

# Towards The Commoditization of Intelligence – A Primer on Artificial Intelligence – From Ancient Concepts to Modern Applications in Drones and Robotics

By

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# Agenda

**Historical Context:** AI's roots and resurgence

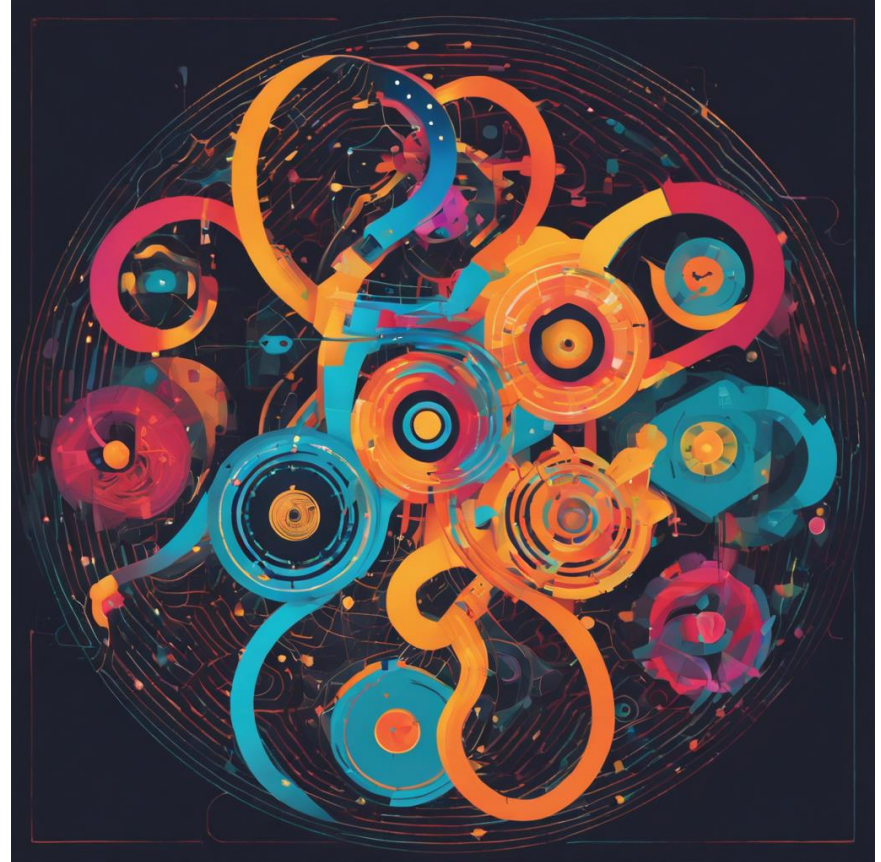
**Fundamentals of AI:** Defining AI and its impact

**AI in Action:** Drones, robotics, and types of robots

**Breakthroughs and Trends:** NLP, Computer Vision, Autonomy, IoT, collaboration, cost efficiency

**Ethical and Societal Impact:** Ethics, employment, societal considerations

**Shaping the Future:** Policy recommendations, economic growth



# Historical Context: From Automata to Modern AI



## References:

[Al-Jazari](#)  
[KAUST AI Research](#)

**Golden Age of Islam (6th-13th Centuries):** Arab scholars made pioneering contributions to mathematics, astronomy, and mechanical engineering. Concepts such as artificial devices (automata) can be traced back to this period, with figures like Al-Jazari creating programmable devices.

**Early Robotics:** Al-Jazari's designs for water clocks, automata, and mechanical servants foreshadow modern robots' function. These early ideas contributed to the mechanization and automation principles seen in today's technologies.

**AI Resurgence:** The Arab world is reinvigorating its innovation in AI, with significant investments in research hubs like the King Abdullah University of Science and Technology (KAUST) and AI-powered ventures across the region, especially in the UAE and Saudi Arabia.



