

University of Essex Online

MSc Artificial Intelligence

# **INTELLIGENT AGENTS**

## **End of Module Assessment: Individual Reflection**

Presented by: Elias Medig

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<https://elimedig.github.io/e-Portfolio/modulePages/intelligentAgents.html>

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# Reflection of Module

## *Introduction*

The Intelligent Agents module has been one of the most engaging parts of my MSc because it connects the theoretical foundations of AI with practical system design in ways that strongly resonate with my professional background as a *domain* architect. Before this module, I largely thought of AI as split between data-driven and symbolic approaches. Through the study of agents, however, I came to see how these paradigms can be integrated into autonomous, goal-directed entities that perceive, decide, and act within complex environments (Russell & Norvig, 2021). What stood out most was the diversity of agent *architecture*. Reactive agents that *prioritize* responsiveness, deliberative models such as BDI that enable planning and goal management, and hybrid systems that combine the strengths of both (Jennings & Wooldridge, 1998). Beyond theory, the discussions and examples highlighted how these architectures can be applied in real-world domains ranging from supply chain logistics and digital forensics to smart factories (Wu et al., 2023). This not only deepened my academic understanding but also provided practical inspiration for my professional work in enterprise architecture. *It was also interesting to read about how agents will take part of the 4<sup>th</sup> industrial revolution. According to University of Essex Online (2025) there will not only be some but various ways agents will be used to optimize and automate processes.*

## *What?*

Throughout the module, we explored core topics such as agent definitions, perception–action loops, architectures (reactive, deliberative, and hybrid), communication mechanisms, and multi-agent coordination. The group project gave me hands-on experience with designing a layered agent architecture for digital forensics, where our team used InteRRaP as a guiding model. InteRRaP (Müller, 1996) is a well-established three-layered agent architecture that integrates reactive, planning, and social behaviour. The strength of this approach lies in combining immediate stimulus–response actions with higher-level deliberative planning and coordinated behaviour between agents. Using InteRRaP as inspiration clarified how architectural choices affect functionality. For instance, how to balance responsiveness with long-term reasoning or how to enable cooperation among distributed agents in dynamic environments.

The weekly discussions were particularly enriching: debates around agent communication languages such as KQML (Finin et al., 1994), the application of speech act theory (Searle, 1969), and the challenges of emergent behaviour (Bonabeau, 2002) helped me refine my understanding of both technical details and broader design implications. I found the interplay between theoretical learning and practical applications especially valuable, as it demonstrated how abstract models can guide concrete system designs in areas such as supply chain logistics, digital forensics, and smart factories (Macal and North, 2014).

## *So what?*

This module challenged me to think differently about architecture in computing. As a domain architect by profession, I often consider alignment of business processes, governance, and technology choices. Studying agent-based systems highlighted how decentralization, autonomy, and adaptability can offer new approaches to these challenges. I sometimes struggled with the abstract nature of emergent behavior and agent interactions, but the discussions and reading helped me see both their potential and their risks. More broadly, I now appreciate that intelligent agents represent not just a technical concept but a design philosophy which values modularity, autonomy, and negotiation in complex environments. I also understand that agents come with a cost and are not a solution to every problem they are more to be seen as a sophisticated tool that can be used for sophisticated challenges.

This module was intellectually stimulating but also personally motivating, as it showed me clear parallels to problems I face in enterprise systems. For example, issues of decentralized decision-making, conflicting priorities across domains, and the need for adaptive governance mirror the same tensions that agents are designed to resolve. By reflecting on these similarities, I began to see how concepts such as hybrid architectures, agent communication, and even emergent behavior could be translated into practical solutions for organizational IT landscapes.

## *Now what?*

Looking ahead, I see strong and lasting connections between this module and both my professional path and my upcoming MSc thesis. The study of agent architectures gave me concrete ideas for applying agent-based principles to enterprise architecture governance and compliance. This is a domain where I daily face challenges of complexity, decentralisation, and inconsistent metadata. Agents could provide continuous monitoring, anomaly detection, and automated compliance checking by operating across distributed systems. This aligns closely with my early thesis planning, where I have been considering the design of AI-enabled compliance agents that integrate machine learning with symbolic or rule-based reasoning. The exposure to hybrid agent models such as BDI and InteRRaP showed me how to practically bridge responsiveness and long-term reasoning, which is exactly the balance required in governance contexts.

The module therefore did more than expand my technical knowledge. It directly shaped how I conceptualise my MSc thesis which will start in a couple of months from now. I now see agent-based computing not only as a subject of academic interest but also as a viable foundation for a thesis that is both theoretically robust and professionally relevant. By combining the decision-making autonomy of agents with the analytical power of machine learning, my thesis can contribute to hybrid AI research while delivering insights applicable to real enterprise systems (Russell and Norvig, 2021).

Professionally, I intend to bring these concepts into my role as a domain architect, using agents as a conceptual and practical tool for automation, governance, and

decision support. This perspective shifts enterprise architecture from static documentation toward a more dynamic, adaptive system, one that reflects the principles of intelligent agents themselves. In this way, the module has provided me with both the theoretical grounding and the inspiration to merge academic research with enterprise practice.

# References

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