

From Problem Solving to Smarter Decisions Making: Harnessing the Power of Large Language Models in Systems Engineering

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Abstract

Artificial Intelligence systems have rapidly evolved to become a defining feature of modern life, permeating both personal domains and a wide range of professional and technological fields. Their growing adoption in engineering disciplines has expanded the scope of automation and delivered significant improvements in efficiency, accuracy, and overall performance. We have demonstrated that these systems can be integrated and optimized to streamline processes in systems engineering. This integration is enabled through the development of appropriate infrastructures and their adaptation to Systems Engineering requirements. The performance of these combined systems was measured and characterized using suitable benchmarks, transforming them into practical engineering tools. This shift in approach raises critical questions: To what extent can Artificial Intelligence systems be trusted to support decision-making processes? What level of human oversight remains essential to ensure quality, uphold ethical standards, and maintain professional accountability? Addressing these challenges requires the development of rigorous evaluation frameworks that incorporate quantitative metrics and comparative methodologies, enabling objective assessments and evidence based evaluations of Artificial Intelligence performance. The present study examines these issues within the context of complex systems engineering. Its primary objectives are to define the boundaries of Artificial Intelligence Systems autonomous decision-making capabilities and to identify the conditions necessary for achieving optimal integration between human judgment and advanced technological systems.

Keywords

Large Language Model, Systems Engineering, Decision Making.

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