# Defining Artificial Intelligence

**AI Overview:** AI refers to technologies that allow machines to simulate human cognitive functions, such as learning, reasoning, problem-solving, and decision-making.

## Characteristics of Artificial Intelligence Systems:

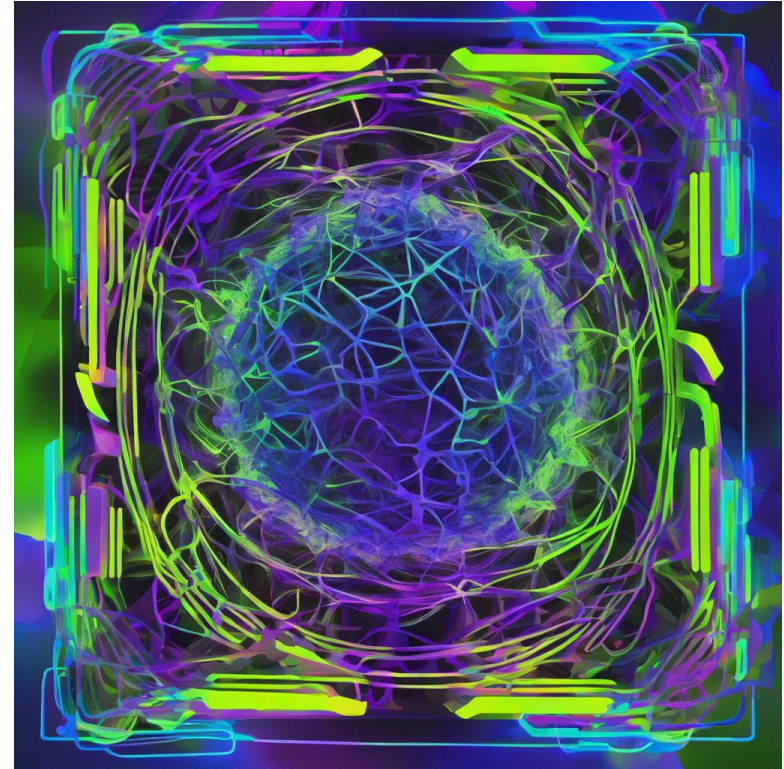
**Data-driven learning:** Machine learning models use large datasets to identify patterns, predict outcomes, and make decisions autonomously.

**Adaptation to patterns over time:** AI systems improve through feedback and new data, refining their predictions and performance over time.

**Real-time decision-making capabilities:** AI enables instant analysis and decision-making, making it ideal for high-stakes environments like healthcare and security.

## Recent Breakthrough: Pre-Trained "Libraries" Of Intelligence

1. Off-the-shelf models that contain large corpus of internet data
2. Custom libraries with your own data
3. Chatbot, Mobile, and Voice interfaces
4. Attractive price / performance (e.g., Deepseek V3 / R1)



# AI: The Great Leveler



**AI's Power:** AI processes vast amounts of data and applies advanced algorithms to make predictions and solve problems, offering advancements far beyond previous technologies like traditional data management systems.

**Core Competence:** As digital transformation reshapes industries globally, AI knowledge is becoming a crucial element for countries to remain competitive, improve public services, and foster innovation. However, access to high-quality data, computational resources, and skilled AI talent remain significant barriers for many, particularly resource-constrained nations.

**Immediately Available To Everyone Everywhere:** Unlike other technology adoption cycles, AI advances are available without friction due to a lack of infrastructure any longer. It is available to anyone anywhere with all the same power and capability.

