

Summary post

Agents are autonomous computational elements capable of sensing and influencing their environment (Wooldridge and Jennings, 1995). The development of agent-based computing (ABC) has evolved significantly since, although similar approaches can be traced to far back in history as highlighted by Rodrigo (Heath and Hill, 2010). Due to its versatility, scalability, and interpretability, ABC have become a mainstay approach in modelling complex interactions among multiple interconnected yet independent elements (Salgado and Gilbert, 2013). While initially deployed in economics to model complex non-linear systems (Hanappi, 2017), ABC has expanded to applications across multiple industries including logistics, traffic management, energy grid management, and other fields where automation and real-time decision-making are paramount (Chassin, Fuller and Djilali, 2014; Ribino *et al.*, 2018; Bastariantto *et al.*, 2023). Such systems can replace human agents in high-risk or standardized tasks, enhancing performance and reducing threats to human lives (Niazi and Hussain, 2011).

Nonetheless, the deployment of agent-based systems must be considered in the context of associated ethical concerns and development challenges. As suggested by Rodrigo, these include balancing abstraction and realism, and ensuring robust model validation, as well as the need to safe proof security vulnerabilities which may be exploited for nefarious purposes (Crooks and Heppenstall, 2012; Salgado and Gilbert, 2013). As mentioned by Yemi, practical approaches to ensure robust and reliable agent system development can include enhancing the quality of training data, implementing ethical guidelines, and fostering model explainability and transparency in agent decision-making to potential mitigate biases (Bonabeau, 2002; Wallach and Allen, 2009; Yadav, 2023).

In sum, while systems harnessing ABC continued to become ever more widespread, and are increasingly demonstrating their potential across many sectors, agent deployment ought to be handled accurately and responsibly in order to ensure system reliability and adherence to high ethical standards. Besides technical development, fostering research and investment into governance and best practices will be vital in building trust in agent-based systems and allowing them to fulfil their potential to advance human wellbeing.

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