



Delivery Disrupted: AI and Staying Ahead of the Curve in Healthcare

Marty Martin, PsyD, MPH, MSc
martym@depaul.edu

2024 IHA Leadership Summit



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Learning Objectives

-
- 1 Understand the fundamentals of disruptive change, analytics and AI.
 - 2 Explore use cases in healthcare from HR to sepsis.
 - 3 Identify opportunities for augmented intelligence.
 - 4 Leading and managing transformation – AI Journey.

2

2

Do you agree?

“It’s not that machines are going to replace physicists. It’s that physicists who use machines will replace those that don’t.”

3

3

POLL QUESTION

AI is a disruptive technology transforming the landscape.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
(1)	(2)	(3)	(4)	(5)

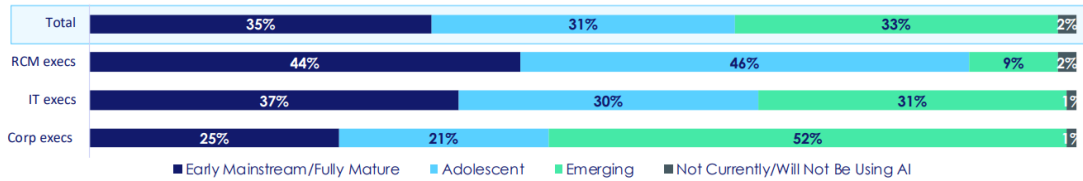
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Almost All Hospitals and Health Systems Expect to Use AI for RCM by 2023

98%

of respondents have plans to use AI in RCM within the next three years, with nearly equal parts anticipating mature, adolescent, and emerging levels of maturity.

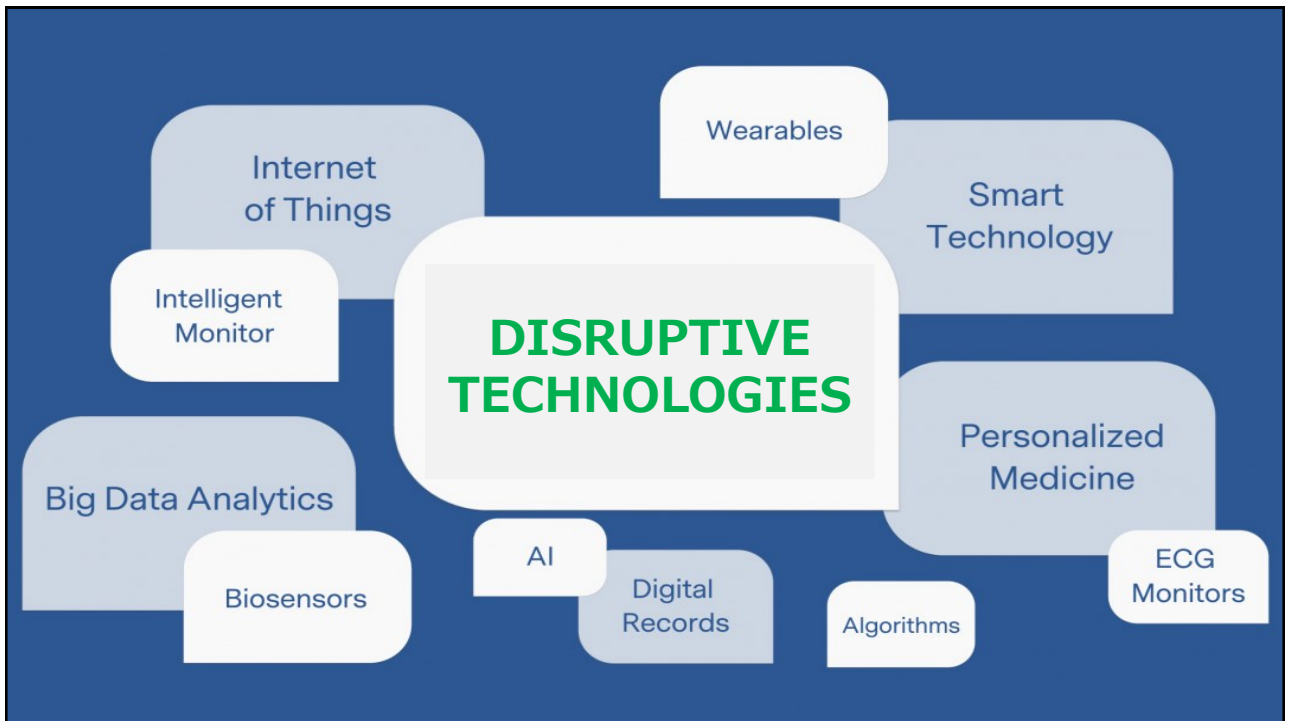
AI Usage/Maturity (Self-Reported): Expected in 3 Years



