



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Optimised Study On Artificial General Intelligence For Future Evolution

Prince Kumar^{#1}, Ankit Kr Verma^{#2}, Md. Aadil Siddike^{#3}, Mr Abhishek Kumar Singh^{#4}

^{1,2,3 & 4} IIMT College of Engineering, Greater Noida, UP, India

Abstract—Artificial General Intelligence (AGI) represents the next frontier in artificial intelligence, aiming to develop systems with human-like cognitive abilities across a wide range of tasks. Unlike narrow AI, which is designed for specific applications, AGI aspires to mimic human reasoning, learning, and problem-solving capabilities with adaptability and generalization. This paper explores the fundamental concepts, historical evolution, and key challenges associated with AGI development. It examines the technological advancements driving progress in this field, along with the ethical, societal, and economic implications of achieving human-level intelligence in machines. Furthermore, it highlights the diverse applications of AGI in various domains, from healthcare and automation to scientific discovery and creative problem-solving. Despite significant advancements in AI research, AGI remains a theoretical goal, with many challenges yet to be addressed. Issues such as safety, control mechanisms, computational requirements, and ethical considerations continue to shape the discourse surrounding AGI. This research aims to provide a comprehensive analysis of AGI, shedding light on the possibilities, risks, and future prospects of achieving true machine intelligence.

Keywords- ML, DL, OpenAI ,AI, AGI, future, reinforcement

THE CURRENT LANDSCAPE: STATE OF AGI RESEARCH AND DEVELOPMENT ADVANCEMENT IN MACHINE LEARNING (ML) AND DEEP LEARNING (DL)

Machine learning (ML) and deep learning (DL) form the core of contemporary AI and have witnessed significant advancements in recent years. Deep learning, an AI discipline, focuses on training neural networks with multiple hidden layers to extract and understand complex relationships from raw data. AI experts use deep learning to build systems capable of understanding text, audio, images, video, and other information types. Recent years have seen significant strides in AGI technology driven by advancements in neural networks, deep learning algorithms, and computational power, with researchers increasingly focusing on creating systems that can learn autonomously, adapt to new environments, and perform complex tasks without human intervention.[1]

Key techniques driving these advancements include neural networks, reinforcement learning, transfer learning, and meta-learning. Reinforcement learning drives models optimizing behavioural strategies maximizing rewards through iterative feedback akin to human decision policies. Meta-learning enhances fundamental learning processes, promising continuous self-improvement by absorbing new experiences faster. These advancements have enhanced AI's ability to tackle specific tasks with greater efficiency. While ML and DL have driven significant progress in AI, many experts believe that scaling these current methods alone will not be sufficient to achieve true AGI, necessitating new architectures and approaches. Current ML and DL models excel at pattern recognition and prediction based on large datasets. However, human intelligence involves more than just statistical correlation; it includes abstract reasoning, common sense, and the ability to generalize knowledge in novel ways, which are areas where current models still fall short.

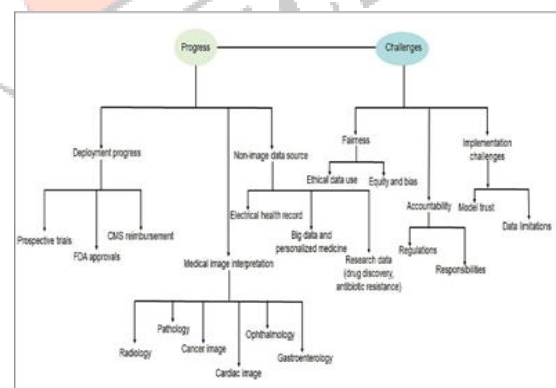


Fig 1:- The challenges and progress of ML and DL in medicines and healthcare.[2]

ASSESSING THE RELEVANCE OF CURRENT AI ADVANCEMENTS TO ACHIEVING AGI

Current advancements in ML, DL, NLP, and CV have laid the groundwork for AGI research. OpenAI's CEO, Sam Altman, expresses optimism that AGI will emerge in the next few years, grounded in the significant progress made by AI models in generating human-like text and understanding complex queries. However, many leading AI scientists remain unconvinced that these advancements alone will yield genuine general intelligence. Yann LeCun, Meta's Chief AI Scientist, argues that current deep learning models fundamentally lack essential reasoning structures needed for

AGI[5]. Gary Marcus, a prominent AI researcher, emphasizes that today's neural networks are powerful statistical tools but lack the inherent cognitive capabilities humans naturally possess. Melanie Mitchell stresses the need for fundamentally new AI architectures, not just larger datasets or more computing power. While current AI shows impressive capabilities in specific domains, it is still considered far from achieving general intelligence. There is an ongoing debate on whether scaling existing models is sufficient or if fundamentally new approaches focusing on more human-like cognitive architectures are required. There is a divergence of opinion among experts regarding the relevance of current AI advancements to achieving AGI, with some optimistic about the trajectory and others emphasizing the need for fundamental breakthroughs in cognitive architectures and reasoning abilities. While the rapid progress in areas like LLMs is undeniable, the question remains whether these advancements represent incremental improvements in narrow AI or are genuine steps towards general intelligence. Some experts believe current models lack the core reasoning structures and common sense necessary for AGI.[3]

