What is Artificial Intelligence and What Do We Mean by AI?

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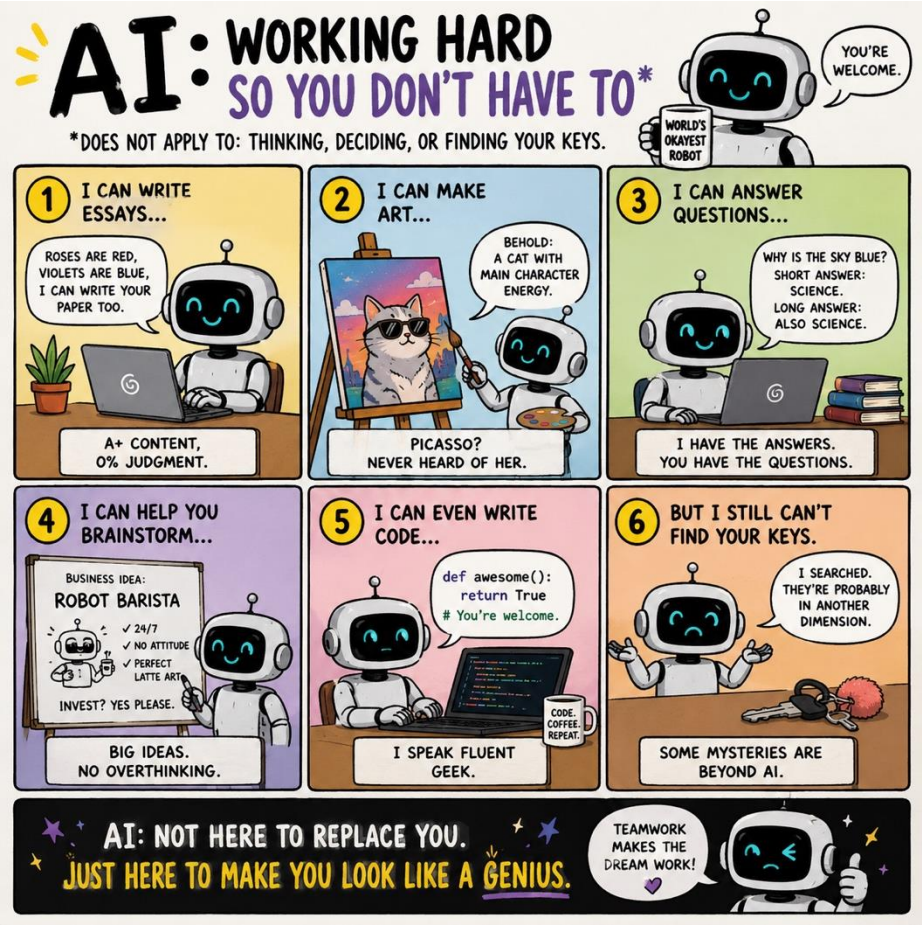




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Overview

- What is AI?
- Data-driven versus mechanistic AI
- Types of AI learning and methods
- The “OI” (opportunities and issues) of “AI”



Thank you to the graphics team



Hannah Dimmick, PhD

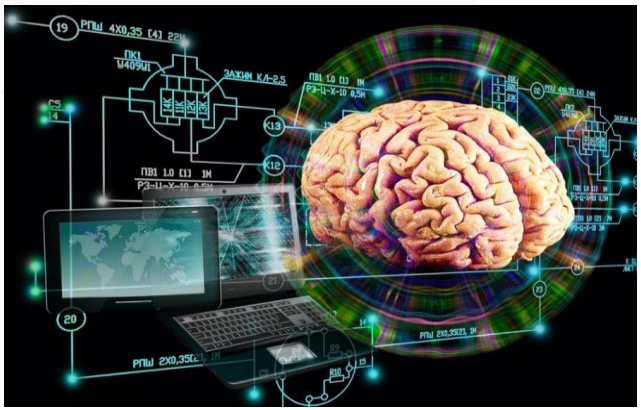
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What is AI?

Forbes

How Artificial Intelligence, AI, Can Help Achieve Precision Nutrition

By Bruce Y. Lee, Senior Contributor. ⓘ Bruce Y. Lee, M.D., MBA, covers health, ...



”AI is an umbrella term that basically encompasses any computer-aided technique that can replicate something that a human brain would normally do beyond simply following step-by-step directions.”