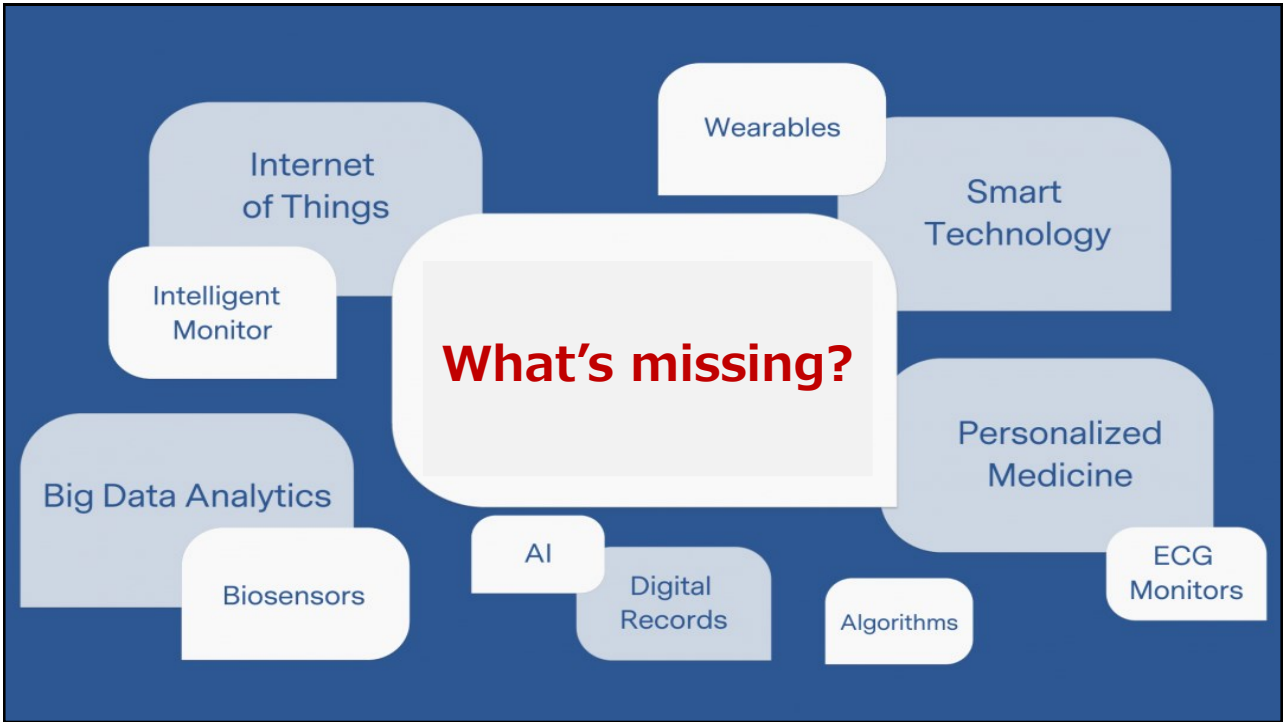
Poised to Transform: AI in the Revenue Cycle
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<https://www.ache.org/-/media/ache/about-ache/corporate-partners/change-healthcare-ai-rcm-research-study-ebook.pdf>

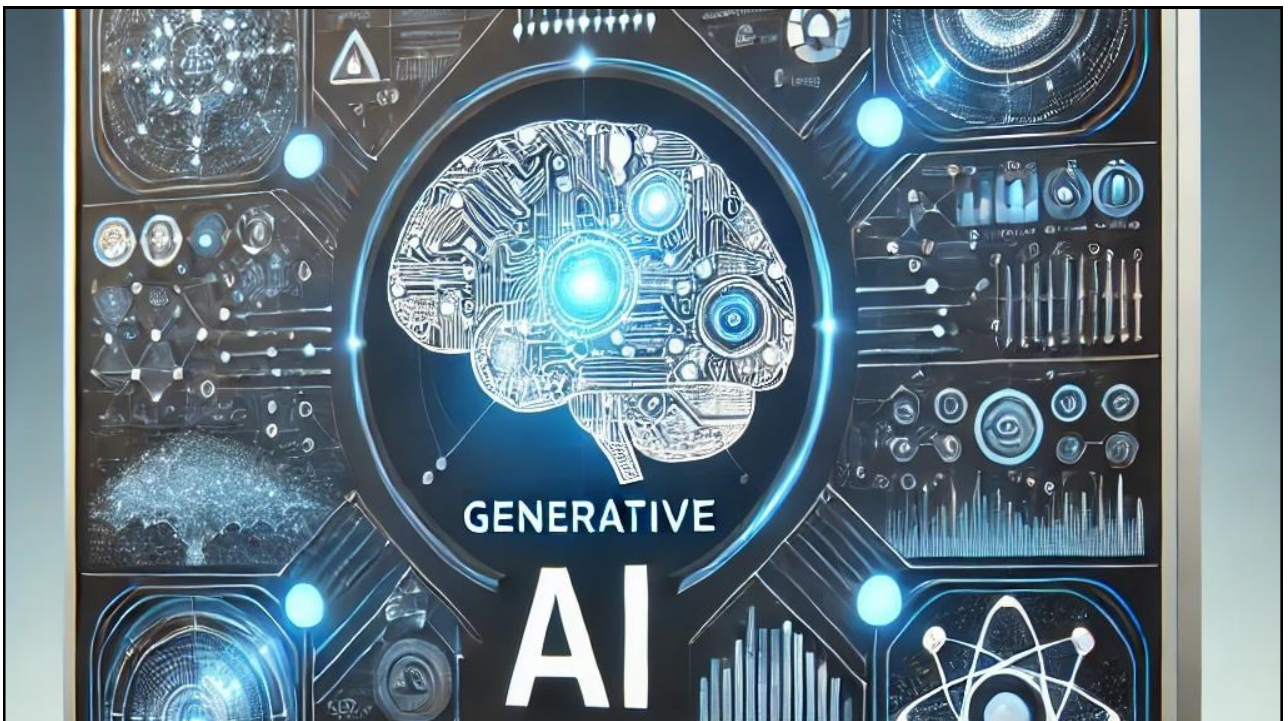
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7



8

Can a search engine do this?

Draw a slide for powerpoint titled Generative AI



Here is the PowerPoint slide titled "Generative AI." You can use this design for your presentation. Let me know if you need any adjustments!

Can you add some red and green in the slide please?



I've updated the slide with the addition of red and green colors. Let me know if you need any further adjustments!

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5 WAYS TO FOSTER ORGANIZATIONAL INNOVATION



1. LEADERS encourage innovation.



2. The CULTURE fosters innovation.



3. There's a formal innovation STRATEGY.



4. There's money in the BUDGET.



5. Leaders set the DIRECTION for innovation.

10

What makes a successful Disruptive Innovation?



Enabling Technology

An invention or innovation that makes a product more affordable and accessible to a wider population.



