

## ARTIFICIAL INTELLIGENCE APPROACHES FOR INTELLIGENT DECISION-MAKING SYSTEMS

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### ABSTRACT

*The rapid growth of Artificial Intelligence (AI) has transformed traditional decision-making paradigms into dynamic, data-driven systems capable of adaptive reasoning and predictive analysis. This paper explores contemporary AI methodologies, including machine learning, deep learning, fuzzy logic, and evolutionary algorithms, and their roles in enhancing the efficiency, accuracy, and transparency of intelligent decision-making systems. It examines how these approaches integrate with cognitive computing, big data analytics, and real-time optimization to support complex problem-solving across various domains, including healthcare, finance, manufacturing, and autonomous systems. By analyzing both centralized and distributed architectures, the study identifies emerging challenges in interpretability, ethical reasoning, and mitigating data bias. Finally, it proposes that a hybrid decision framework can combine human expertise with AI-driven inference models, aiming to achieve a balance between automation and accountability in next-generation decision-support environments.*

**KEYWORDS:** Artificial Intelligence (AI)

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