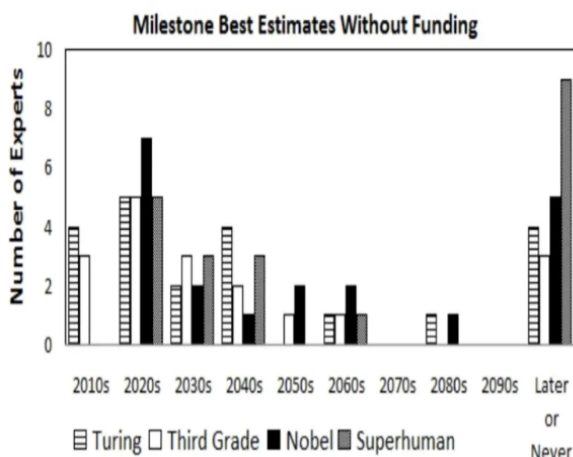


Fig 2:- Results from the survey distributed to attendees of the Artificial General Intelligence 2009 (AGI-09) conference

NAVIGATING THE OBSTACLES:- MAJOR TECHNICAL CHALLENGES HINDERING AGI.(THE COMPUTATIONAL POWER IMPERATIVE AND ITS LIMITATIONS.

Developing and running Artificial General Intelligence (AGI) systems demands enormous computational resources. Graphics processing units (GPUs) have been instrumental in the major AI advances of the past few years due to their ability to handle multiple tasks related to visual data simultaneously, making them efficient for training complex neural networks. Quantum computing is touted as another way of achieving the necessary computational power for AGI, although today's quantum computers are not yet ready for everyday applications[8]. Data scientists estimate that AGI will require computing power of more than 10^{16} teraflops, making today's AI models' computing seem insignificant. Steven Byrnes estimates that a current high-end retail gaming PC could be sufficient for human-level human-speed AGI, while others suggest that GPUs are not as efficient as neuromorphic hardware like the brain for running neural circuits, potentially requiring significantly more computational power. Developing AGI would require enormous computational resources, and while advancements in hardware such as quantum computing and neuromorphic chips could aid this effort, current computational limitations present a significant barrier. While computational power has been a key driver of recent AI progress, the requirements for AGI are likely to be orders of magnitude greater than current capabilities, posing a significant bottleneck[9]. The

complexity of simulating human-level intelligence, with its vast neural networks and intricate processing, demands immense computational resources[4]. Current hardware, while powerful, may not be sufficient, and advancements in areas like quantum computing are still in early stages.[7]

TRANSFORMING INDUSTRIES:- POTENTIAL APPLICATIONS OF AGI AND THEIR IMPACT.

AGI holds immense potential to transform the healthcare sector. It could be utilized to evaluate patient data, suggest individualized treatment regimens, help with disease diagnosis, and even carry out research on novel treatments. AGI systems can analyze patient history and symptoms to generate or confirm diagnoses and recommend the best treatments for given conditions. By analyzing vast amounts of medical data, including medical images, patient records, and genetic information, AGI could identify subtle patterns that might escape human attention. This could lead to more accurate diagnoses and a deeper understanding of diseases. Furthermore, AGI could tailor treatment plans to an individual's genetic makeup and medical history, potentially resulting in more effective therapies and fewer side effects. AGI is also poised to revolutionize medical research and drug development by analyzing complex datasets to expedite the discovery of new drugs, identify potential side effects, and optimize clinical trials. The integration of AGI into diagnostic processes is transforming the way diseases are detected by learning from large datasets of medical images, lab results, and patient histories to assist healthcare professionals in diagnosing diseases earlier and more accurately [10]. AGI holds immense promise for transforming healthcare by enabling more accurate diagnoses, personalized treatments, and faster drug development, potentially leading to significant improvements in human health and well-being. The ability of AGI to process and analyze vast amounts of complex medical data could lead to breakthroughs in understanding and treating diseases. Personalized medicine, tailored to individual genetic profiles, could become a reality.

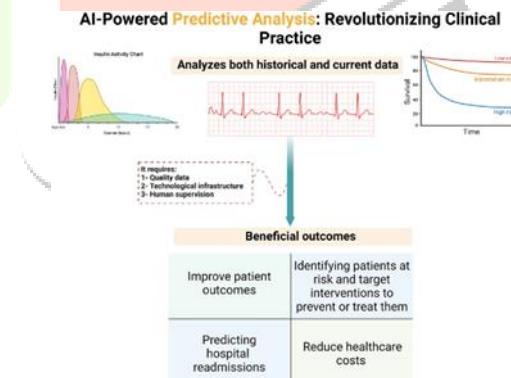


Fig 3: - Predicting hospital readmissions is another area where predictive analytics can be applied [11]

ETHICAL AND SOCIETAL CROSSROADS: IMPLICATIONS OF AGI DEVELOPMENT (THE FUTURE OF WORK:- JOB DISPLACEMENT AND THE EVOLVING WORKFORCE.)

