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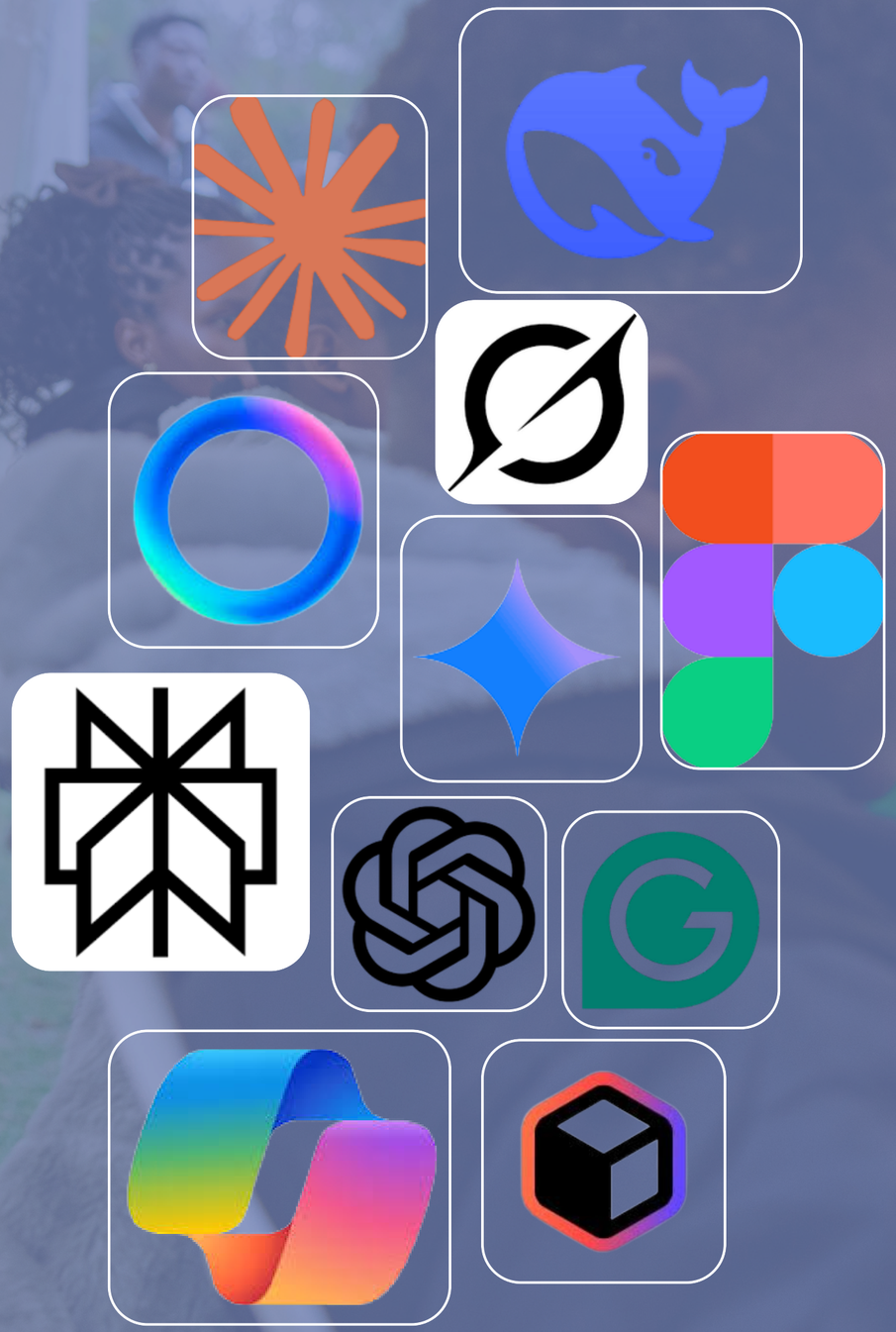
ARTIFICIAL INTELLIGENCE





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- What comes to mind?
- Have you ever seen these images anywhere?
- Can you identify them?

INTRODUCTION



WHAT IS ARTIFICIAL INTELLIGENCE?

Artificial Intelligence (AI) is the technology that enables machines and computers to perform tasks that typically require human intelligence — such as understanding language, recognizing patterns, making decisions, or solving problems. Simply put, AI is a branch of computer science that makes machines think and act like humans.

