

OPM Presents: Artificial Intelligence Fundamentals

By Government, For Government

Agenda and Objectives

Review current Artificial Intelligence (AI) guidance

- Executive order 14110 on the safe, secure, and trustworthy development and use of artificial intelligence
- OMB guidance

Explore types of AI

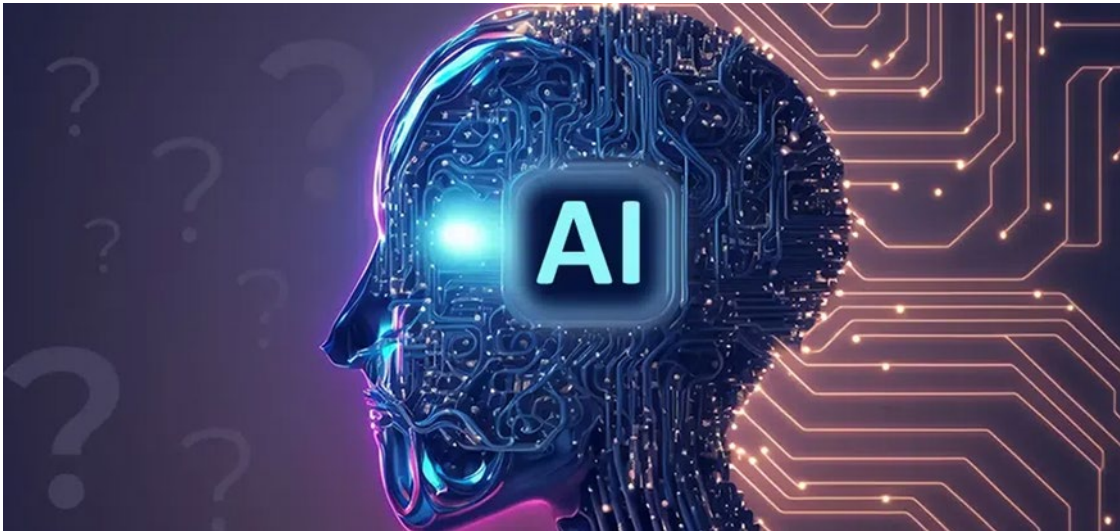
- Traditional AI
- Machine Learning (ML)
- Generative AI (GenAI)
- Artificial General Intelligence (AGI)

Benefits and challenges

Discuss why this matters to you



AI Executive Order 14110: Directive and Instructive



- Directs organizations to execute various tasks
- Showcases the unique functions each organization performs
- Demonstrates the power of collective action
- Presents a stellar case study in whole-of-government operations

OMB Guidance

Key Aspects of M-24-10, a Balanced Approach

- Office of Management and Budget's (OMB) Memorandum: "Advancing Governance, Innovation, and Risk Management for Agency Use of Artificial Intelligence" (M-24-10)
- Promotes AI innovation while safeguarding against risks, underscoring the importance of collaboration, transparency, and accountability in federal AI adoption through:
 - AI governance
 - Risk management
 - Innovation and responsible adoption
 - Public input and accountability

What is Artificial Intelligence?



You are using AI today, directly or indirectly!

- Any artificial system that performs tasks under varying and unpredictable circumstances without significant human oversight or that can learn from experience and improve performance when exposed to data sets.
- An artificial system developed in computer software, physical hardware, or other context that solves tasks requiring human-like perception, cognition, planning, learning, communication or physical action.
- An artificial system designed to think or act like a human, including cognitive architectures and neural networks.
- A set of techniques, including machine learning, that is designed to approximate a cognitive task.
- An artificial system designed to act rationally, including an intelligent software agent or embodied robot that achieves goals using perception, planning, reasoning, learning, communicating, decision making and acting.

Levels of AI

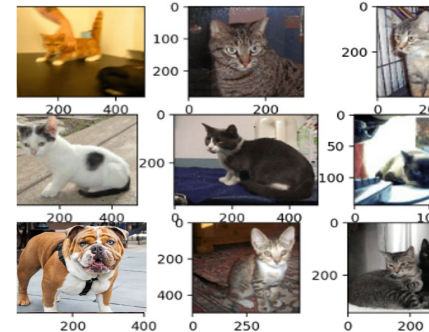
Narrow = Traditional AI

- Designed to perform a single or narrow task, but cannot perform outside of its defined task
- Example: facial recognition software



Predictive Models or Machine Learning (ML)

- A model that can classify something within the realm of what it was trained to identify
- Example: a program that can tell you if a photo is a cat



Levels of AI Continued

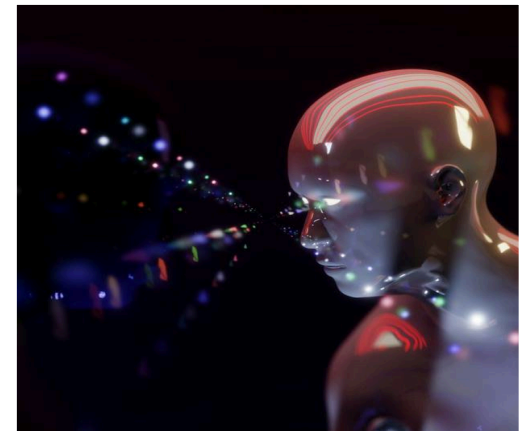
Deep = Generative AI

- Deep learning models that allow AI to learn how to perform new tasks, engage in new behaviors, and make decisions
- Example: ChatGPT



