Collaborative Discussion 1: Agent Based Systems

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Initial Post

According to Woolridge (2009) the key characteristic of an agent is autonomy—the operation of a computer system to independently meet delegated objectives. While agents can automatically handle tasks requiring manual intervention, improving efficiencies, they also can have adjustable autonomy in situations of environmental uncertainty or potential harm, returning some decisions to human control. Crucially, the agent itself selects how to achieve its delegated goals.

An agent perceives its environment using sensors, interacts—influencing but not fully controlling—via actuators, and must handle failure (Wooldridge, 2009; Russell and Norvig, 2021). Most intelligent systems use one or more of four kinds of agent programs: simple reflex, model-based reflex, goal-based, and utility-based (Russell & Norvig, 2021).

Some non-intelligent agents include control systems like thermostats or autopilot, software daemons which operate background processes like email, or functional systems like compilers, as well as more complex reactive systems. Intelligent agents further require reactivity, proactiveness and social ability (Wooldridge, 2009).

Agent-based systems have arisen in part because Moore's Law has reduced costs, and therefore increased the ubiquity of large interconnected systems (like the Internet) (Wooldridge, 2009; Russell & Norvig, 2021). However, since Woolridge published in 2009 the global computing he refers to is not the cloud computing of today (Wooldridge, 2009; Sunyaev, 2020).

Cloud computing is one of the key components of Industry 4.0 which has driven automated and collaborative manufacturing and enabled agent-based deployments in Internet of Things (IoT) devices like smart home thermostats and wearable health tech (Wooldridge, 2009; Peres et al., 2020).

References:

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