# Breakthrough AI Models Slash Costs with Pre-Trained Foundations

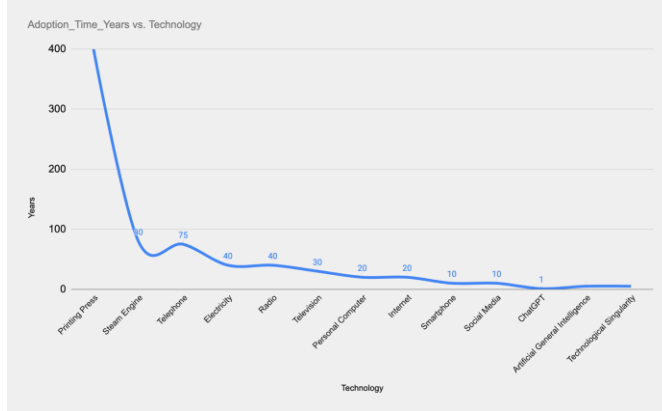
## Key Techniques for Cost Efficiency:

- **Transfer Learning:** By utilizing existing large models as a foundation, new approach minimizes the need for extensive data collection and training from scratch, thus reducing computational costs.
- **Optimized Training Algorithms:** Implementing advanced optimization techniques enables faster convergence during training, leading to lower energy consumption and resource allocation.

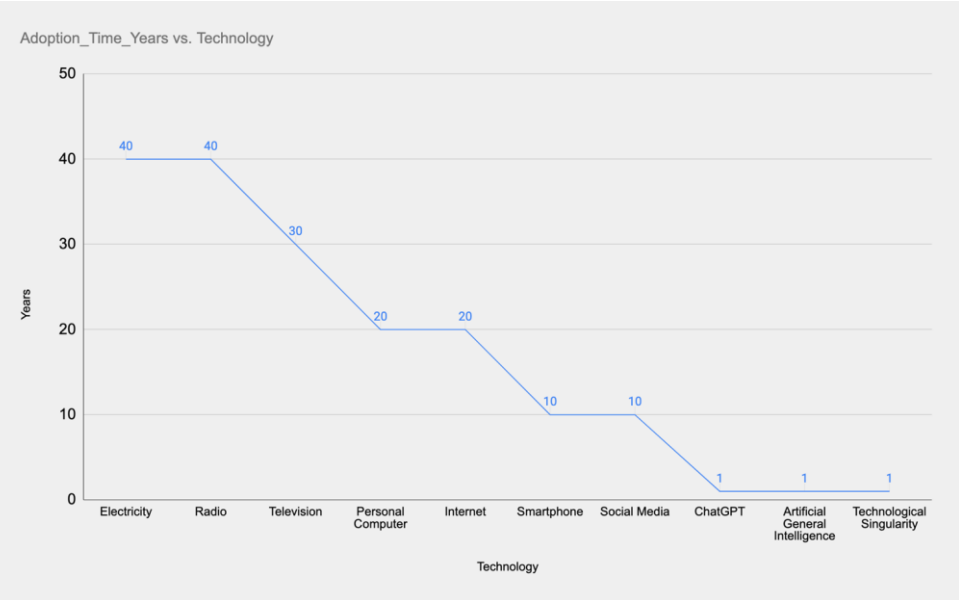


Deepseek's Innovation Levels AI Access,  
Fostering Equitable Technological Growth