Innovative Business Model

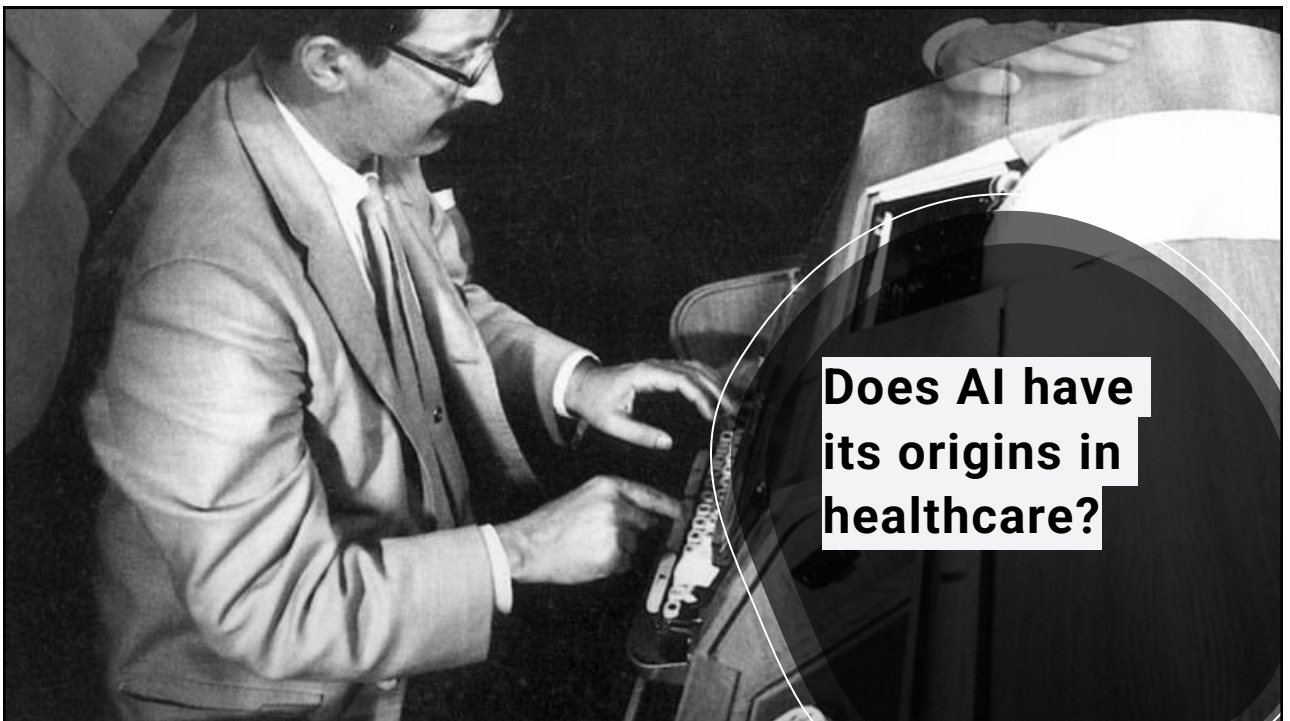
A business model that targets nonconsumers (new customers who previously did not buy products or services in a given market) or low-end consumers (the least profitable customers).



Coherent Value Network

A network in which suppliers, partners, distributors, and customers are each better off when the disruptive technology prospers.

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**Does AI have
its origins in
healthcare?**

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Welcome to

```

EEEEEE LL      IIII  ZZZZZZ  AAAAA
EE      LL      II    ZZ     AA  AA
EEEEEE LL      II    ZZ     AAAAAA
EE      LL      II    ZZ     AA  AA
EEEEEE LLLLLL  IIII  ZZZZZZ  AA  AA

```

Eliza is a mock Rogerian psychotherapist.
The original program was described by Joseph Weizenbaum in 1966.
This implementation by Norbert Landsteiner 2005.

```

ELIZA: Is something troubling you ?
YOU:   Men are all alike.
ELIZA: What is the connection, do you suppose ?
YOU:   They're always bugging us about something or other.
ELIZA: Can you think of a specific example ?
YOU:   Well, my boyfriend made me come here.
ELIZA: Is it important to you that your boyfriend made you come here ?
YOU:   He says I'm depressed much of the time.
ELIZA: I am sorry to hear that you are depressed.
YOU:   It's true. I am unhappy.
ELIZA: Can you explain what made you unhappy ?
YOU:

```

<https://web.njit.edu/~ronkowitz/eliza.html>

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FDA-Approved Mental Health Apps

Endeavor Rx

Used to treat ADHD

NightWare

Used to treat PTSD-induced nightmares

ReSET

Aids in the treatment of substance use disorders

ReSET-O

Helps clients dealing with opioid use

Somryst

Used to treat insomnia



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AI Fundamentals

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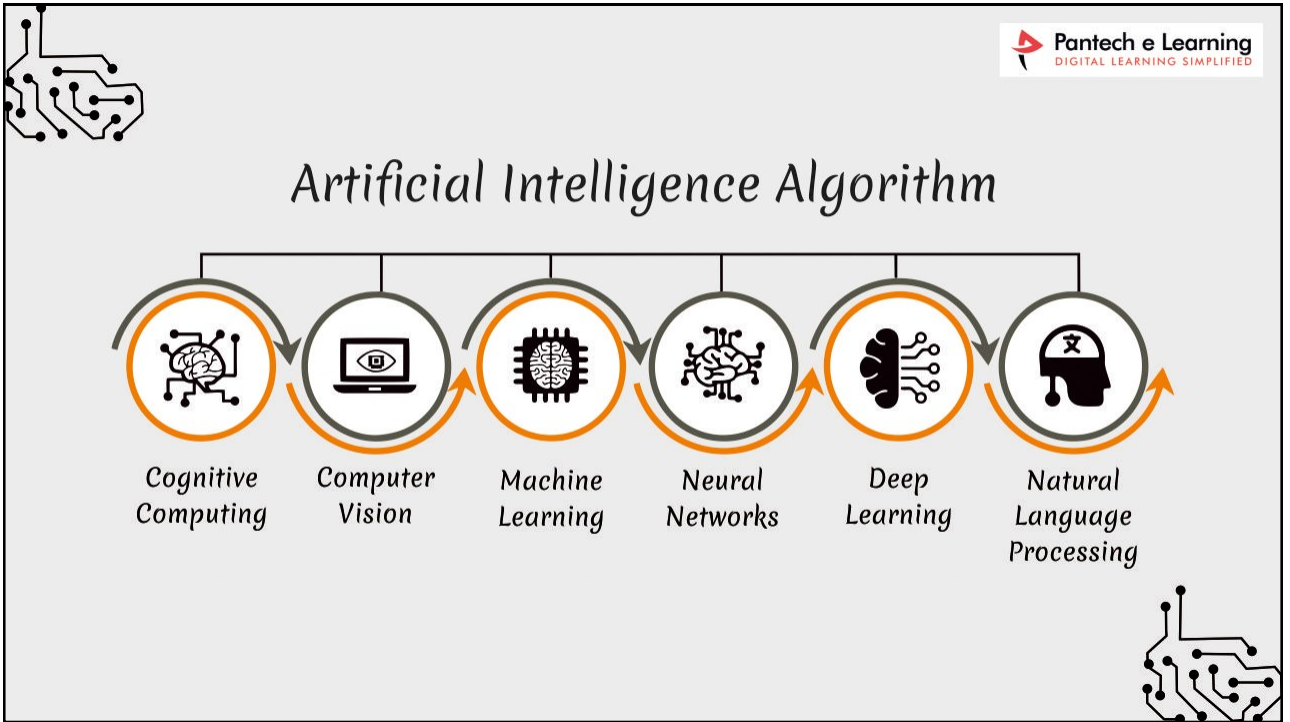


