**Collaborative Discussion 2: OO Design for IoT**

*Making reference to the article by Fortino et al. (2015), consider the strengths and weaknesses of designing a metamodel to support object-oriented design of the IoT. Design a smart model equivalent to that presented in Figure 6 which would instead support operation of a driverless car.*

**Summary Post:**

In the Initial Post, I discussed the development methodology for smart object-oriented IoT systems proposed by Fortino et al. (2015). This methodology employs metamodels across three development phases: analysis, design, and implementation. The analysis phase involves a high-level smart object metamodel, the design phase focuses on modelling functional attributes and their interactions, and the implementation phase contextualizes these within the Java Agent DEvelopment Framework (JADE). I highlighted the strengths of metamodeling, such as its conceptual versatility and compartmentalisation, and its weaknesses, including its generic nature and potential incompatibility due to insufficient real-life detail.

Although my initial post did not receive any peer reviews, I gained valuable insights from reviewing my peers' posts. One peer emphasised the detailed component breakdown in the smart model for driverless cars, noting the inclusion of various sensors (LIDAR, RADAR, Camera, GPS) and the modular design approach. This modularity enhances system maintainability and facilitates updates and integration of new technologies. The peer also highlighted the importance of interoperability and communication, particularly vehicle-to-vehicle (V2V) and vehicle-to-infrastructure

(V2I) communication, aligning with the broader vision of smart cities and connected transportation systems.

Another peer focused on the comprehensive abstraction provided by metamodels, which simplifies the understanding and communication of complex systems involved in driverless cars. They also underscored the benefits of standardisation and interoperability, promoting component reuse and efficient system design. Additionally, the peer discussed scalability, despite the initial overhead and ongoing maintenance efforts required. They also acknowledged the complexity in defining clear and concise concepts for driverless vehicles but appreciated the structured approach to identifying key components and mapping them to smart object attributes.

In summary, the insights from my peers reinforced the strengths of using a metamodeling approach for designing complex systems like driverless vehicles. The detailed breakdown of components, emphasis on modularity, interoperability, and scalability, and the structured approach to abstraction and standardisation provide a robust framework for developing driverless vehicle systems 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. In *2015 IEEE international conference on systems, man, and cybernetics* (1297-1302). IEEE.