Artificial Intelligence (AI) Replicates Human Cognitive Functions

- Learning
- Reasoning
- Problem-Solving
- Perception
- Language Understanding
- Creating and Designing



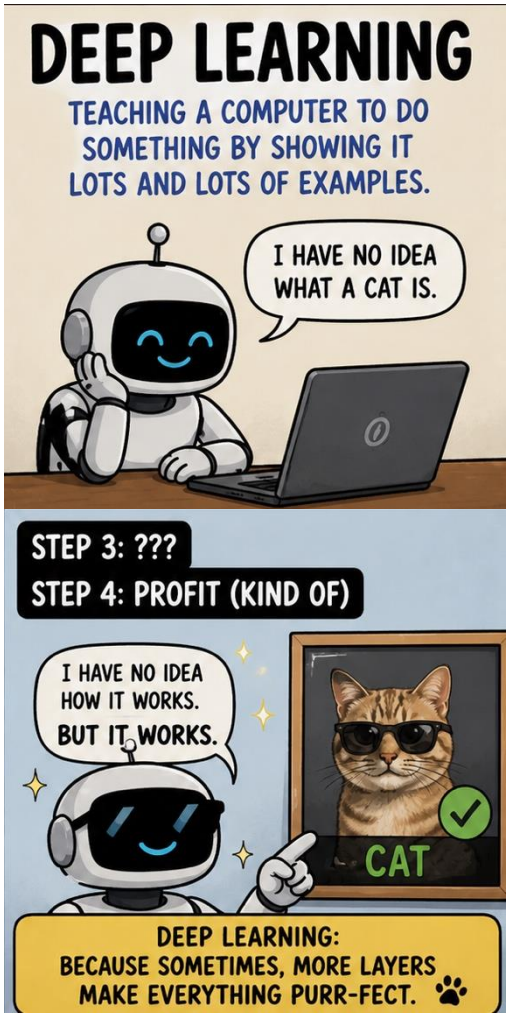
You may have heard…

- **Generative AI**: creates original content
- **Natural language processing (NLP)**: understand, interpret, and generate human language
- **Large language models (LLMs)**: originally trained on large amounts of text to perform NLP tasks



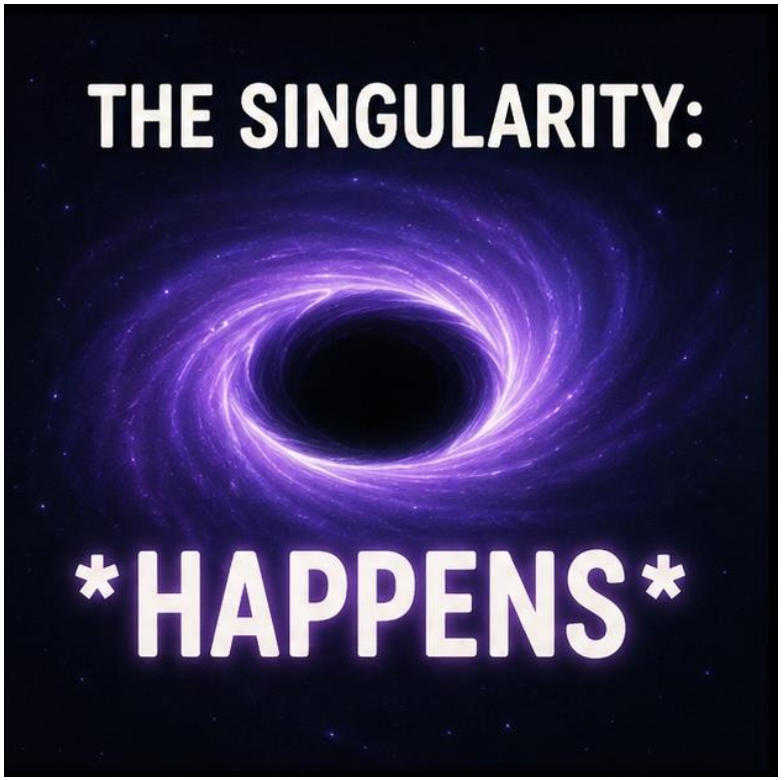
You may have heard…

- **Machine learning (ML)**: AI subtype identifies patterns in large datasets
- **Deep learning**: subset of ML that uses multi-layered neural networks
- **Agentic AI**: autonomous system that sets goals, creates plans, and executes tasks with minimal or no supervision