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Algorithm: A Definition

A **set of instructions** for solving a problem, accomplishing a task, generating content or seizing an opportunity.

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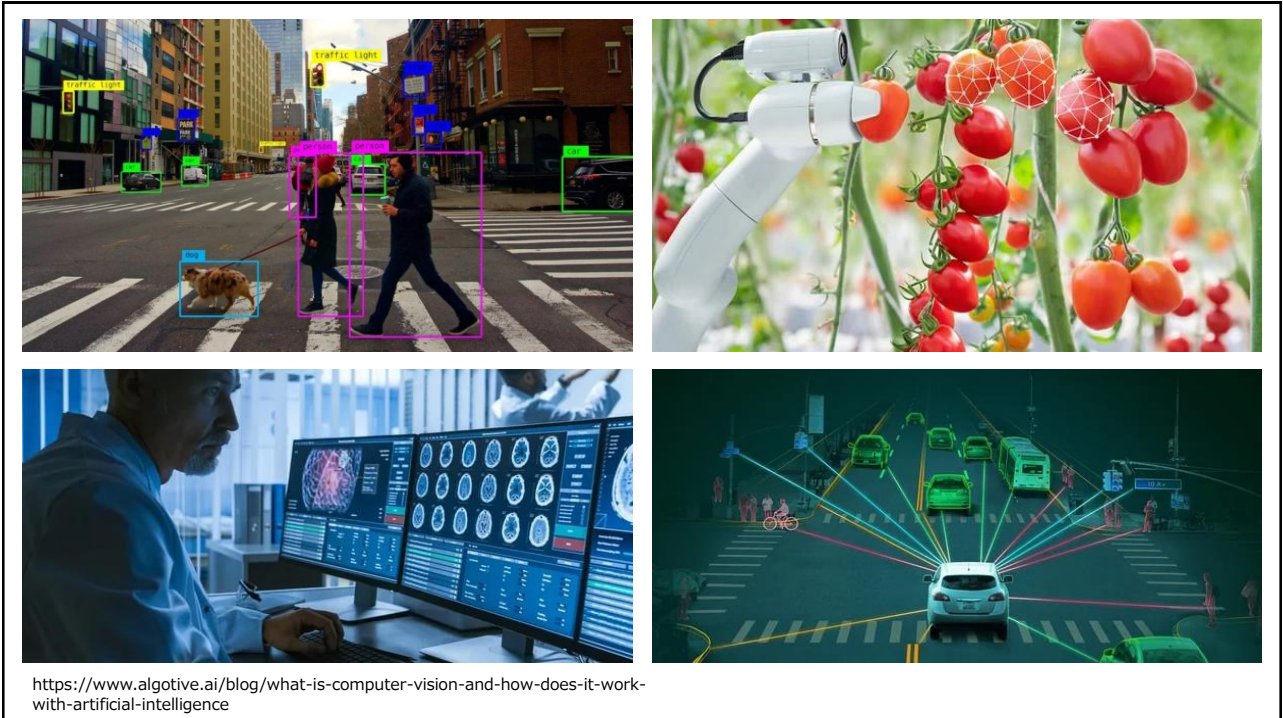
COGNITIVE COMPUTING

Cognitive computing is a problem-solving approach that uses hardware or software to approximate the form or function of natural cognitive processes.

The components of cognitive computing are represented by seven colored circles:

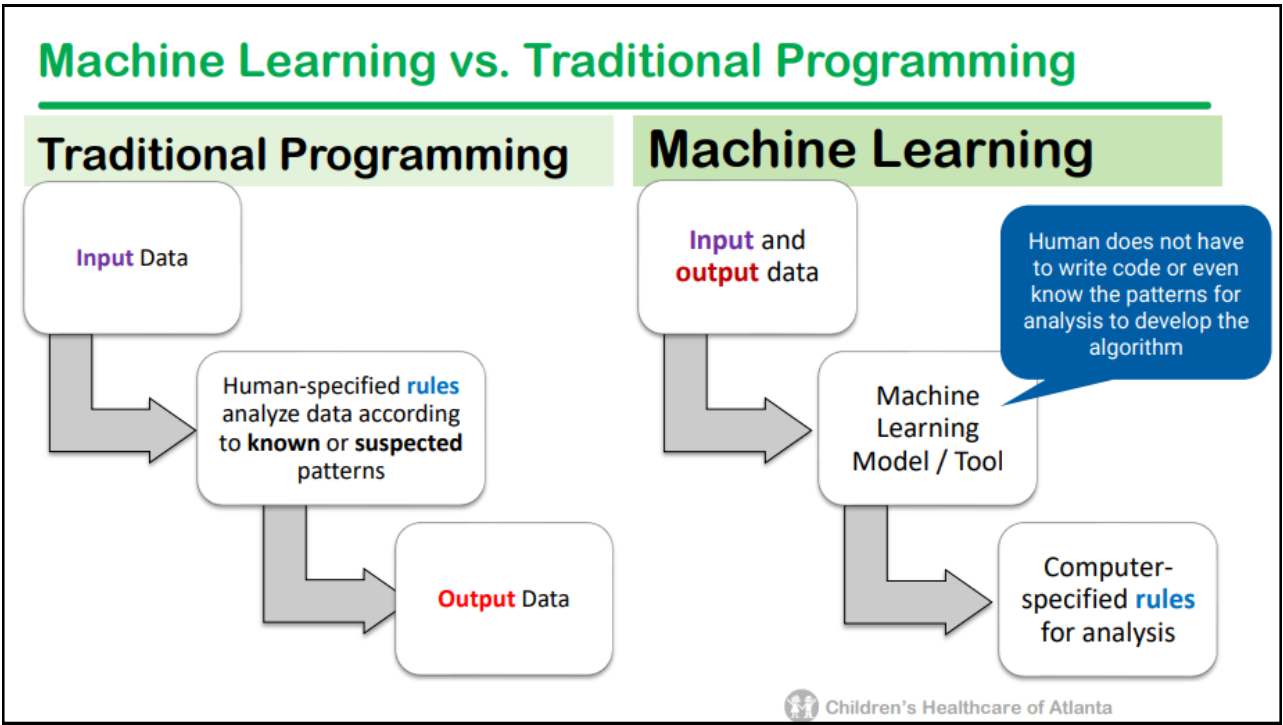
- Learning (blue)
- Perception (purple)
- Motivation (red)
- reasoning (blue)
- deduction (blue)
- inference (blue)
- reflection (blue)

