COLLABORATIVE DISCUSSION 2: AGENT COMMUNICATION LANGUAGES

Summary Post

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In my initial post, I discussed KQML (the Knowledge Query and Manipulation Language) as an agent communication language (ACL), comparing it to a method call in Python or Java. Semantic richness, interoperability and flexibility are the benets of using ACLs because it is possible to communicate through semantically rich terms (Souza et al., 2016). However, they also present problems: wordiness, overhead of processing time and human efforts in creating and maintaining shared ontologies also become a great issue that should be solved properly (Kōne et al., 2000). On the other hand, method calling is efficient and easy but suffers from lack of expressiveness and communication intention (Berna-Koes, Nourbakhsh & Sycara, 2004).

My colleagues contributed additional perspectives that expanded the conversation. Concerns raised in other work regarding ontology management are also evident, with domain specific ontologies and mediation affecting scalability and ACL's adding overhead (Jimenez-Ruiz et al., 2018). Jaafar stressed the significance of ontology alignment and called for more standardisation and automation support to deal with semantic mismatches (Mohammadi et al., 2017). He also suggested a middle way, where simple interactions could be supported by lightweight protocols and ACLs would take care of more complex exchanges (Suchanek, Abiteboul and Senellart, 2011). Ahmed emphasised semantic interoperability and advocated for middleware and modular ontologies as strategies to reduce overhead (Fatras, Ma and Jørgensen, 2022; Williams, 2025). He also related ACLs to knowledge engineering, emphasising that it "all boils down to having good feature representations necessary for efficient AI communication" (Souza et al., 2016).

In reaction, I explored these recommendations by examining hybrid protocols, ontology alignment techniques, and middleware optimisations. While such an architecture is useful in many regards, I concluded that ACLs and method invocation are not mutually exclusive possibilities; rather, they represent two points on a spectrum of potential designs, determined by system constraints, domain-specific requirements, and performance characteristics (Berna-Koes, Nourbakhsh and Sycara, 2004; Fatras, Ma and Jørgensen, 2022).

Reflecting on this conversation, the most vivid takeaway was how peers propelled the discussion beyond theoretical distinctions toward practical paths—such as ontology tools, hybrid methods, and middleware—that

increase the real-world value of ACL-oriented communication (Williams, 2025). Whereas method invocation satisfies the needs of monolithic, tightly coupled applications, ACLs remain important in distributed, heterogeneous, and negotiation-oriented scenarios (Kōne, Shimazu and Nakajima, 2000; Souza et al., 2016). This discussion underscored the importance of connecting formal models with applied approaches to enhance agent communication (Jimenez-Ruiz et al., 2018).

References

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