You may have heard…

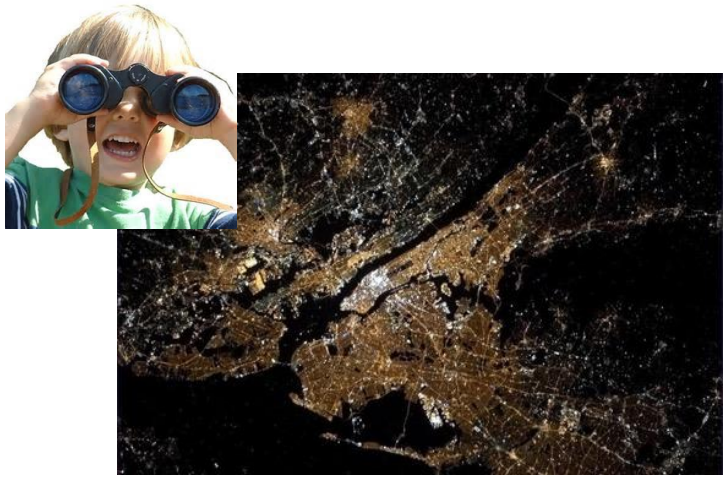
- **Foundation models**: trained on very large datasets for broad application
- **Multi-modal model**: can interact with (process, interpret, generate) many data types simultaneously
- **Artificial general intelligence (AGI)**: hypothetical AI form that surpasses all human functions (*also see: the singularity*)



