

## **Case Study: Application of AI Agents to Metaverse Contexts**

**[Your Name]**

*Dr John O'Hare*

**[Supported Company Name]**

Visioning Lab – Dr Jess Symons

**[# Hours Spent Assisting Company]**

Approximately 96 hours (12 working days)

### **Company Description, Service, and Challenge (c. 200 words)**

Visioning Lab is a UK-based research and development company that operates at the intersection of creativity, digital innovation, sustainability, and public engagement. Focused on exploring how emerging technologies can help achieve social and environmental objectives, Visioning Lab places particular emphasis on the role of the metaverse and AI in fostering equitable, bias-aware digital environments.

The key challenge they presented was to conceptualise and prototype AI-driven agentic systems within metaverse contexts that could support the growth and governance of emerging global communities. In particular, Visioning Lab wanted to understand how AI agents might ensure interoperability across diverse virtual worlds, empower individual users, and adapt to shifting governance requirements—while also confronting ethical considerations regarding bias and social control. The deliverable entailed both a practical conceptual framework and an academic paper to be presented at the 9th International XR Metaverse Conference in Busan, Korea (May 2024). Given the tight timeframe, rapid research and development were vital, calling for advanced AI tools and clear, structured ontological models.

## **Proposed Approach and Initial Response (c. 100 words)**

My initial strategy involved analysing existing research on AI agents, socio-technical governance models, and decentralised protocols. I proposed an “Agentic Mycelia” framework: an interconnected network of intelligent agents modelled on the adaptable, decentralised properties of mycelial structures in nature. This approach emphasised interoperability, user-driven preferences, and crypto-verified living contracts. Visioning Lab responded favourably to the concept, particularly the idea of standardising metaverse processes through detailed ontologies in Linked-JSON. [They also appreciated](#) the focus on user empowerment—where individuals retain control over their data and avatars—as well as the inclusion of ethical considerations around bias and social influence.

## **Implementation, Outcome, and Reflections (c. 200 words)**

Over the course of this project, I collaborated closely with Dr. Jess Symons of Visioning Lab. We conducted iterative research and development, ultimately co-authoring the paper *Ordinary Ontologies: Strategies for Standardising Metaverse Processes, Systems and Technologies*, [presented](#) at the 9th International XR Metaverse Conference. This work drew on AI tools such as Gemini 1.5, ClaudeAI, and GPT-4 to generate and refine a complex ontological representation of metaverse entities, interactions, and governance structures.

Initially prototyped in the Web Ontology Language (OWL), the ontology was later translated into Linked-JSON for improved accessibility and interoperability. Within the proposed “Agentic Mycelia” framework, onboarding agents assist users in defining preferences, scene agents oversee specific metaverse instances, and transfer agents enable communication between distinct virtual worlds. Legal and jurisdictional agents, meanwhile, address issues of regulatory compliance and dispute resolution.

The results, including diagrams and technical notes, were [open-sourced](#) on an MITIH-supported website: [Narrative Goldmine](#). In retrospect, allocating additional time to conflict resolution mechanisms and user-facing interfaces would have further strengthened the framework. Nonetheless, the project demonstrated the powerful synergy between human expertise and AI-driven tools, while underscoring the critical importance of ethics, transparency, and bias mitigation in emerging digital ecosystems.