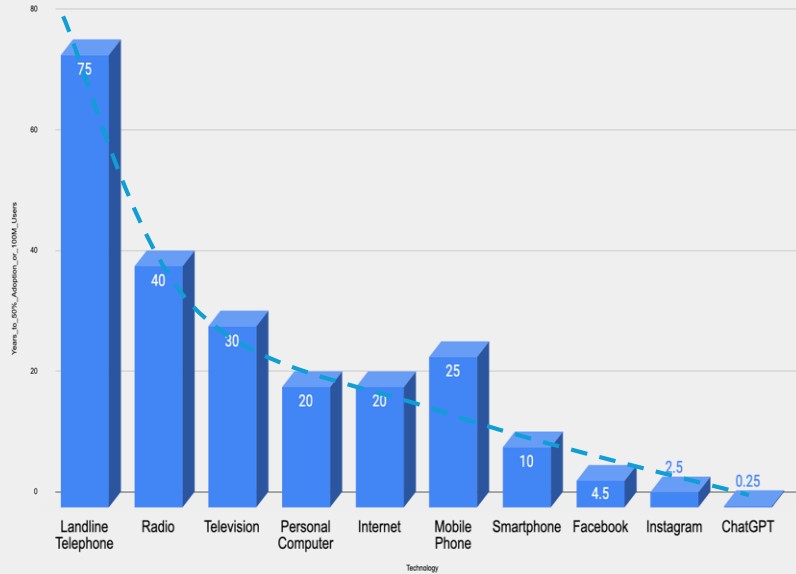
Last 150 years



- Internet/Web - decades to reach full potential.
- LLM & Pre-trained Models - Near-instant benefits.
- Rapid adoption driven by:
  - Vast datasets.
  - Powerful computational resources.
  - Fine Tuning.

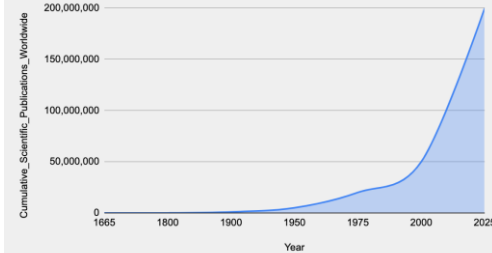
## Technology Adoption Increasing In Velocity

Years\_to\_50%\_Adoption\_or\_100M\_Users

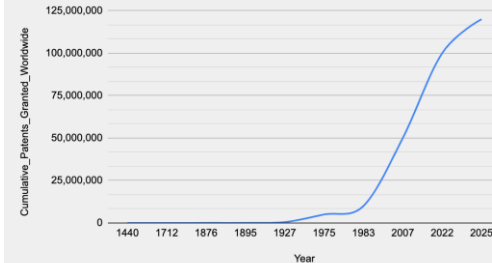


## The Cycle Of Technology: Innovate → Integrate → Innovate

Cumulative\_Scientific\_Publications\_Worldwide vs. Year



Cumulative\_Patents\_Granted\_Worldwide vs. Year





# Fusion of AI and Robotic Drones

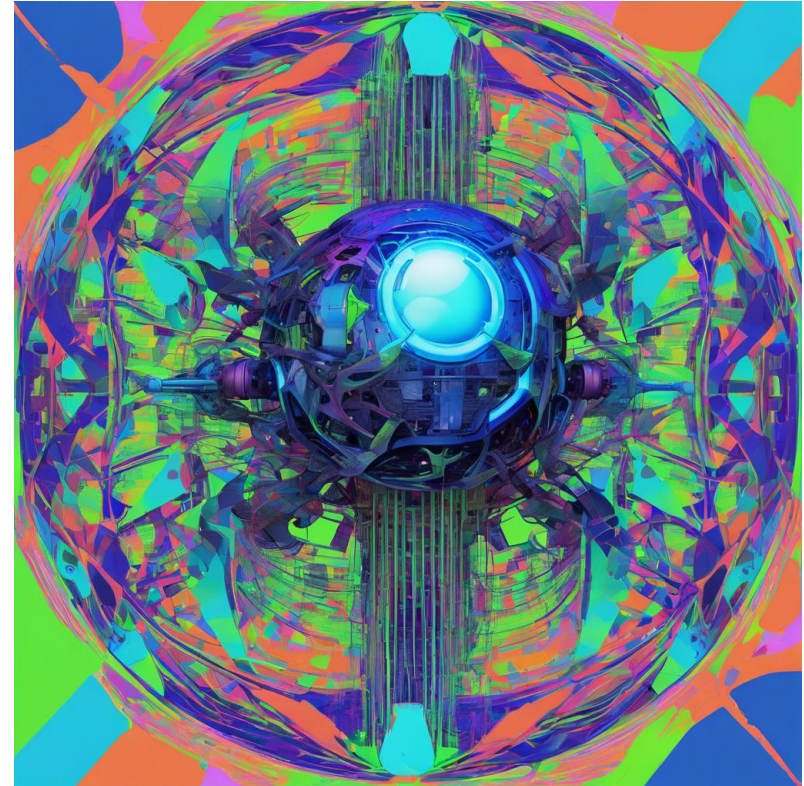
**Drones Transformed by AI:** AI enables drones to perform sophisticated real-time tasks such as autonomous navigation, data analysis, and decision-making without human intervention.