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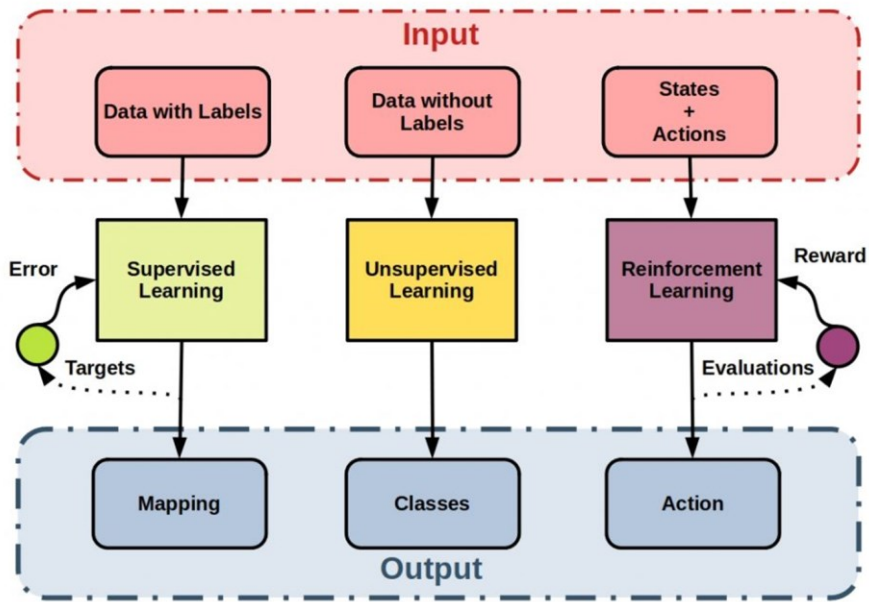
<https://www.algotive.ai/blog/what-is-computer-vision-and-how-does-it-work-with-artificial-intelligence>

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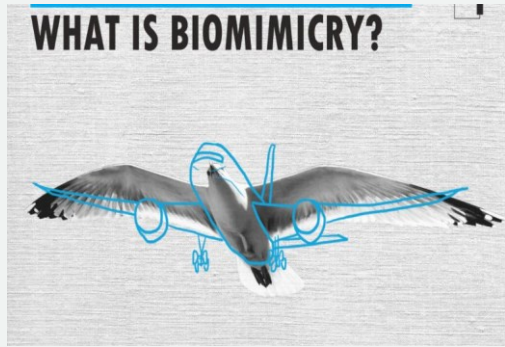
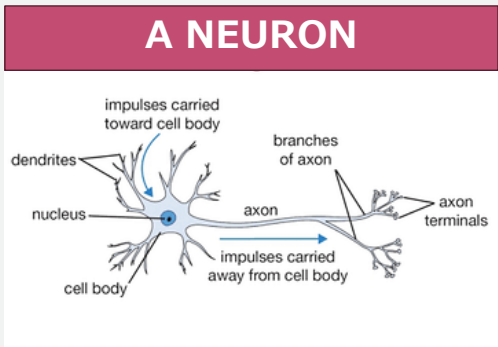
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MACHINE LEARNING



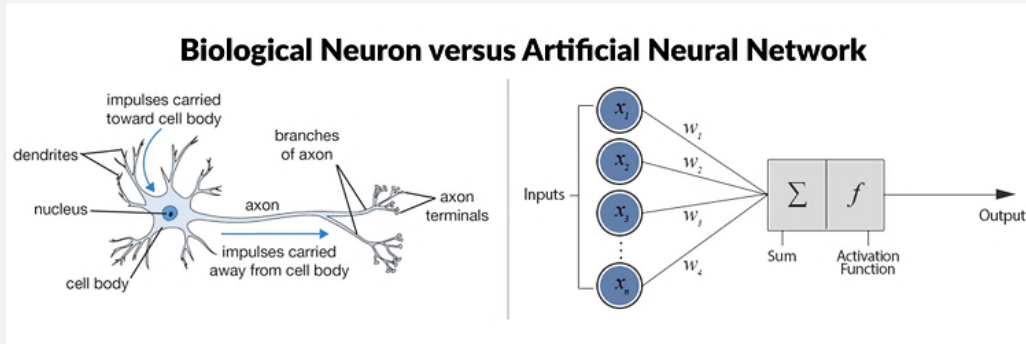
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NEURAL NETWORK