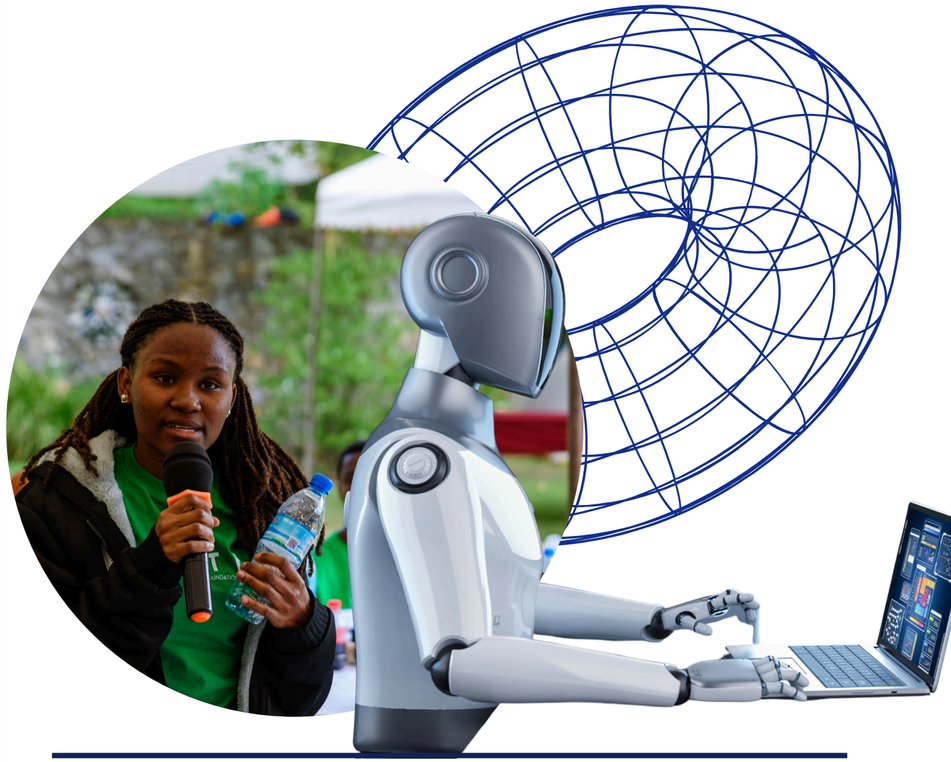
- **The broadest concept involves creating machines or systems that simulate human intelligence, including problem-solving, reasoning, learning, language understanding, perception, and more. Examples include a chatbot that can hold a conversation or a robot that navigates a room.**

THE DIGITAL REVOLUTION

- The idea of AI can be traced back thousands of years, where inventors created "automations" — a word from ancient Greek meaning "acting as one’s own will." Early programs in the 1950s could talk simply and follow rules.

- Alan Turing, a British mathematician, posed the question "Can machines think?" The term "AI" was first used at a meeting in Dartmouth College by John McCarthy, known as the "father of Artificial Intelligence." He believed machines could think and learn like humans and organized the first AI meeting in 1956.

- By the 2010s, AI became more powerful and common. Today, it creates stories, drawings, and computer code, making work and learning easier and more exciting for people everywhere.



HOW AI WORKS



- **Data:** AI learns by analyzing large amounts of data (text, images, numbers, etc.). It studies tons of examples to recognize patterns, like identifying cats or translating languages.

- **Learning:** It detects patterns and correlations within that data. Algorithms guide this process — step-by-step instructions that help AI models (like neural networks) make sense of information.

- **Action:** It uses what it has learned to make predictions or decisions. Once trained, AI solves problems or improves over time. Some systems keep learning, while others need updates with new data.

The more information AI receives, the better it gets. In a world full of challenges, AI is a tool humans can use to solve big problems and create a better future.

TYPES OF AI

- **Narrow AI (Weak AI):** AI that does one task well, e.g, Google Assistant or Siri.

- **General AI (Strong AI):** AI that can think and learn like a human in any situation (still being developed).

- **Super AI:** AI that is smarter than humans (still in the future).





COMMON FORMS OF AI



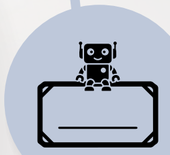
01 Machine Learning (ML)

Computers learn from data and improve without being directly programmed. Daily examples: email spam filters, voice assistants like Siri and Alexa, navigation apps like Google Maps, online shopping suggestions (Amazon), and fraud detection in banking.



02 Computer Vision

Enables machines to understand images and videos. Examples: Face ID on iPhone, Google Photos organization, self-driving cars detecting road signs/lanes/people, medical imaging support for doctors.



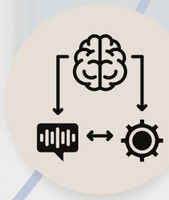
03 Robotics

Combines AI and engineering to build machines that move, sense, and act intelligently.



04 Recommendation Systems

Suggest products, songs, or videos based on user behavior (YouTube, Amazon, Netflix, TikTok).



05 Natural Language Processing (NLP)

Focuses on enabling computers to understand, interpret, and generate human language (ChatGPT, Google Translate).

OTHER COMMON LARGE LANGUAGE MODELS (LLMS)

LLMS	Claude (Anthropic)	Gemini (Google DeepMinds)
Strengths	• Ethical alignment: Built with Constitutional AI to minimize harmful outputs. • Long context window: Handles up to 1 million tokens, ideal for analyzing large scope of data. • Developer tools: Integrates well with APIs, IDEs and coding platforms.	• Multimodal capabilities: Processes text, images, audio, and video. • Real-time web access: Uses Google Search for up-to-date information. • Fast performance: Generates up to 1,000 tokens per second making it faster.
Weakness	• Limited multimodal support: Doesn't natively process images or audio. • Premium pricing: Opus tier can be expensive for high-volume users. • Occasional logic gaps: Struggles with highly specialized or abstract reasoning.	• Philosophical depth: Offers basic answers but lacks relevance to society. • Inconsistencies: Sometimes contradicts itself or avoids sensitive topics. • Limited creativity: Responses can be repetitive in artistic tasks to among users.