## Applications:

**Precision Agriculture:** AI drones assess crop health, detect pest infestations, and optimize irrigation practices, thereby increasing agricultural efficiency and sustainability.

**Emergency Response:** AI-powered drones help with disaster recovery, search and rescue missions, and assessing damage in hard-to-reach areas.

**Environmental Monitoring:** AI drones can track wildlife populations, monitor deforestation, and assess the health of ecosystems in real-time.



# Drones in Agriculture and Emergency Response



**Precision Agriculture:** AI drones identify patterns that human eyes may miss, from detecting early signs of disease to estimating crop yield, thus increasing efficiency and reducing the need for pesticides and fertilizers.

**Emergency & Disaster Response:** Drones have been used in real-time disaster mapping after events like earthquakes, hurricanes, and wildfires. Their ability to access hazardous areas without risking human lives is invaluable.

**Personal Connection:** Family history developing agricultural programs in the region



# Robotics: Automation Across Sectors

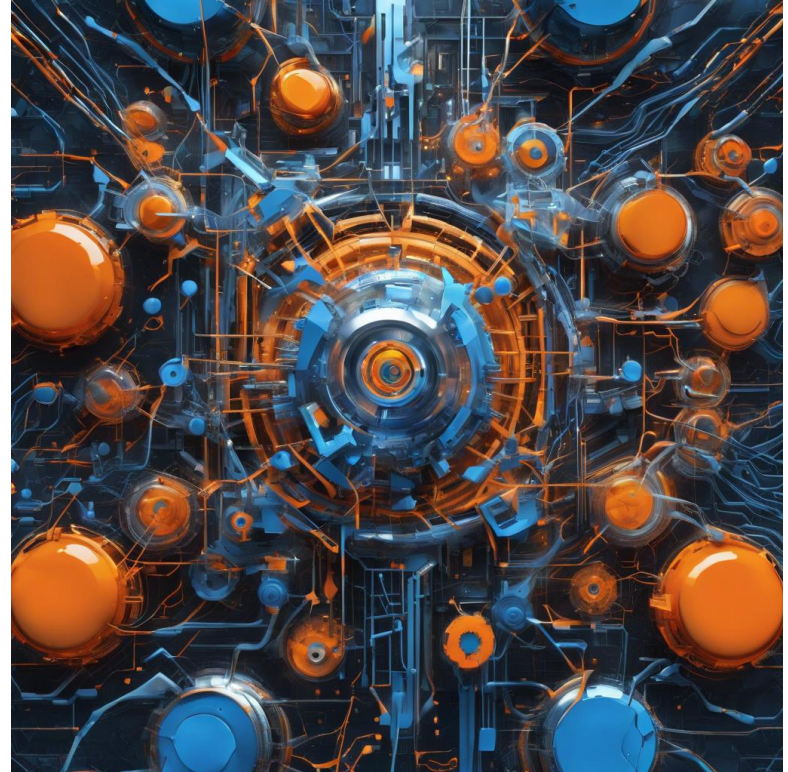
**AI and Robotics:** The fusion of AI and robotics enables machines to autonomously perform tasks that previously required human intelligence and dexterity, such as identifying objects, adjusting to changes, and providing solutions in dynamic environments.

