Opportunities and Risks of Foundation Model approach in an interdisciplinary Systems Engineering

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Abstract:

Large Language Models (LLM's) have emerged as a groundbreaking technology, capable of understanding and generating human-like text matching and cross-matching search capabilities of information at a decision-making level with an assessable level of confidence. In the fields of systems engineering, it was found that the models suffer from a lack of accuracy arising as a result of undirected training inability to reach up-to-date and expert data sources. We investigated the use LLM's within systems engineering, employing a Retrieval-Augmented Generation (RAG) framework to address the complexities of specialized engineering tasks. We outlined a structured approach to build a domain-specific RAG dataset, applying techniques such as text splitting, cleaning and relevance checking to enhance retrieval effectiveness. Our dramatic improvement results on the performance of LLM's in solving complex issues in system engineering, laying the foundations for public RAG infrastructure. Leveraging foundation models and LLM's by our innovative setup paves the way for future Systems Engineering tool. This approach uses unique enhanced data corpus laying on efficient and controlled real time expert knowledge sharing.

Keywords:

Large Language Model, Retrieval Augmented Generation, S.E.