LLMS	DeepSeek R1	Copilot (Microsoft)
Strengths	• Cost-effective: Much cheaper than prior models. • Open-source: Transparent and customizable. • Strong in math and coding: Outperforms GPT-4o in technical benchmarks.	• Seamlessly integrates with Microsoft 365 apps and services • Can access and utilize real-time information, making it a reliable source for current data. • Can automate various tasks within Microsoft 365, such as summarizing emails, generating reports, and creating presentations.
Weakness	• Verbose outputs: Tends to over-explain or repeat steps. • Slower processing: Not ideal for real-time applications. • Limited creativity: Less effective in open-ended or artistic tasks.	• Primarily focused on Microsoft products and may not be as versatile for tasks outside this ecosystem. • Switching between different "modes (balanced, precise, creative) requires starting new searches, which can be inconvenient. • May miss key details or overlook main points in summaries.

HOW AI IS ALREADY IN USE GLOBALLY

01

Healthcare

Personalizes treatment, assists surgeries, aids drug discovery. In Africa: Predictive analytics for malaria/HIV, AI diagnostics, medical research for tuberculosis, virtual assistants addressng worker shortages, patient monitoring for chronic diseases.

02

Education

Personalized tutors (Khan Academy, ChatGPT). In Africa: AI chatbots for questions, language translation (e.g., Kenyan sign language at Maseno University), data insights for teachers (dropout prediction in Rwanda), automated grading/admin tasks.

03

Industry & Manufacturing

Predictive maintenance, quality control, automation. In Africa: Design/simulation for local products, supply chain optimization, defect detection, quality control in food/textiles, production planning.

...CONT

04

Transportation

Self-driving cars, traffic management, logistics. In Africa: Smart traffic systems reduce congestion, autonomous vehicles reduce errors, smart infrastructure for parking/urban planning.

05

Finance

Fraud detection, automated trading (Mastercard). In Africa: Mobile loan approvals, fraud detection in wallets, smart credit scoring via mobile behavior, chatbots for 24/7 service (CRDB/NMB).

06

Robotics

Autonomous security drones (Aptonomy), humanoid robots (Sanbot), autonomous cars (Tesla).

...CONT

07

Entertainment

TikTok suggestions, Netflix movie recommendations, AI-generated music/voices, YouTube music personalization.

08

Customer Service

24/7 access, increased efficiency, automated call centers, public ethics in remote work.

09

Daily Life

Face unlock, Google search suggestions, maps traffic prediction.

...CONT

10

Agriculture

Drones/sensors optimize irrigation, fertilization, pest control.

11

Environment

Predicts climate change, optimizes renewable energy.

12

Security

Enhances safety in vehicles/machines (emergency notifications).

ADVANTAGES OF AI

01 Works 24/7 without tiring.

02 Makes fast and smart decisions.

03 Reduces human mistakes (e.g., grammar checks).

04 Saves time and increases productivity.

05 Learns and improves over time.

06 Helpful for people with disabilities.

07 Makes life easier with smart devices (PC, phones).

08 Analyzes big data quickly for statistics.

09 Supports personalized education (study at home).

10 Increases safety in vehicles/machines.

CHALLENGES AND DISADVANTAGES OF AI

01 Job Displacement: Automation leads to job loss (e.g., Foxconn replaced 60,000 workers with robots in 2016). Can take away human jobs.