Two General Approaches to AI

Top-down data driven approaches

Discovery; Look for patterns and associations

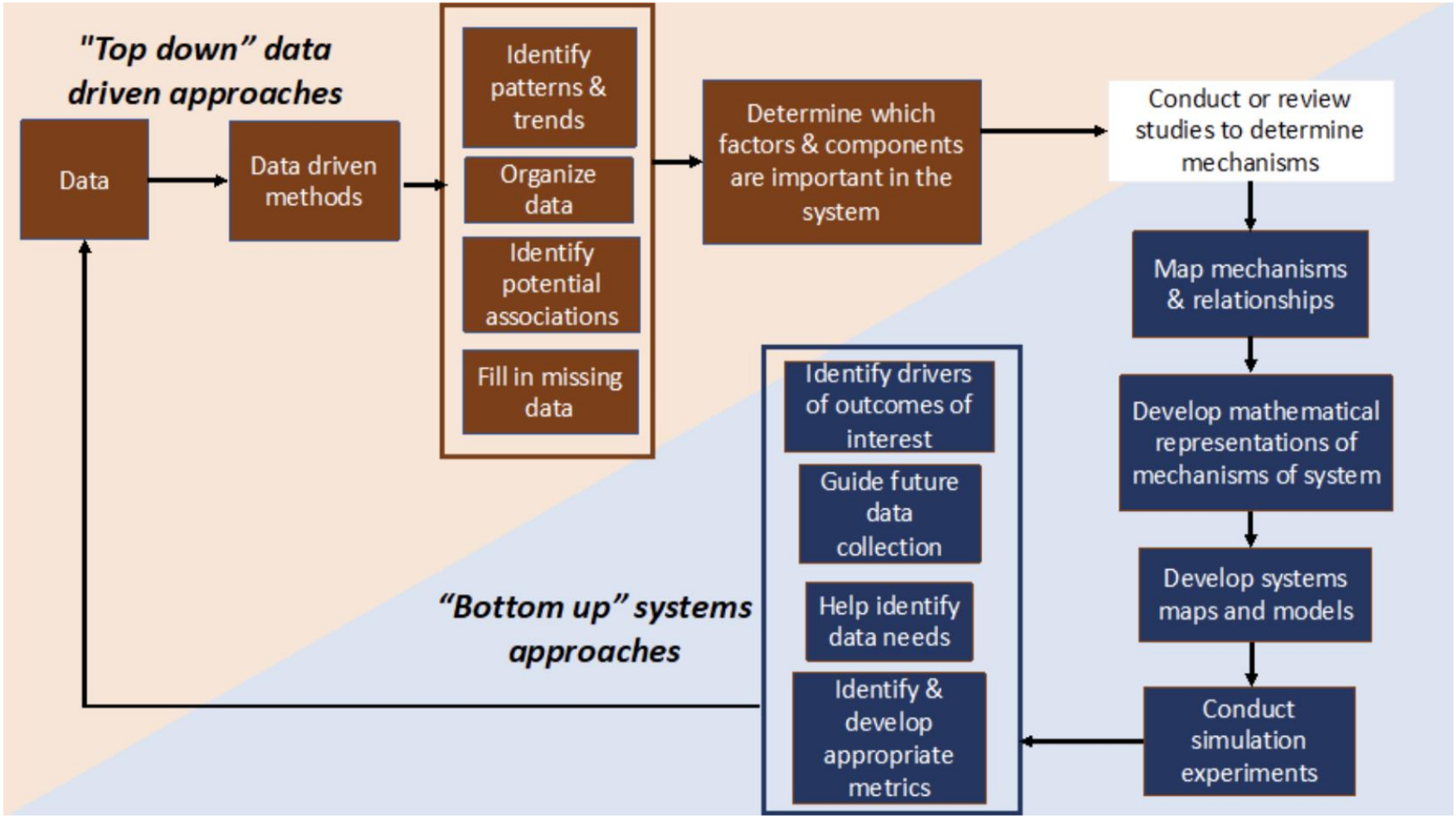


Bottom-up mechanistic approaches

Re-create the system and understand mechanisms

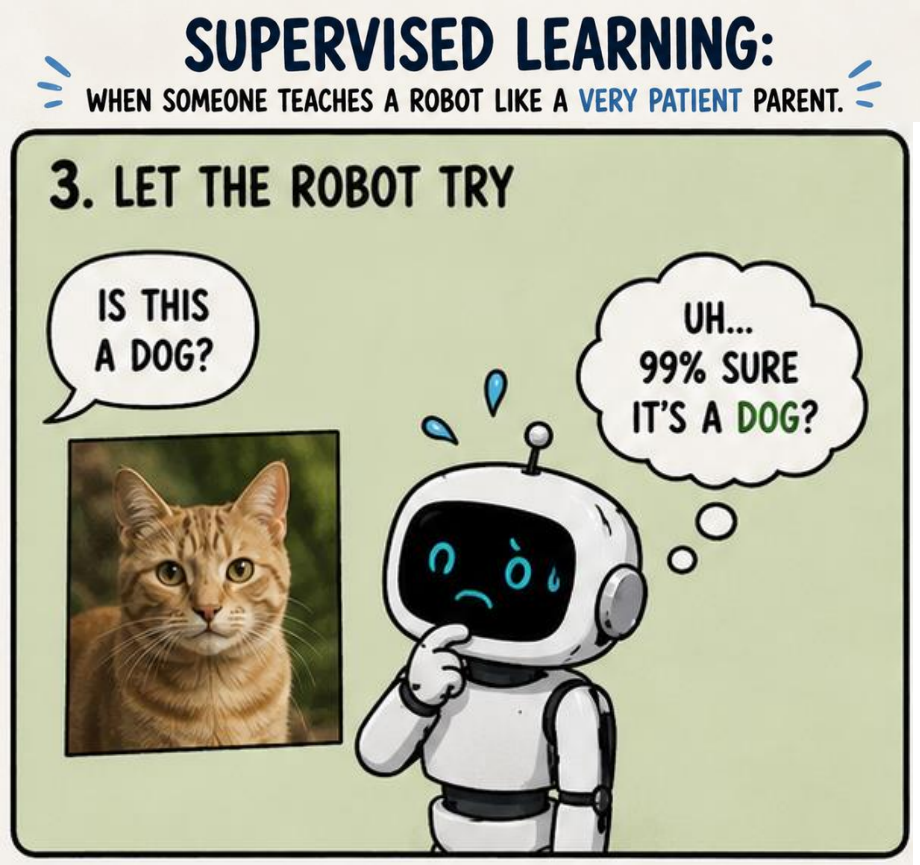


How Top-Down and Bottom-Up Approaches Work Together

