**Initial Post**

by Aleksandr Vygodchikov - Sunday, 5 May 2024, 11:51 AM

Fortino et al. (2015) advocate for a metamodel approach to IoT system design, as demonstrated in their SmartOffice example. While effective, this approach can be applied to more complex systems like driverless cars. Next I try to assess its strengths and weaknesses and propose a smart model for such a vehicle.

**Strengths:**

- Abstraction: Metamodels simplify complex systems by focusing on essential concepts, aiding understanding and communication.
- Flexibility: They adapt well to diverse application domains, accommodating various requirements and functionalities.
- Standardization: Establishing standard practices promotes interoperability, component reuse, and collaboration.
- Scalability: Metamodels scale with system complexity, handling evolution and expansion effectively.

**Weaknesses:**

- Complexity: Defining clear and concise concepts requires significant effort, especially for complex systems.
- Initial Overhead: There's upfront investment in defining the metamodel's structure before system design can begin.
- Maintenance: Keeping metamodels aligned with evolving requirements and technologies requires ongoing effort.

**Proposed Smart Model for a Driverless Car:**

- Identifier, Creator, Location: Basic attributes.
- Quality Parameters: Performance and safety metrics.
- Dynamic Information: Real-time environment data.
- Available Devices: Sensors.
- Smart Services: Autonomous driving features.

This model captures interactions and defines rules for decision-making and control. It adapts to specific vehicle types and use cases, ensuring flexibility and scalability.

In conclusion, while metamodels for IoT design pose challenges, their benefits in abstraction, flexibility, standardization, and scalability make them valuable for designing complex systems like driverless cars.

**References**

Fortino, G., Guerrieri, A., Russo, W., & Savaglio, C. (2015) "Towards a Development Methodology for Smart Object-Oriented IoT Systems: A Metamodel Approach," *2015 IEEE International Conference on Systems, Man, and Cybernetics*, Hong Kong, China, pp. 1297-1302. DOI: 10.1109/SMC.2015.231.

Permalink Reply

**Re: Initial Post**

by Oi Lam Siu - Tuesday, 7 May 2024, 11:55 AM

Peer Response

Dear Aleksandr,

Thank you for sharing your proposed smart model for a driverless car. Your design highlights the key components and interactions necessary for implementing autonomous functionalities within the IoT context.

Your proposed smart model includes essential attributes such as Identifier, Creator, and Location, which help in uniquely identifying and tracking the car. Additionally, the inclusion of Quality Parameters, such as performance and safety metrics, is crucial for ensuring optimal performance and safety in the driverless car system.

The Dynamic Information component captures real-time environmental data, enabling the car to navigate and appropriately respond to various situations.

The availability of devices, specifically sensors, provides vital data for the perception module. This module processes the sensor data and feeds it into the decision-making module.

The Smart Services component, representing autonomous driving features, encompasses the decision-making and control modules. These modules are responsible for planning paths, avoiding obstacles, and executing actions to ensure safe and efficient navigation. By incorporating these modules, your smart model provides a comprehensive framework for implementing autonomous functionalities.

Overall, your proposed smart model captures the essential components and interactions needed for the successful operation of a driverless car within the IoT context. Your design exhibits a thoughtful approach, emphasizing flexibility, scalability, and the critical aspects of performance and safety.

Thank you once again for sharing your insights.

Maximum rating: -