The advent of AGI has profound implications for the future of work, with the potential to automate a wide array of tasks currently performed by humans. Experts hold varying opinions on the extent and timeline of this job displacement. Some predict that AGI could replace a significant percentage of existing jobs, while others argue that it will primarily augment human capabilities and create new job roles. Sectors characterized by routine-based tasks, such as manufacturing, transportation logistics, customer service, and administrative support, are considered most susceptible to disruption. However, new roles in areas like AI development,

maintenance, and ethics are expected to emerge. The transformation of the global workforce due to AGI will necessitate reskilling and upskilling initiatives to prepare individuals for the evolving demands of the job market. AGI has the potential to significantly transform the global workforce, automating both routine and complex tasks, leading to potential job displacement and the need for workforce adaptation and reskilling. The ability of AGI to perform intellectual tasks at a human level could impact a wide range of occupations[13]. Understanding which jobs are most vulnerable and what new skills will be in demand is crucial for individuals, businesses, and governments.



Fig 4: - Writer Eric Heisserer hold his sign on the picket line on the fourth day of the strike by the Writers Guild of America in front of Netflix in Hollywood, California

The long-term vision for AGI development anticipates its pervasive integration into various aspects of society and daily life. Some experts predict that AGI could arrive within the next few years or decades, while others maintain it might take a century or longer. The long-term vision includes AGI acting as a powerful tool for humanity, increasing abundance, turbocharging the global economy, and aiding in the discovery of new scientific knowledge [14]. It could lead to personalized learning systems, advanced medical diagnostics, and solutions to complex problems like climate change [S_S183]. The integration of AGI into society is expected to be a gradual process, with initial deployments likely focused on specific domains before becoming more widespread. The long-term vision also emphasizes the importance of ensuring that the future of humanity is determined by humanity, with public scrutiny and consultation for major decisions regarding AGI development and integration. The long-term vision for AGI involves its pervasive integration into society, potentially transforming how we live, work, and interact with technology, but the exact nature and timeline of this integration remain uncertain. As AGI capabilities advance, it is expected to become increasingly integrated into various aspects of human life, from personal assistants to industrial automation. Understanding the potential scope and pace of this integration is crucial for anticipating its impact.

CONCLUSION.

The pursuit of Artificial General Intelligence represents one of the most ambitious and potentially transformative endeavors in the history of technology. This report has explored the multifaceted nature of AGI, from its theoretical definition and historical evolution to the current state of research and the formidable technical challenges that lie ahead. The potential applications of AGI across healthcare, finance, education, and manufacturing, among other sectors, offer a glimpse into a future where complex problems could be solved with unprecedented efficiency and innovation. However, the development of AGI is inextricably linked with profound ethical and societal implications, including the future of work, the imperative of algorithmic fairness, the

risks of misuse, and the long-term consequences for humanity. As we navigate this complex landscape, the economic and business implications of AGI adoption will be significant, potentially leading to new business models, driving unprecedented productivity gains, and transforming the global workforce. The journey towards AGI is ongoing, with diverse research approaches and the promise of future scientific breakthroughs shaping its trajectory. Ultimately, the successful integration of AGI into society will require careful consideration of ethical frameworks, robust governance strategies, and a balanced perspective on the long-term risks and benefits to ensure a future where this powerful technology serves the best interests of humanity.

REFERENCE

1. (<https://aws.amazon.com/what-is/artificial-general-intelligence/>)
2. (<https://www.sciencedirect.com/science/article/pii/S2590262823000461>)
3. (<https://quinteft.com/understanding-openai-five-levels-of-ai-progress-towards-agi/>)
4. (<https://hyperight.com/artificial-general-intelligence-is-agi-really-coming-by-2025/>)
5. (<https://research.aimultiple.com/artificial-general-intelligence-singularity-timing/>)
6. (<https://www.nature.com/articles/s41598-025-92190-7>)
7. (<https://www.degruyterbrill.com/document/doi/10.1515/ijdlg-2024-0015/html?lang=en>)
8. (<https://deepmind.google/discover/blog/taking-a-responsible-path-to-agi/>)
9. (<https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-023-04698-z>)
10. (<https://pmc.ncbi.nlm.nih.gov/articles/PMC11520245/>)
11. (<https://www.forbes.com/sites/benjaminlaker/2023/05/09/ai-at-the-crossroads-navigating-job-displacement-ethical-concerns-and-the-future-of-work/>)

12. (<https://www.brookings.edu/articles/generative-ai-the-american-worker-and-the-future-of-work/>)
13. (https://en.wikipedia.org/wiki/Artificial_general_intelligence)

14. (<https://www.aei.org/articles/the-age-of-agi-the-upside-and-challenges-of-superintelligence/>)