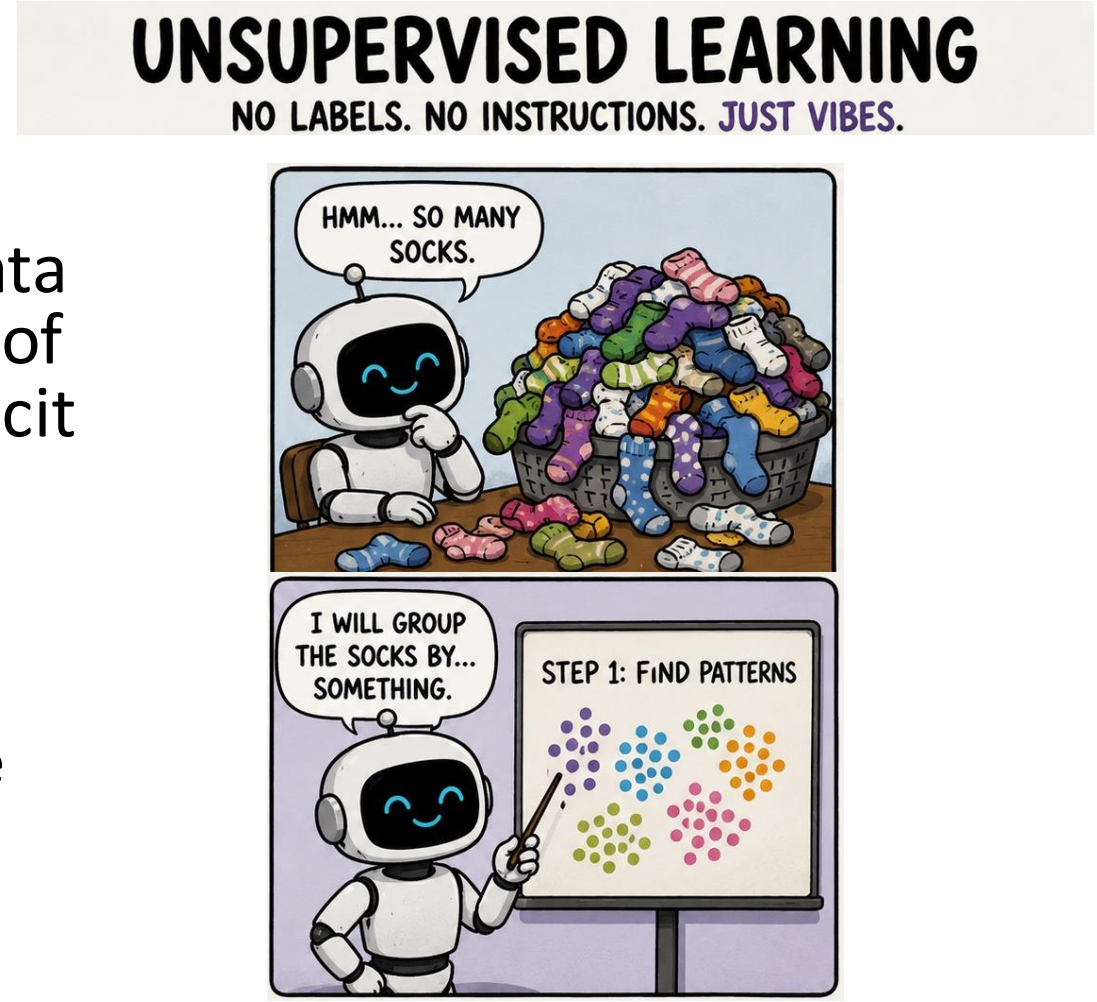


Types of AI Learning: Supervised

- Uses labeled training data to teach model specific relationship
  - Classification
  - Regression
- Model iteratively adjusts itself to minimize the error
- Examples:
  - Random forest
  - Support Vector Machine
  - Linear / logistic regression