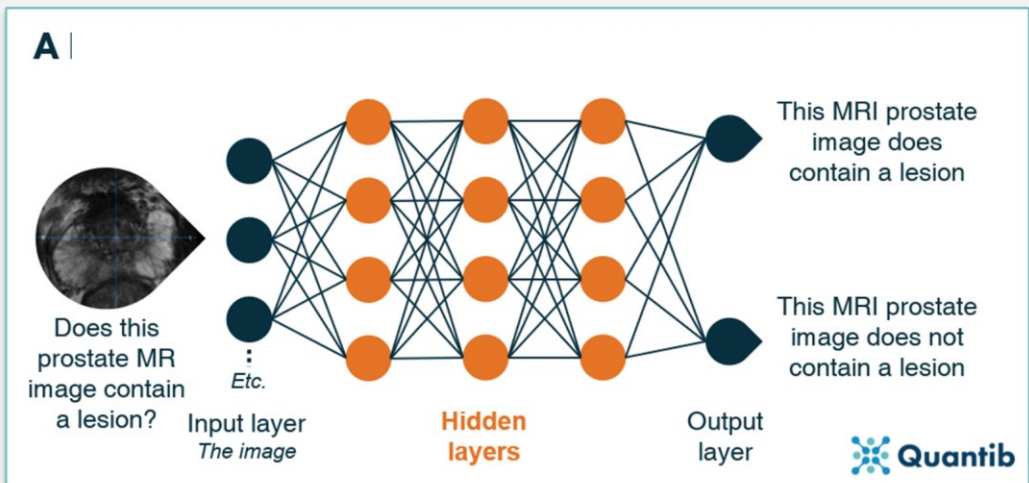
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NEURAL NETWORK



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DEEP LEARNING



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NATURAL LANGUAGE PROCESSING

A Venn diagram with two overlapping circles. The left circle is orange and labeled 'COMPUTER SCIENCE'. The right circle is yellow and labeled 'LINGUISTICS'. The intersection is a blue oval labeled 'NLP'. A bracket above the circles is labeled 'AI', and a bracket below is labeled 'MACHINE LEARNING'.

A lovely xx-year-old gentleman with multiple issues for comprehensive evaluation.

- Tinnitus of many years' duration. He has no *neurologic complaints*, no headache, no *vertigo*, no sudden changes in hearing.
- Low-grade pancreatic neoplasm. In xxxx, presented with *epigastric pain* and high *CA 19-9*. *CT* showed a mass in the *pancreas*.

He underwent a Whipple procedure with a *pancreatectomy* and *splenectomy* showing a *mucinous neoplasm* with *secondary pancreatitis*.

This was complicated by a *bile duct stricture* requiring reconstruction in xxxx.

In xxxx, he had *H1B*, *Meningovax* and *Pneumovax*, and he had a flu shot this fall.

In xxxx, he had some *epigastric pain* prompting a contrast *CT* of the *abdomen* and *pelvis* that did not show any *tumor recurrence*.

The patient is on *pancreatic enzyme* replacement. He is also an *insulin-dependent diabetic*.

He tells me he had one bout of abdominal pain that may be xxxx that lasted about 4 hours in low abdomen, crampy without diarrhea or vomiting and it has gone away. He has had nothing since. No pain, burning or blood with urination. Appetite is excellent. There is no *melena* or bad diarrhea.

What percent of healthcare data is unstructured data?

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Generative AI: Under the Hood

AI

ML

DL

GAI & LLM

NLP

How it Works?

Sources for LLM Model Training

- Image / Pictures
- Code / Script
- Text / Documents

LLM - Large Language Model Training and/or Refinement

Generative AI Service

Output

- Code
- Test Cases
- Document Text
- Image
- SOP
- Language Translation
- Design
- Search Results etc.

Event/ Triggers

Query/ Prompt

Verify/ Modify/ Use

Feedback Loop

Source: Adapted from Gartner (786698_C)

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Use Cases: AI

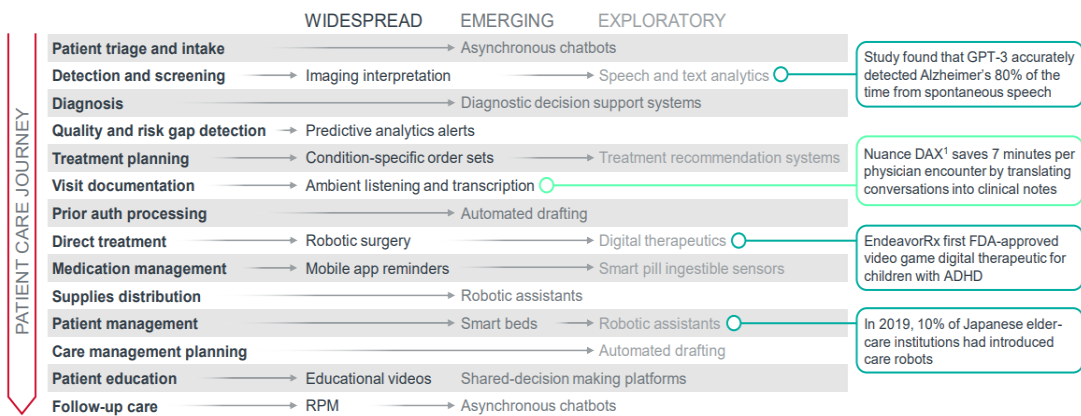
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AI is solving pressing healthcare problems

Adoption of select clinical workforce technologies across the patient care journey



1. Dragon Ambient eXperience.

Source: "Ambient Clinical Intelligence," Nuance, 2023; "Inside Japan's long experiment in automating eldercare," MIT, January 2023; "FDA Permits Marketing of First Game-Based Digital Therapeutic to Improve Attention Function in Children with ADHD," FDA, June 2020; "Predicting dementia from spontaneous speech using large language models," PLOS Digital Health, December 2022; "ChatGPT's AI Could Help Catch Alzheimer's Early," WebMD, February 2023.



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Advisory Board interviews and analysis.

<https://www.advisory.com/content/dam/advisory/en/public/success-pages/ai-and-generative-ai-101-slides.pdf.coredownload.pdf>

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The Top 100 Use-Cases for Generative AI (01-10) filtered