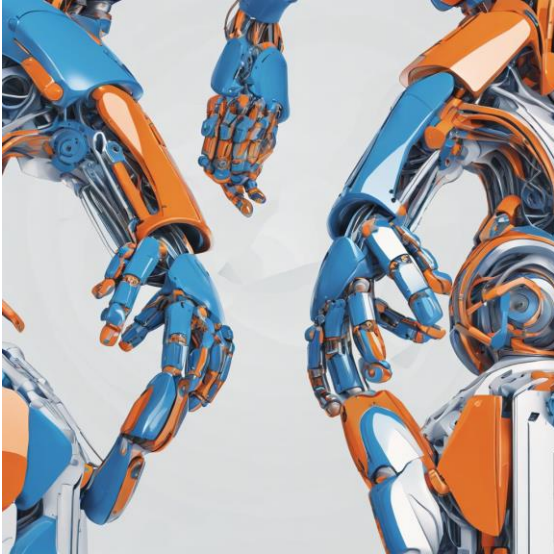
## Key Applications:

**Manufacturing:** Collaborative robots (cobots) are revolutionizing production lines by working side-by-side with human workers to perform repetitive tasks efficiently and safely.

**Healthcare & Services:** AI-driven robots assist in surgery, rehabilitation, elder care, and even provide personalized services in hospitality and retail.

**Security:** Autonomous security robots equipped with AI sensors perform surveillance, identify threats, and provide real-time reports, reducing the reliance on human personnel.





## Collaborative Robots (Cobots) in Manufacturing

**Cobots:** These robots are designed to complement and work with human operators, often taking over dangerous or repetitive tasks while allowing humans to focus on more complex activities.

**Benefits:** Cobots increase productivity and efficiency, improve safety in hazardous environments, and reduce the potential for human error in manufacturing settings.

**Scenario:** In a modern manufacturing plant, workers collaborate with AI-powered cobots to assemble electronic devices.

**Task Allocation:** Cobots handle repetitive and physically demanding tasks such as screwing, welding, and component placement, while human workers focus on quality control, troubleshooting, and complex assembly tasks.

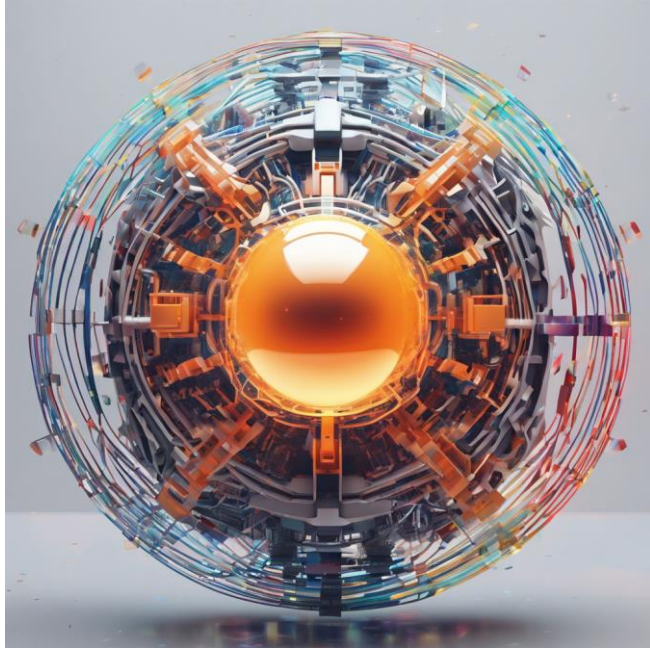
**Increased Efficiency:** The cobots' precision and speed reduce the time required for assembly, leading to a significant increase in overall production rates.

**Error Reduction:** AI algorithms enable cobots to detect and correct errors in real-time, minimizing defects and ensuring high-quality output.

**Worker Empowerment:** By offloading monotonous tasks to cobots, workers can engage in more intellectually stimulating activities, enhancing job satisfaction and productivity.

**Continuous Learning:** AI systems analyze production data to identify bottlenecks and suggest process improvements, fostering a culture of continuous improvement and





## Recent Breakthroughs in AI

**Natural Language Processing (NLP):** NLP advancements have significantly improved human-robot interactions, enabling robots to understand and respond to complex language and context. True natural language understanding, including nuanced language, sarcasm, and real-world context, remains an ongoing challenge.

