper?**

ConGolog contributes to the paper's ideas by providing a formalism for expressing and analyzing the behavior of business processes, aligning with the broader goal of using AI techniques for representing knowledge about organizations and their processes.

* **Supported by a software application? (If yes, provide more details) :**

No, this article is not supported by a software application