02 Misinformation: Deepfakes spread falsehoods.

03 Bias and Discrimination: Facial recognition has higher error rates for darker skin tones (MIT 2018).

04 Privacy Concerns: Data leaks (e.g., Facebook Cambridge Analytica).

05 Mental Health Risks: Harmful interactions (e.g., 2023 OpenAI lawsuit over suicide).

06 Dependence on AI: Reduces creativity and problem-solving.

07 Costful: Expensive to make/maintain; needs electricity/data; hard to fix errors.

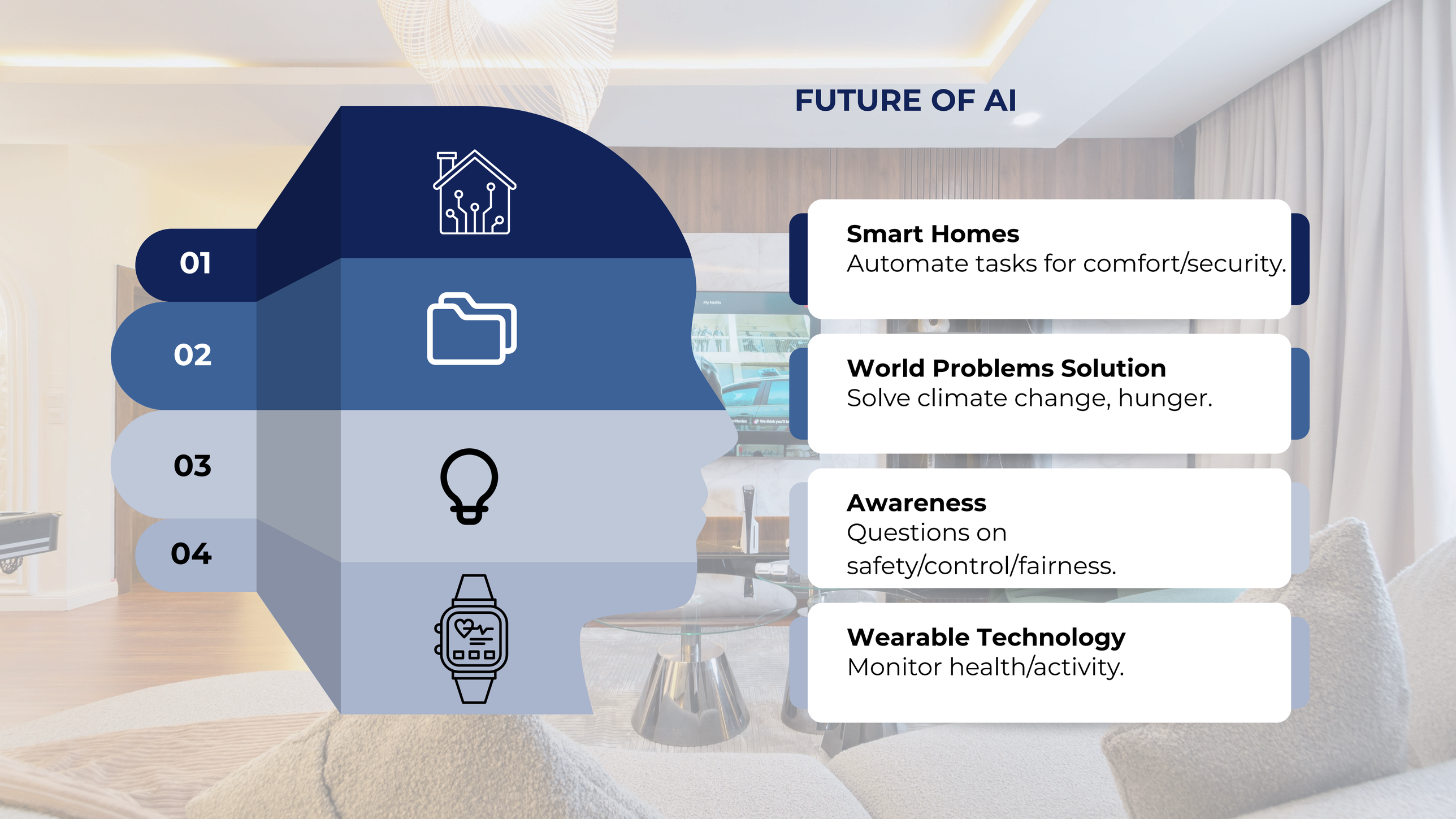
08 Emerging Threats: New cybersecurity risks; hackers use AI for harm.

09 Lack of Creativity: Develops thoughts but not creatively like humans.

10 Lack of Feelings: Increases laziness, especially in students.

Raises questions about safety, control, fairness, and new laws for protection/privacy.

FUTURE OF AI



01

02

03

04

Smart Homes
Automate tasks for comfort/security.

World Problems Solution
Solve climate change, hunger.

Awareness
Questions on safety/control/fairness.

Wearable Technology
Monitor health/activity.

FUTURE OF AI

05

06

07

08

Legal Jurisdiction
New rules for humans/privacy.

Smart Cities
Optimize transport/energy/safety.

Emotional Intelligence
More creative/emotional.

Industrial Automation
Real-time monitoring/maintenance.

HOW SCHOLARS AND TEAMS CAN USE AI EFFECTIVELY

Academic Enhancement

Generate summaries, explain concepts simply, create quizzes

Team Collaboration

Co-write/edit documents, summarize meetings (Otter.ai, Fireflies.ai).

Learning and Mentorship

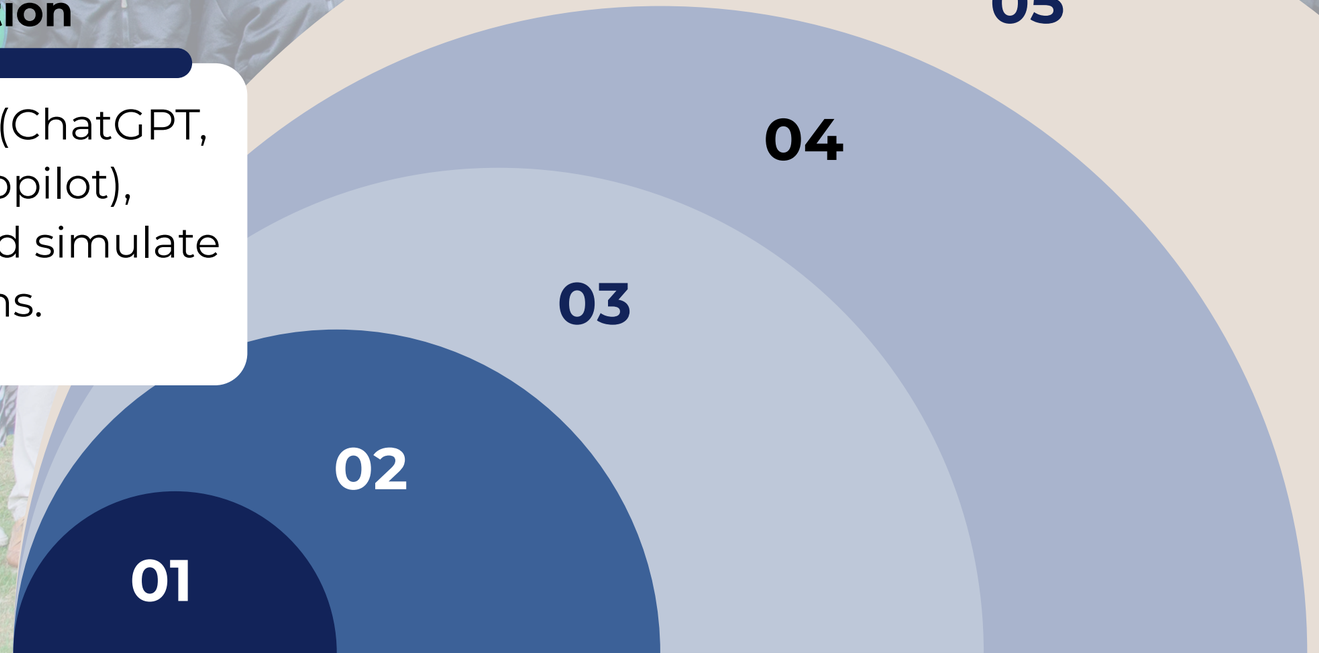
Explore fields like coding/robotics/design, personalized feedback.