**Computer Vision:** AI systems are now able to analyze visual data with higher precision, enabling robots to interpret their environment and execute tasks like object recognition, facial recognition, and quality control.

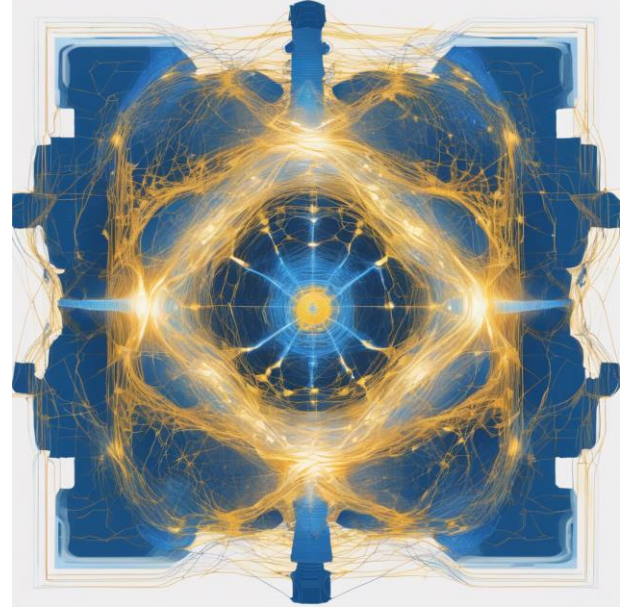
**Autonomy:** Innovations in AI-powered robots now allow machines to operate independently in dynamic environments, navigating obstacles and performing complex tasks without human intervention.

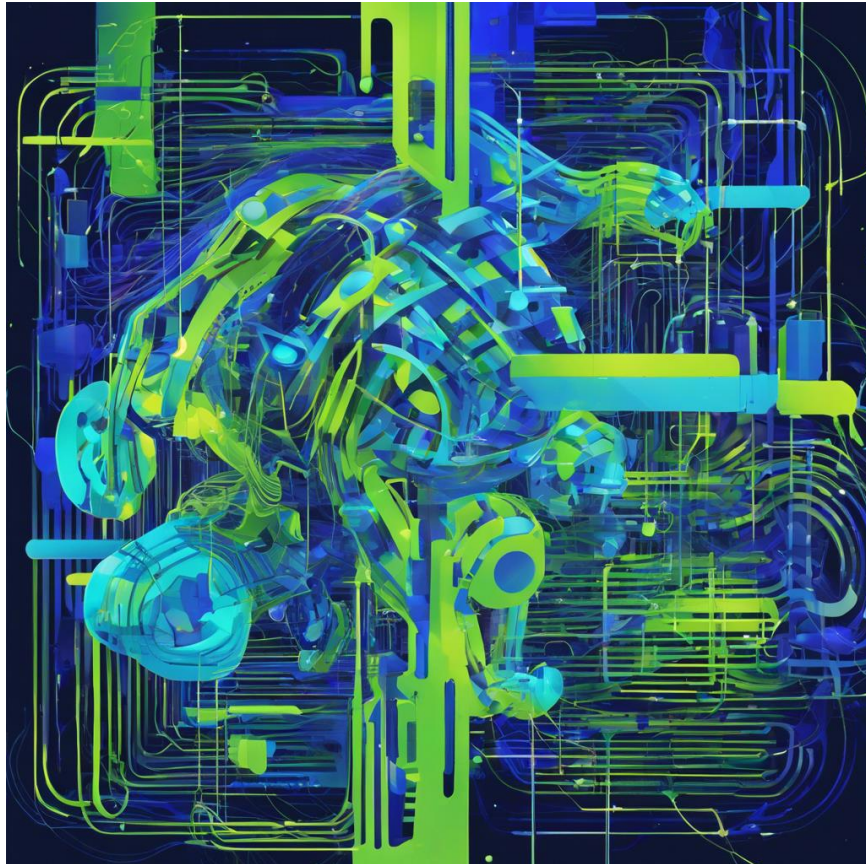
**Efficiency:** Recent techniques generate 10X-100X more efficient models

# Ethics of AI

**Responsible AI Development:** The development of AI in robotics and drones must prioritize ethical considerations such as safety, privacy, accountability, and the mitigation of biases in algorithms.

