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by Oi Lam Siu - Tuesday, 7 May 2024, 11:21 AM

Fortino et al. (2015) proposed an approach that introduces metamodels at different levels of abstraction to support the various stages of analysis, design, and implementation in the development of smart objects (SO). These metamodels include the High-Level Smart Object Metamodel for the analysis phase, which models the relevant aspects of the SO. Additionally, the Event-driven Lightweight Distilled statecharts-based Agent (ELDA) smart Object Metamodel and the Agent-based COoper-ating Smart Objects (ACOSO) Smart Object Metamodel are used for the design phase to model the functional components, relationships, and interactions of the system. Moreover, the ACOSO-based Smart Object Metamodel has been specialized for the JADE platform, resulting in the JACOSO Metamodel, which supports the implementation phase.

A metamodel that supports the object-oriented design of the Internet of Things (IoT) is a model that defines the structure, relationships, and behaviors of other models within the IoT domain. It offers a higher-level abstraction and serves as a template or framework for creating specific object models for IoT systems. The advantages of using a metamodel in this context include abstraction and standardization, promoting reusability, and allowing for flexibility and extensibility as the IoT landscape evolves. However, the development of a metamodel can be complex, and there may be a learning curve for designers and developers.

To design a smart model that supports the operation of a driverless car, an object-oriented approach can be followed. The model would involve a "Vehicle" object to represent the car, sensor objects (such as Lidar, Radar, Camera, GPS) for perceiving the environment, actuator objects (such as Steering, Accelerator, Brake) for controlling the car's movements, a perception module for processing sensor data, a decision-making module for planning paths and avoiding obstacles, a control module for executing actions, a communication module for vehicle-to-vehicle and vehicle-to-infrastructure communication, and a user interface for interaction and monitoring. By incorporating these components and their interactions, the smart model provides a framework for designing and implementing the autonomous functionalities of a driverless car within the IoT context.

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.* 1297-1302. DOI: 10.1109/SMC.2015.231.

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