Research and Innovation

Data analysis (ChatGPT, Excel AI Copilot), brainstorm and simulate designs.

Productivity and Time Management

Automate tasks (Zapier, Notion AI, Microsoft Copilot), schedule or prioritize.



SMART PROMPTING WITH AI TOOLS

WHAT IS A PROMPT?

A prompt refers to an instruction that is given to AI to perform a particular task. Therefore the quality of the prompt determines the quality of the answer.

SMART PROMPTING

is the skill of writing effective instructions (prompts) to get better, more accurate, and more useful responses from AI systems. It’s about how you ask, by providing enough detail, role, and context to guide the AI’s output.

Smart prompting is important because it saves time by reducing trials and errors, improves output quality and relevance and unlocks the full potential of AI across various fields such as education, work, business, coding, productivity, design and automation.

TIPS FOR SMART PROMPTING

01

Be Clear and Specific

Write your prompt as plainly as possible. Avoid vague instructions.

Example: "Summarize this article in 3 bullet points for a 10th-grade student." instead of just "Summarize this article."

02

Give Context

Say who the audience is, what your goal is, or any relevant background.

Example: "You are a business analyst. Explain these sales numbers to a group of new sales hires."

03

Assign a Role or Persona

Tell the AI to act as a teacher, coach, marketer, coder, designer, etc.

Example: "Act as a math tutor. Break down this calculus problem step by step."

04

Specify Format & Output

Do you want a list, table, summary, code, email, lesson plan? Name it directly.

Example: "Create a table comparing three AI writing tools by cost and features."

TIPS FOR SMART PROMPTING

05

Use Constraints or Boundaries

Give limits for tone, length, language, time, or other specifics.

Example: "List 5 benefits, each in 1 sentence, written for an adult audience."

06

Break Complex Tasks into Steps

Ask for one thing at a time or chain your prompts.

Example (Prompt chaining):

"Give me a lesson outline on climate change."

"Expand the first bullet into a 100-word explanation for middle school students."

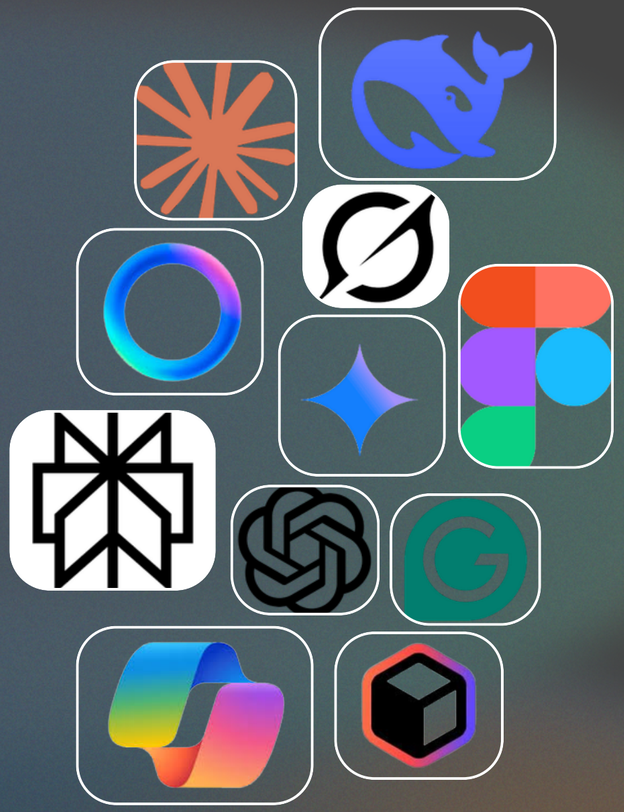
07

Revise, Iterate, and Treat It Like a Conversation

If the answer isn’t perfect, refine your prompt or ask follow-ups.

Example: "Make that answer friendlier for beginners and add an example."

