

Collaborative Discussion 2: Peer Response 2

Dear Anda,

Your post provides an insightful summary of Fortino et al.'s (2015) methodology for designing smart object-focused IoT systems using agent-oriented metamodels. You effectively highlight the strengths and weaknesses of using metamodels in this context, as well as suggest alternative such as foundational ontologies to address some of the identified limitations.

You correctly note that metamodels offer conceptual clarity that can be utilized across multiple domains and business use cases. This is a significant strength as it allows for a standardized approach that can be adapted to various applications, promoting reusability.

Your point about the compartmentalization of implementation and interface is also important. By separating these aspects, metamodels provide a clear structure that simplifies the development, maintenance and learning processes for developers. This modularity is particularly beneficial in large-scale IoT projects where different teams might work on different components.

To mitigate the weaknesses, incorporating more domain-specific customization during the analysis phase can help that the metamodel captures the necessary details instead of being too generic. This could involve collaboration with domain experts to refine the high-level models.

Similarly, implementing an iterative development process with regular feedback loops can help address the incompatibility and evolution challenges. By continuously refining the model based on real-world implementation feedback, the metamodel can remain relevant and effective.

Your proposal for a smart model equivalent for driverless car operations effectively integrates high-level components such as Fingerprint, PhysicalProperty, Service, Device, Status, and Location. Introducing the concept of an agent, as described by Savaglio et al. (2020), aligns well with the needs of autonomous vehicle systems, providing a robust framework for their development.

References:

- Fortino, G., Guerrieri, A., Russo, W., & Savaglio, C. (2015). Towards a development methodology for smart object-oriented IoT systems: A metamodel approach. In 2015 IEEE international conference on systems, man, and cybernetics (1297-1302). IEEE.
- Henderson-Sellers, B. (2011). Bridging metamodels and ontologies in software engineering. *Journal of Systems and Software*, 84(2), 301-313.
- Savaglio, C., Ganzha, M., Paprzycki, M., Bădică, C., Ivanović, M., & Fortino, G. (2020). Agent-based Internet of Things: State-of-the-art and research challenges. *Future Generation Computer Systems*, 102, 1038-1053.