

This survey paper aims to provide an extensive collection of Agentic AI knowledge and set its boundaries for easier understanding by a wider audience of researchers, developers, and policy-makers. Key contributions of this survey include:

VOLUME 13, 2025

issues, as concerns
ance with the law.

- **Section IX** Looks at constructive and responsible AI, including oversi

- **Section X** Describes gaps in knowledge and prospected Research and Development work alongside the consideration of refreshing Agentic AI ideas.
- **Section XI** recommends the paper's final remarks, including a conclusion of the findings and a remark that cross-disciplinary connections are needed to move the field forward in a responsible manner.

This comprehensive survey will provide valuable insights into Agentic AI's current state, future potential, and the challenges that must be addressed to ensure its safe and effective deployment.

II. FOUNDATIONAL CONCEPTS AND DEFINITIONS

A. AGENTIC AI AND ITS ROLE IN THE AI ECOSYSTEM

Within the AI field, Agentic AI serves as a different form of intelligence that can take more autonomously functioning agentic behaviors that are not limited to performing specific tasks or following content-generating algorithms. When viewed in an ecosystem context, Agentic AI stands out because of its purpose, flexibility, and behavior, which enables such AIs to operate almost independently. Rather than following strict guidelines like other robotic AIs, Agentic AI systems are promoted to have rationalism in them, which enables each system [9] to reason and adapt to different scenarios and such circumstances in a sufficient way to accomplish goals. Due to its tendencies to enhance its functions to prepare for any obstacles, Agentic AI has been seen as a potential point of anchor for tasks and goals that require high levels of interactions, for example, autonomous devices, collaborative robots, and interactive decision support systems in the areas of finance and health care.

The increasing demand for systems capable of autonomously handling intricate and dynamic processes

learning approaches on re determined by the input people. Thus, traditional environments with limited and rather more significant

On the other hand, Ag as possessing the character there is no prescription c They work with and adapt On the other hand, which be accurate, they do not and goal-directed dynamic example may include a fit to predict equipment failure AI will not incorporate a failures due to factors such schedule or changes in work other hand, Agentic AI c processes depending on t and long-term strategies, models.

As shown in Table 1, based on real-time context to optimize for complex, illustrate Agentic AI's value rule-bound AI falls short role in addressing the dynamic environments.

C. EXPANDED COMPAR

While classical AI systems supervised-learning models Agentic AI integrates au