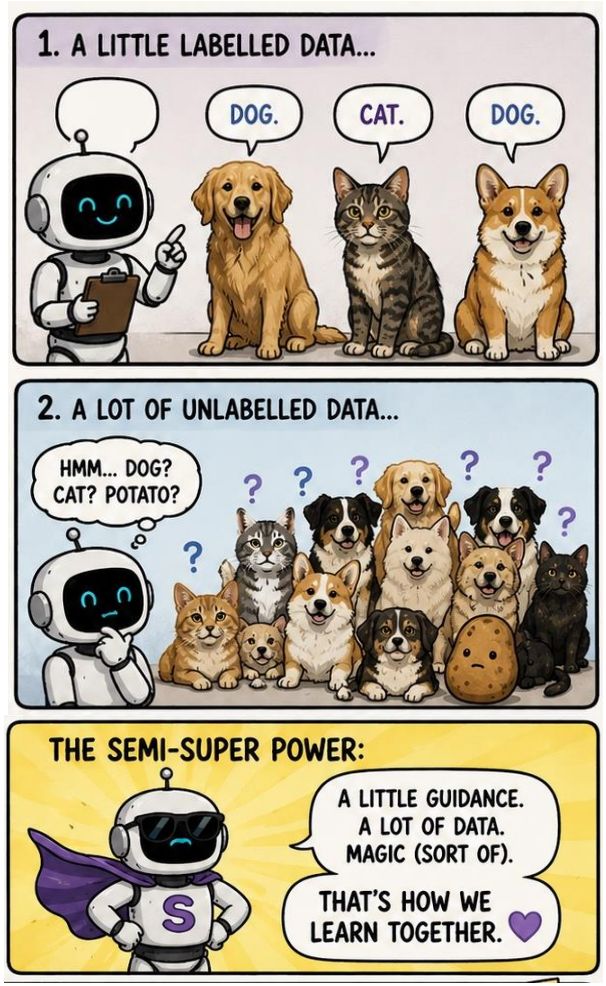
Types of AI Learning: Unsupervised



- Uses unlabeled data to learn structure of data without explicit instructions
- Examples
  - Clustering
  - Gaussian Mixture Model

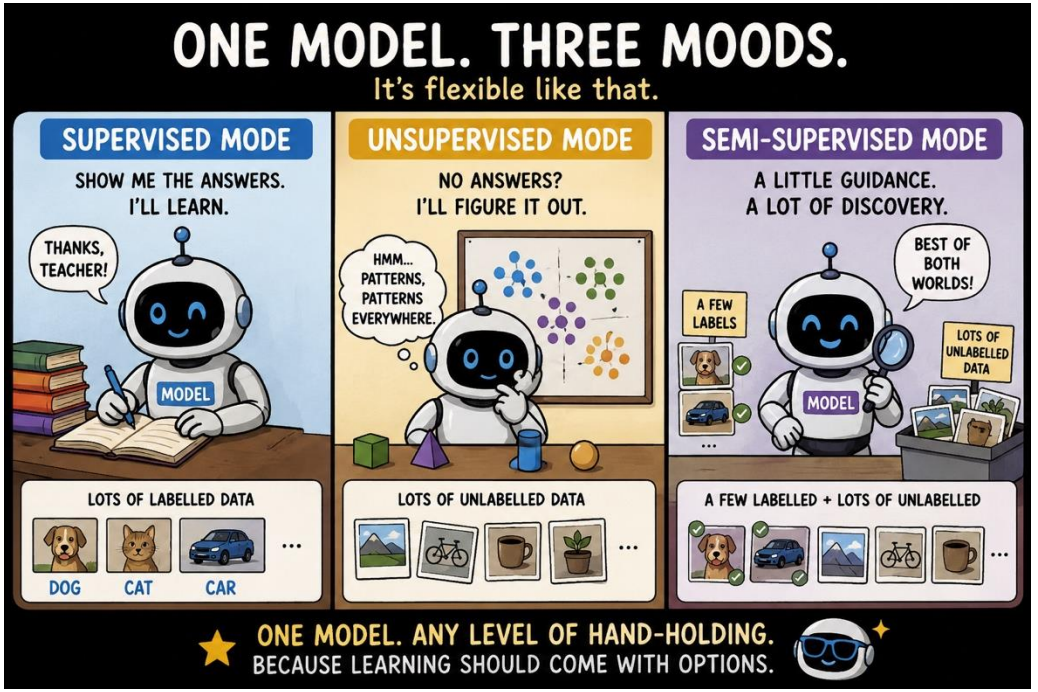
Types of AI Learning: Semi-Supervised

- Combination of supervised and unsupervised learning
- Includes labeled and unlabeled data
- Examples:
  - Ladder networks (type of neural network)
  - Pseudo-ensembles



Types of AI Learning: Flexible Approaches

- Some models can have either a supervised, unsupervised, or semi-supervised framework
- Examples
  - Reinforcement learning
  - Q learning
  - Neural networks
  - Natural language processing
  - Computer vision



The “OI” of “AI”