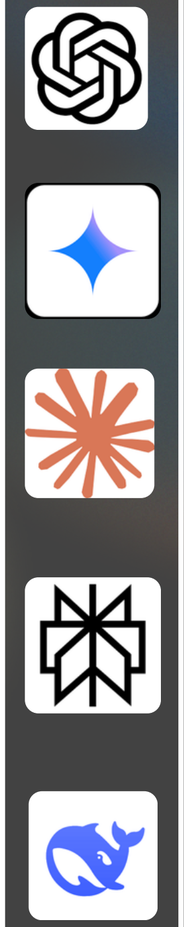
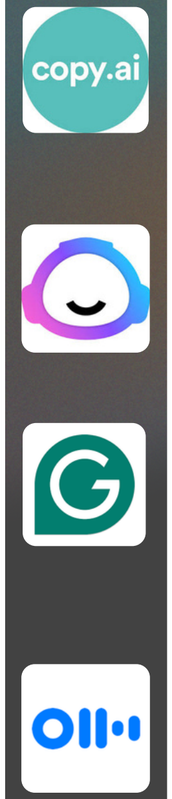
USEFUL AI TOOLS



Professional Presentation

Elevate your presentations and visual storytelling with cutting-edge AI tools.

- **Gamma.ai , Magic Slides:** AI-powered platform for creating visually engaging, interactive presentations quickly; ideal for students and professionals.

General Assistance and Research		Writing & Documentation	
Powerful AI chatbots for knowledge, tutoring, ideation, and research synthesis. • **ChatGPT, Geminiai, Claude:** Conversational AI ideal for tutoring, complex problem solving, and creative writing. • **Perplexity AI, Deepseek:** AI-powered search with fact-based summarization, perfect for research and data validation.		Tools to support professional writing, marketing, note-taking, and documentation. • **Copy AI:** Generating polished marketing copy, business content, and product descriptions. • **Jasper:** High-quality blog posts, emails, and ad copy with tone and style customization. • **Grammarly AI:** Advanced writing feedback, tone control, plagiarism detection for business and academic professionals. • **Otter.ai:** Automated transcription of meetings, lectures, interviews, and voice notes for accurate record-keeping and easy reference.	

Design & Branding

Create professional branding visuals and digital design assets with AI support.

- **Canva AI:** Intuitive design tool for presentations, social media graphics, and marketing materials.
- **Looka:** AI-driven logo and brand identity generation for startups and enterprises.
- **Krea.ai:** AI-generated digital art and icons for presentations and UI design.
- **DALL-E, Midjourney:** Image generation from text prompts.

Software Development and Coding

Increase programming efficiency and accuracy with AI code helpers.

- **GitHub Copilot:** AI-powered coding assistant with multi-language code suggestions and explanations.
- **Cursor:** Smart code autocomplete and navigation to accelerate software development workflows.

Video Content Creation and Editing

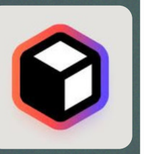
AI-enhanced video production tailored for corporate training, marketing, and education.

- **Fliki.ai, Synthesia, Pika.art, Pictory:** Text-to-video creation with professional AI voiceovers, perfect for presentations and marketing.
- **Runway ML, Google Flow:** Advanced video editing software with AI-powered background removal and effects.

Engineering and Healthcare

Specialized AI tools tailored for professionals and practitioners in engineering and heathcare fields.

- **AUTOCAD (newest version):** Automation for Drafting, 3D modelling, and architecture design workflows.
- **MATLAB (Integrated with AI):** Advanced mathematical modelling, simulations and control system design for engineering applications.
- **Aidoc:** AI assistant for radiologists, detecting abnormalities in medical imaging.
- **PathAI:** AI-powered paatholgy system to enhance diagnostic accuracy and speed.

Workflow Automation and Project Management		Web Design, Prototyping, and Data Analytics	
Optimize business processes and team productivity with AI-driven automation and organization. • **Zapier AI:** Automate multi-app workflows, from Customer Relationship Management (CRM) updates to email scheduling. • **Trello AI, Workhelix:** AI-enhanced task management for project tracking, reminders, and team collaboration.	  	AI tools useful for website designing, prototyping and data analytics. • **Relume.io**: Automated wireframe and website layout generation optimized for agencies and startups. • **Figma AI:** AI assist in design workflows, prototyping, and UI layout. • **Tableau:** Data visualization, dashboard creation, predictive insights for researchers and analysists. • **Wolfram Alpha:** AI enabled computation, data analysis, and research for engineering, science and maths.	   

FURTHER TO LEARN AI

1. **Take Online Courses from Leading Platforms:**

- **Coursera:** AI and machine learning courses, including AI for Everyone, and Machine Learning.
- **edX:** Features university-led programs like “Principles of Machine Learning” (Microsoft), and “Artificial Intelligence” (Columbia University).
- **Udacity:** Useful in AI programming, deep learning, and reinforcement learning.
- **Google AI:** Free courses and labs on machine learning, responsible AI, and TensorFlow, plus hands-on projects using Google Colab.
- **AWS Training:** Amazon’s cloud-based AI and ML courses, with practical labs on AWS infrastructure.
- **Microsoft Learn:** Free modules and certifications on Azure AI, machine learning, and responsible AI practices

2. **Participate in AI Competitions and Projects**

- **Kaggle:** Compete in real-world data science challenges, collaborate with a global community, and access public datasets.

- **GitHub:** Contribute to open-source AI projects and explore repositories from leading companies and researchers.

3. **Engage with AI Communities and Events:**

- **Reddit:** Discuss research, share resources, and ask questions.

- **AI Conferences:** Attend AI events, company-hosted events either online or physical for the latest breakthroughs and networking.