Super = Artificial General Intelligence (AGI)

- A theoretical form of AI that matches and can surpass human intelligence and can better perform tasks
- Example: the talking droids from Star Wars



Traditional AI

- Involves the use of explicit rules and algorithms programmed into a system to solve problems
- Designed to follow a set of instructions and make decisions based on those predefined rules

Examples:

- GPS navigation systems
- Voice recognition systems like Siri and Alexa
- Chess programs like IBM's Deep Blue which use predefined strategies and heuristics

Machine Learning

- Uses statistical techniques to enable machines to improve at tasks with experience
- Involves the creation of algorithms that allow computers to learn from and make decisions or predictions

Examples:

- Recommendation systems like those used by Amazon or Netflix
- Search algorithms
- Credit scoring and fraud detection systems in banking
- Natural language processing tools like Google Translate
- Image recognition systems used in self-driving cars

Machine Learning Types

Supervised

- Relies on labeled data for prediction
- **Tasks:** classification, regression
- **Examples:** spam detection, credit scoring, medical diagnosis

Unsupervised

- Discovers patterns in unlabeled data
- **Tasks:** clustering, reduction
- **Examples:** market segmentation, image compression, anomaly detection

Reinforcement

- Optimizes actions based on rewards and exploration
- **Applications:** robotics, autonomous vehicles, traffic signal optimization, recommendation systems

Generative AI

- Systems capable of generating new content
- A form of machine learning that produces new content, whether it be in the form of text, images, voice, or even music
- Generated content is typically unique and bears resemblance to the data on which it was trained

Examples:

- Text generation models like OpenAI's ChatGPT
- Image generation models like DALL-E
- Deepfake technology for generating realistic images and videos

Generative AI Capabilities

Automate Tasks	Analyze Data	Support Decisions	Personalize Experiences	Detect Anomalies
Automate routine tasks, freeing up human workers to focus on more complex and creative work	Analyze and make sense of large datasets. Useful for making predictions and identifying trends and patterns	Determine options for decision-makers by analyzing data and providing insights that are nearly impossible for a human to identify on their own	Provide personalized experiences to customers or users based on their individual preferences and behavior	Improve security by detecting and preventing cyber-attacks, fraud, and other types of threats

This is what the buzz is all about!

Challenges of Generative AI

- Robustness and security
- Data quality and quantity
- Bias and fairness
- Lack of control
- Generalization
- Ethical concerns
- Interpretability
- Hallucinations, fabrications, and errors
- Legal and regulatory issues
- Computational resources

Remember, ethical use of AI is not just about following laws and regulations; it's about ensuring AI is used to benefit society and cause no harm

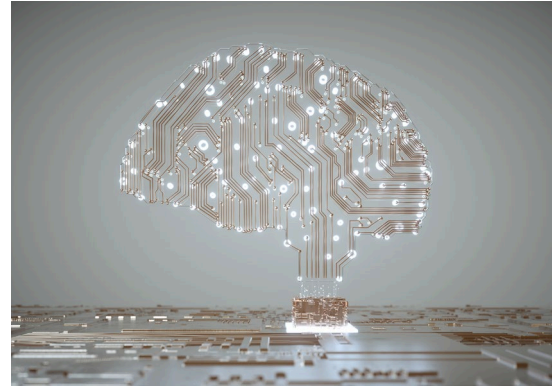
Humanity and Technology

Human Strengths



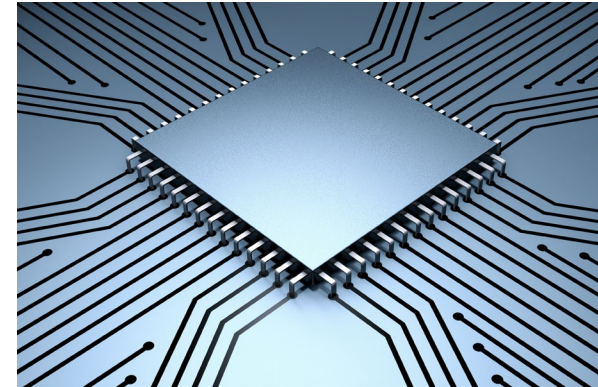
- Lead
- Emphasize
- Create
- Judge

Human-AI Hybrid



- Humans Complement Machines
 - Train, Explain, Sustain
- AI Gives Humans Superpowers
 - Embody, Interact, Amplify

AI Strengths



- Adapt
- Predict
- Interact
- Transact

Lead
Emphasize
Create
Judge
Train
Explain
Sustain
Amplify
Interact
Embody
Transact
Interact
Predict
Adapt

Source: *Human + Machine* (2018)

AI Opportunities Activity

1. Discuss how your organization can use AI to improve its performance
2. Identify 2-3 challenges you anticipate in leading a significant AI change initiative in your organization
3. Be prepared to share your insights



Exciting Times Ahead!

Do

- Have a basic understanding
- Set clear objectives
- Promote responsible usage
- Know the rules
- Engage

Do Not

- Blindly trust the output
- Overlook privacy and security
- Ignore ethical considerations
- Use GenAI on your government device until approved

Questions and Final Thoughts