01	Generate ideas <small>Generating ideas involves brainstorming and creating new concepts or solutions. Generative AI can assist by suggesting innovative ideas based on patterns and data analysis.</small>	REACH: 10 VALUE-ADD: 8
02	Edit copy <small>Editing copy involves refining and connecting written content for clarity, coherence, and accuracy. Generative AI can assist by offering suggestions for improving grammar, style, and overall readability, helping streamline the editing process and produce high-quality content.</small>	REACH: 9 VALUE-ADD: 9
03	Therapy / companionship <small>Therapy provides emotional support and guidance through conversation and connection. Generative AI can assist by offering virtual companionship, providing a listening ear, and generating empathetic responses to support individuals in their healing journey.</small>	REACH: 9 VALUE-ADD: 7
04	Specific search <small>Specific search involves looking for a particular piece of information or content within a large dataset or database. Generative AI can help by quickly generating relevant search results based on user input or preferences, making the search process more efficient and effective.</small>	REACH: 9 VALUE-ADD: 8
05	Fun & nonsense <small>"Fun & nonsense" refers to engaging in activities that are light-hearted, playful, and without any serious purpose. Generative AI can assist in creating entertaining and whimsical content, such as jokes, memes, and surreal scenarios, to add an element of fun and creativity to various projects or interactions.</small>	REACH: 9 VALUE-ADD: 8
06	Simple explainers <small>Simple explainers are short, easy-to-understand descriptions that break down complex concepts into digestible chunks. Generative AI can help by quickly generating clear and concise explainers, making complicated topics more accessible to a wider audience.</small>	REACH: 9 VALUE-ADD: 7
07	Write / edit CV / resume <small>"Creating a professional profile outlining skills, education, and experiences for job applications. Generative AI can assist by suggesting relevant keywords, formatting styles, and personalized content based on the job requirements and individual strengths."</small>	REACH: 8 VALUE-ADD: 9
08	Explore topics of interests <small>Exploring topics of interest involves diving deep into subjects that captivate our attention. Generative AI can help by producing relevant content, generating new ideas, and suggesting connections between offer.</small>	REACH: 9 VALUE-ADD: 8
09	General advice <small>General advice is a service that provides helpful suggestions and recommendations on various topics to assist individuals in making informed decisions. Generative AI can help by analyzing vast amounts of data and generating personalized advice based on individual preferences, trends, and past experiences.</small>	REACH: 9 VALUE-ADD: 8
10	Improve code (pros) <small>Optimizing and enhancing code for better functionality and efficiency. Generative AI can provide automated suggestions, refactor code, detect and fix errors, and optimize performance.</small>	REACH: 3 VALUE-ADD: 9