4. **Read Research and Stay Updated:**

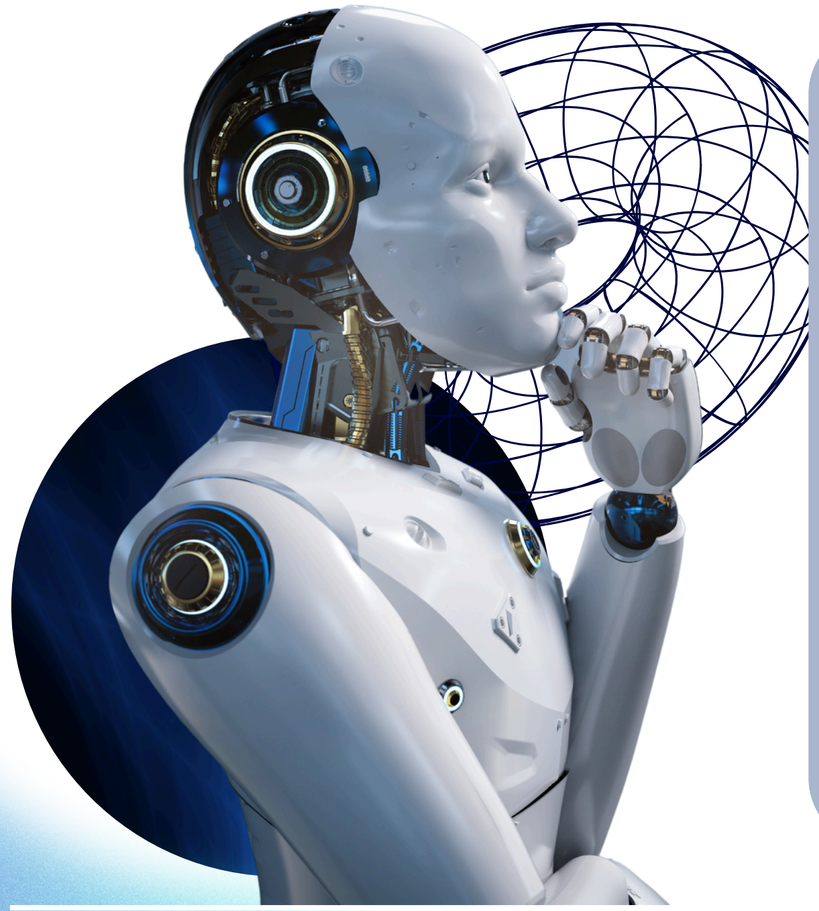
- **arXiv.org:** Access preprints of cutting-edge AI research.

- **Company Blogs and Newsletters:** Follow updates from OpenAI, Google AI, DeepMind, Microsoft, Meta, Nvidia, and Anthropic.

COMPANIES TO FOLLOW FOR AI UPDATES

- **OpenAI:** Pioneers in generative AI (ChatGPT, DALL·E, Codex). Their research, APIs, and blog are essential for anyone interested in conversational AI and creative applications.
- **Google (Alphabet/DeepMind):** Leaders in deep learning, reinforcement learning, and scientific AI (AlphaGo, AlphaFold, Gemini). Google's open-source tools (TensorFlow, Colab) are industry standards.
- **Microsoft:** Integrates AI into cloud (Azure), productivity (Copilot), and business solutions.
- **Amazon:** Innovates in cloud AI (AWS), logistics, and voice assistants (Alexa).
- **Meta (Facebook):** Advances open-source AI (Llama models), computer vision, and social AI.
- **Nvidia:** The backbone of AI hardware (GPUs, CUDA) and simulation platforms (Omniverse). Nvidia's Deep Learning Institute and GTC conference are key for technical learning.
- **IBM:** Focuses on AI for business, healthcare, and explainable AI (Watson).
- **Anthropic/xAI:** Conversational and multimodal AI (Claude/Grok).
- **Sanbot/Tesla/Aptonomy:** Humanoid service robots/Autonomous cars and robots/Autonomous security drones.