**Ethical Guidelines:** Regulatory frameworks are increasingly important in areas like autonomous weaponry, surveillance, and privacy. The EU, for example, has proposed ethical guidelines for AI to ensure responsible usage across industries. The EU has published the "Ethics Guidelines for Trustworthy AI," which provide a framework for developing and deploying trustworthy AI systems.





**IoT Integration:** AI-powered robots and drones will integrate with the Internet of Things (IoT), enabling real-time data exchange and collaboration across different systems for smarter, more efficient operations.

**Human-Robot Collaboration:** The use of cobots in manufacturing, healthcare, and other sectors will grow, enhancing human productivity by automating dangerous or mundane tasks.

**IoT and AI Integration:** Over the last decade, the deployment of IoT devices worldwide has surged, enabling these devices to connect to powerful AI systems. This integration allows AI to reason and understand the data reported by IoT devices, leading to smarter and more efficient operations. Additionally, services like Alexa and Siri can natively control these IoT devices, providing seamless user experiences and enhancing the functionality of smart homes, industries, and cities.



**New Opportunities:** AI and robotics will create entirely new job categories in data science, AI training, and robotics engineering, demanding reskilling and upskilling for workers.

**Workforce Adaptation:** Governments, businesses, and educational institutions will need to invest in training programs to equip workers with the skills necessary to thrive in an AI-driven economy.

**Complex Impact on Employment:** The impact on employment is complex. While some jobs will be displaced, others will be created, and many existing jobs will be significantly transformed.

**Radiology:** Radiologists are increasingly relying on AI software to enhance their diagnostic capabilities. AI systems can analyze medical images with high precision, catching small anomalies that might be missed by the human eye. This not only improves diagnostic accuracy but also saves time and effort, allowing radiologists to focus on more complex cases and ultimately improving patient outcomes.

**Cybersecurity:** AI is also being used to combat sophisticated fraudulent activities. As cybercriminals leverage AI to create more advanced phishing attacks, AI-driven cybersecurity systems are essential in detecting and mitigating these threats. These systems can analyze patterns, identify anomalies, and respond to potential security

## Impact of AI Automation on Employment





## Shaping the Future of AI in the Arab World

**Strategic Policy Recommendations:** The Arab world should focus on creating regulatory frameworks that support AI innovation, foster public-private partnerships, and develop strong data governance policies.

**AI for Economic Growth:** By investing in AI and robotics, the Arab world can unlock economic opportunities, diversify industries, and drive growth in high-tech sectors like AI research, clean energy, and digital transformation.



## Conclusion: Embracing AI's Transformative Potential



**AI as an Opportunity:** The Arab League stands at the crossroads of unprecedented AI-driven growth, with the potential to transform economies and societies.

**The Great Leveler:** AI technology is rapidly dropping in cost and becoming more accessible, making it a powerful tool for innovation and development. Unlike previous technological revolutions, AI is instantly available to everyone, transcending geopolitical boundaries and offering equal opportunities for adoption. Recent techniques (e.g., DeepSeek) highlight the dramatic increases in accessibility of AI to all.

**Responsible Development:** Embracing AI responsibly will help the Arab world unlock new economic potential, create jobs, and improve the quality of life, all while preserving cultural identity and values.

**Ethics and Data Issues:** As AI adoption grows, it is crucial to address ethical considerations and data privacy issues. Ensuring transparent, fair, and accountable AI systems will be key to maintaining public trust and maximizing the benefits of AI technologies.

THANK YOU