Issues



Opportunities

AI changes the information marketplace



Misinformation

Manipulation

Increase bias

Overreliance on one source



Better access to information

Interactive discussion

Decrease bias

Critically considering multiple sources

AI impacts the economy



Job losses

Traditional job functions / roles replaced by AI

Higher productivity expectations

Major consolidation



Job gains

Humans focus on different and newer functions / roles

Higher efficiency and new operations

Lower barriers to entry

AI has legal consequences



Help evade cybersecurity

Collect/use personal data

Intellectual property infringements

Loss of accountability



Evaluate/improve cybersecurity

Track/safeguard personal data

Intellectual property protections

Help track processes

AI has environmental consequences



Data centers may increase pollution

E-waste

Water depletion

Electricity / grid challenges



AI can help identify new ways of doing things and environmental solutions

AI leads to changes in social governance and structure



Colonialism

Resource exploitation

Models may perpetuate bias



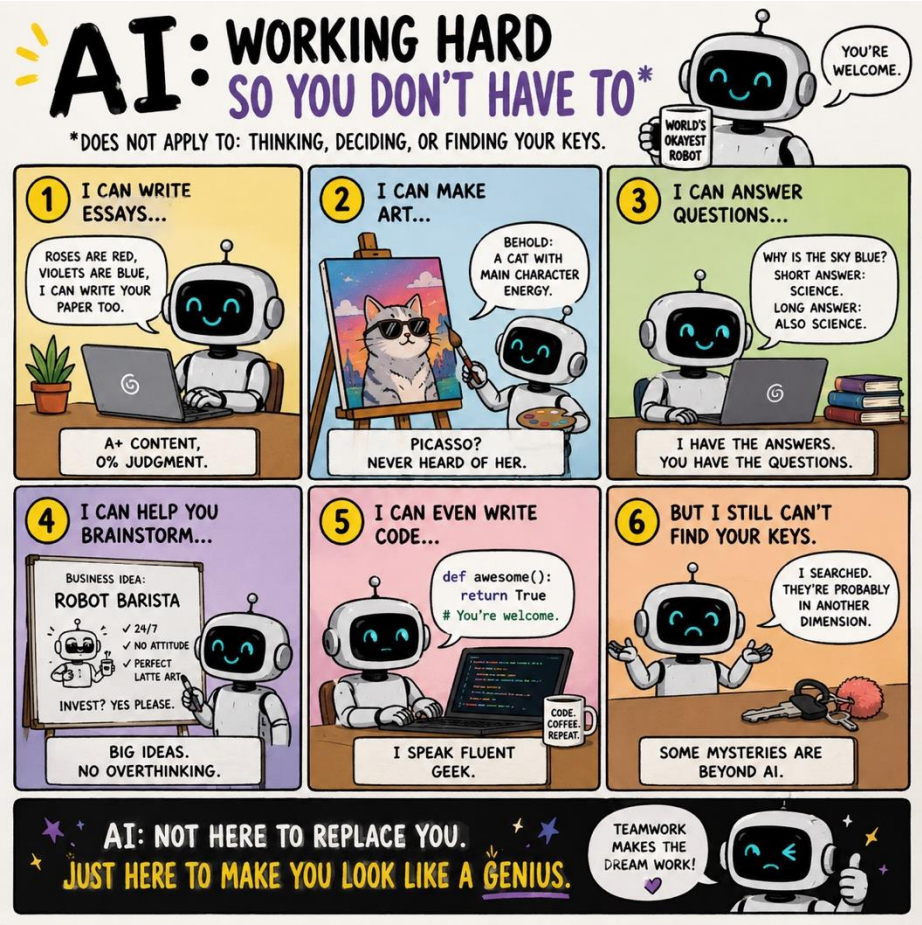
Opportunities for self-determination

Enhanced self-governance of resources

Models may be less biased

Summary

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Sources

- IBM. (n.d.). Artificial intelligence. IBM. Retrieved February 2025, from https://www.ibm.com/think/topics/artificial-intelligence
- UC Berkeley School of Information. (n.d.). What is machine learning? Retrieved February 2025, from https://ischoolonline.berkeley.edu/blog/what-is-machine-learning/
- Tableau. (n.d.). Algorithms in AI: Supervised learning & more. Retrieved February 2025, from https://www.tableau.com/data-insights/ai/algorithms#supervised-learning
- The Knowledge Academy. (n.d.). Artificial intelligence techniques. Retrieved February 2025, from https://www.theknowledgeacademy.com/blog/artificial-intelligence-techniques/
- Getty Images. (n.d.). Images sourced from Getty Images. Retrieved February 2025, from https://www.gettyimages.com/
- OpenAI. (n.d.). ChatGPT. Retrieved February 2025, from https://openai.com/chatgpt

Questions?

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A Funny Bone to Pick

How to deal with life's and career ups and downs, including some humerus breaks



Bruce Y. Lee, M.D., M.B.A., is a writer, journalist, professor, systems modeler, computational and digital

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