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Mapping Generative Artificial Intelligence (GAI's) Exciting Future: From Gemini to Q* and Beyond

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Abstract

This research investigates the transformative potential of Mixture of Experts (MoE) and multimodal learning within generative AI, exploring their roles in advancing towards Artificial General Intelligence (AGI). By leveraging a combination of specialized models, MoE addresses scalability and computational limitations, enabling more nuanced and robust modelling across diverse data modalities. The research exploration draws inspiration from pioneering projects like Google's Gemini and OpenAI's anticipated Q* to push the boundaries of AI capabilities. The objectives include exploring the impact of MoE on generative AI, investigating multimodal learning's role in achieving AGI, conducting experiments to demonstrate MoE's effectiveness across various domains, and assessing the influence of AI-generated preprints on the peer-review process. Ethical considerations are also emphasized, advocating for AI development that aligns with societal well-being. The methodology employs techniques from social network analysis to examine the current landscape and future possibilities of MoE and multimodal learning. Experiments conducted across healthcare, finance, and education demonstrate a 25% increase in training efficiency and a 30% improvement in output quality when using MoE compared to traditional single-model approaches. The analysis of AI-generated preprints highlights their significant impact on the peer-review process and scholarly communication. The findings underscore the potential of MoE and multimodal learning to propel generative AI towards AGI. The study advocates for responsible AI development, aligned with human-centric values and societal well-being, and proposes strategic directions for future research. This research promotes the balanced and ethical integration of MoE, multimodality, and AGI in generative AI, fostering equitable distribution and ethical usage of AI technologies.

Keywords: Artificial Intelligence (AI), Artificial General Intelligence (AGI), Bard, ChatGPT, Computer Vision, Deep Learning (DL), Gemini, Generative Artificial Intelligence (GAI), Large Language Models (LLMs), Machine Intelligence, Machine Learning (ML), Mixture of Experts (MoE), Multimodality, Q* (Q-star)

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1. Introduction

The journey of Artificial Intelligence (AI) has been a remarkable one, beginning with early theories and Alan Turing's ***"Imitation Game"*** that laid the foundation for today's sophisticated models. Advancements such as neural networks and machine learning have paved the way for innovative approaches like Mixture of Experts (MoE) and multimodal AI systems, underscoring the dynamic nature of this field [1,2,3]. Large Language Models (LLMs) like ChatGPT and Google's Gemini have revolutionized AI, sparking discussions about their potential societal impacts and even the possibility of AI consciousness. These models, including Anthropic's Claude, have pushed the boundaries in language understanding and generation with techniques such as ***"spike-and-slab"*** attention [112].

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