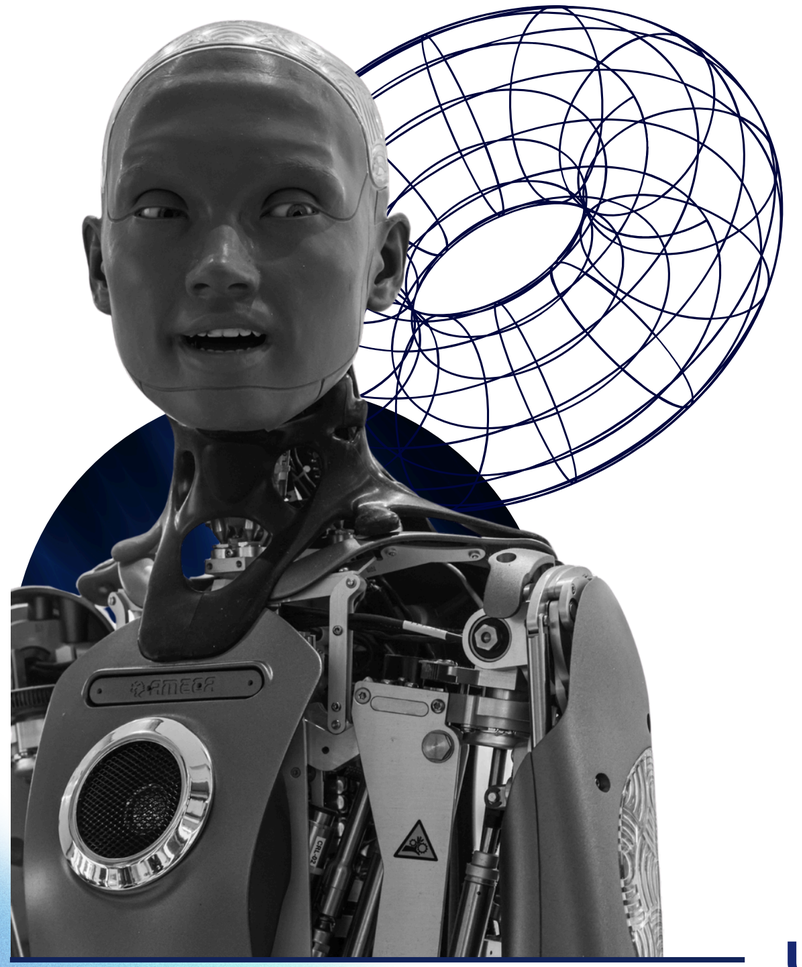
PRACTICAL ADVICE WHEN USING AI



WHAT TO DO

- Combine AI with your own knowledge: Validate facts, blend human insight, add your info (especially for projects/presentations).
- Be clear with prompts: Describe goal/context, e.g., "Help design a Unite flyer for secondary students." Use specifics like bullet points/playful tone/Swahili summary.
- Treat AI like a thinking partner: Follow-ups for ideas, brainstorm/refine drafts.
- Use to boost writing/creativity/coding: Improve grammar/structure/tone; spark ideas for captions/essays/lessons/Arduino/Canva (stick to real-life drafts).
- Share thoughtfully: Teach responsible use to fuel teamwork, avoid isolation.

PRACTICAL ADVICE WHEN USING AI



WHAT NOT TO DO

- Don't assume everything is true: AI "hallucinates" incorrect info; fact-check before publishing/presenting.
- Don't rely on it for all work: Support creativity/decision-making, not replace; avoid blind copying (essays/exams use only key concepts).
- Don't feed sensitive/personal data: No private details/passwords/confidential info; keep ethical boundaries.
- Don't ignore bias/harmful language: Challenge exclusionary/skewed content; ensure inclusion/safety/public ethics.
- Don't use where human sensitivity is key: Emotional support/conflict resolution/community feedback need real empathy — AI isn't a substitute.

Use AI as a partner, not a replacement for critical thinking.

SCENARIO 1: IMPACT ON CRITICAL THINKING IN EDUCATION

Muhunzi is a Form Five student at Mwanalugali Secondary school. She is well known for her high intelligence, ability to think critically, and excellent performance in her Form Four national examination. In the midterm examination at her new school, she scored lower grades in physics and mathematics, which shocked almost everyone. Her teachers followed up with her to understand causes of her underperformance.

Teacher Moshi, who lived near Muhunzi's home, paid a visit to Muhunzi during the weekend. The teacher found her, doing all her homework and exercises by the assistance of ChatGpt and Google assistant. Miss Moshi had to inform fellow teachers on what she witnessed. The fellow teachers argued on the necessarily of using Artificial Intelligence and its effects on thinking ability. They presented their discussion to Muhunzi and insisted that she use her own thinking ability to tackle most of the questions. Then, Muhunzi and her teachers had to prepare a presentation on proper use of ArtificialIntelligence in accessing learning resources

QUESTIONS ON SCENARIO 1



What do you think are the reasons for Muhunzi’s low performance?

Assess the contribution of AI on Thinking Capacity?

Basing on Muhunzi’s story, is it important to use AI in education?

SCENARIO 2: AI IN BUSINESS AND TIME MANAGEMENT

Mtolilo was a 22-year-old first-year student at the University of Dar es Salaam. He was among the students who received a loan from the government (through HESLB). Mtolilo invested the money in a clothing business in town so that he could at least support his family in the village while also managing his life in Dar es Salaam.

He sold the clothes on the streets after classes. These daily activities left him extremely tired, so he often failed to study at night due to fatigue. He began thinking of abandoning the business because he feared failing his university studies and getting disqualified.

One day, he met his secondary school friend Mulushi, who was also studying at the same university. During their conversation, Mulushi asked about the progress of Mtolilo's business. Mtolilo, sounding somewhat discouraged, explained that he was planning to stop because the business wasted his time and always left him exhausted.

QUESTIONS ON SCENARIO 2

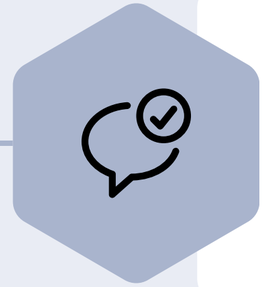
Mulushi calmed him down and told him there was an easier and simpler way to run it—by using social media. Moreover, since Mulushi was studying digital marketing, he explained that there were AI-powered post makers that could help create posts quickly and easily, without consuming much time. After one month of trying this new approach, Mtolilo’s business grew significantly, attracting more customers than before. He was able to earn enough income to support his family and meet his own needs. Best of all, the new method gave him more time to study and participate in other university activities.



What is positive contribution of AI on Mtolilo's business ?



What was the effect of moving with the clothes on the streets on academic performance of Mtolilo?



Do you think it is correct to use AI in the business? What challenges could be brought by Ai in Mtolilo’s business ?


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