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Use Cases: Generative AI






Text Generation
Writers, Bloggers, Lawyers


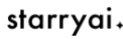


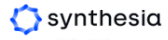

Code Generation
Programmers






Image/Video Generation
Artists, Photographers, Videographers

Other Generative AIs
Voice Actors, Musicians, Exec Assistants

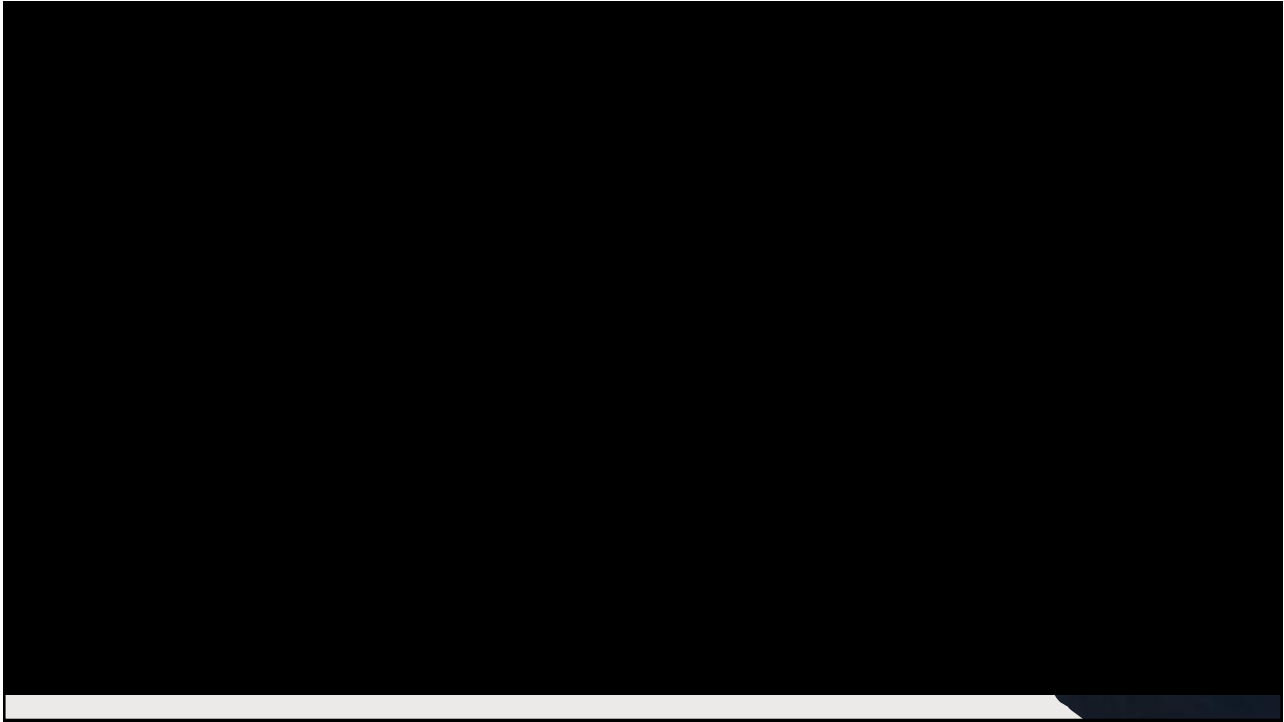





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Identify AI Opportunities

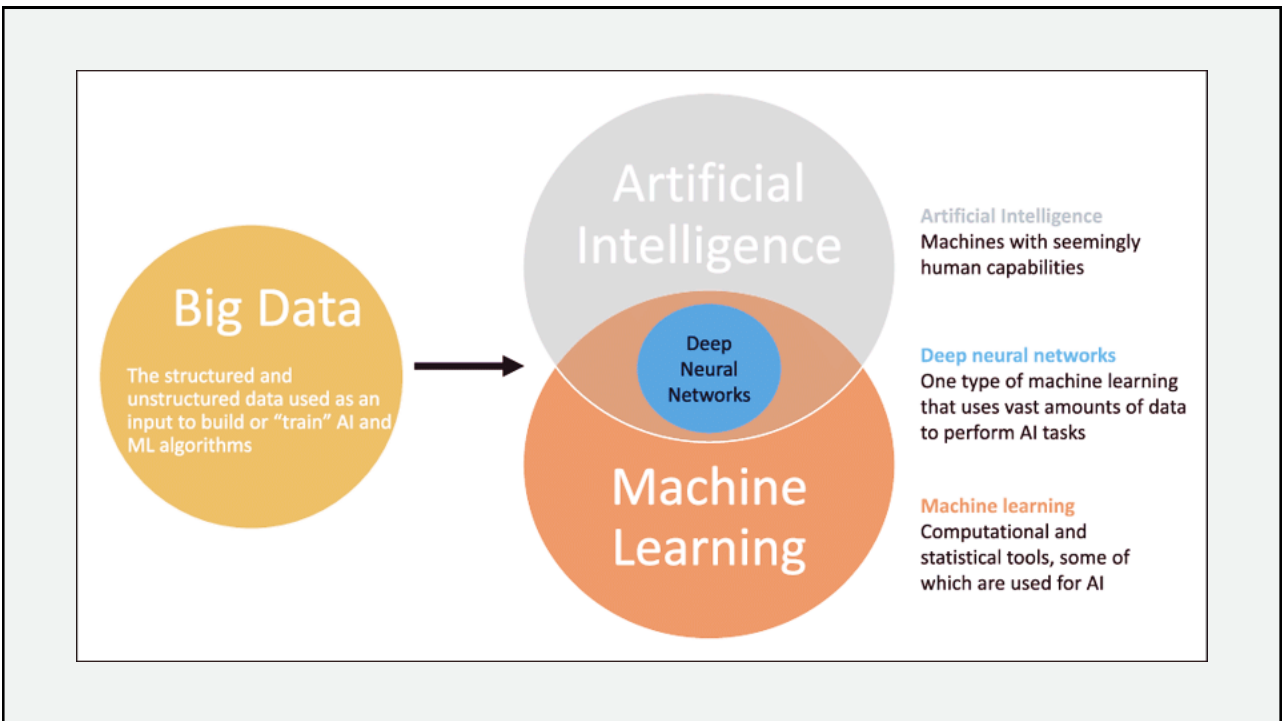
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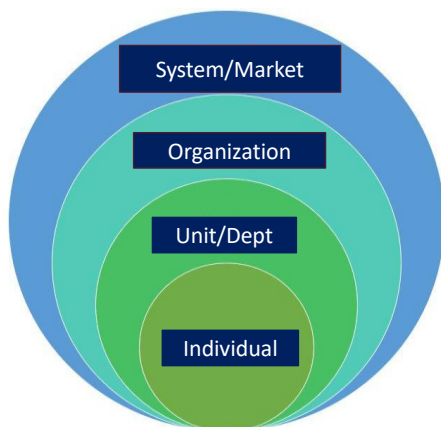


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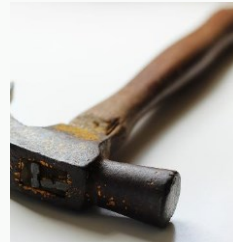
Describe the current reality



Identify a current challenge, dilemma, problem or opportunity. Write that down please.

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**What do
you use this
tool for?**



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AI Governance: A Definition

An AI governance framework enforces organizational priorities through standardized rules, processes, and requirements that shape how AI is designed, developed, funded, procured, deployed and evaluated.

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AI governance organization structure



Role	Assignment	Responsibilities	Members
AI Governance Board	Strategic oversight and policy-making	Approves AI strategy, policies, and major projects. Ensures alignment with business objectives and compliance with legal and ethical standards.	C-Level Executives, Head of AI, Legal Advisor, Ethics Officer.
AI Project Management Office (PMO)	Coordination and management	Oversees project planning, resource allocation, and execution. i.e., Projects align with organizational strategy and governance policies.	AI Project Managers, Technical Leads
AI Ethics Committee	Guidance on ethical considerations	Review projects for ethical implications, provide recommendations, and guide adherence to ethical standards.	Ethics Officer, Legal Advisor, External Ethicists, AI Developers.
Data Governance Team	Management of data assets	Ensures data quality, security, and privacy. Develops and enforces data governance policies.	Data Governance Lead, Data Scientists, Data Protection Officer, IT/Security.
IT and Cybersecurity Department	Security operations and technical support	Provides IT infrastructure, implements cybersecurity measures for AI systems, and monitors for security threats.	CIO, IT Personnel, Cybersecurity Experts.
AI Research and Development (R&D) Team	Solutions Development	Conducts AI research, develops and tests AI models.	AI Engineers, Data Scientists, Research Specialists.
Compliance and Legal Department	Legal oversight	Ensures AI initiatives comply with laws and regulations, manages legal risks.	Legal Advisor, Compliance Officers.
Human Resources (HR)	Workforce management	Manages AI-related training and development, addresses workforce implications of AI deployment.	HR Managers, Training Coordinators.

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CODING SHEET

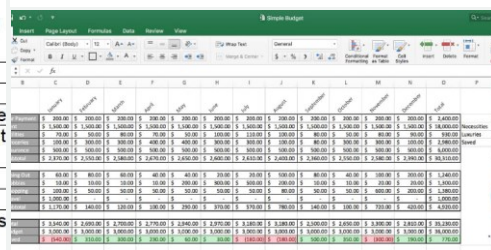
Table 1.9: Compliance-Gaming Strategies (adapted from Shelby & Reinsch 2003)

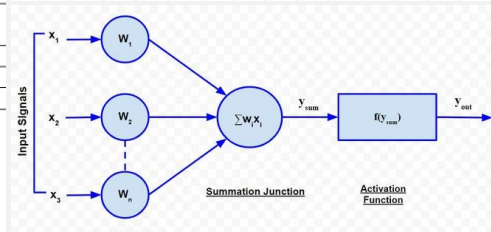
Type	Coercive	Remunerative	Social normative
Coercive	Averse stimulus: If you do not comply, I will punish you.	Promise: If you comply, I will reward you.	Liking: Friendly writer tries to get reader in a good mood.
Remunerative	Positive expectation: If you comply, you will be punished because that is nature of things.	Pregiving: If you are rewarded, you are expected to comply.	Debt: You should comply because you owe me.
Social normative	Negative expectation: If you do not comply, you will be punished because that is nature of things.	Positive expectation: If you comply, you will be rewarded because that is nature of things.	Positive esteem: Others will think well of you if you comply.
		Negative esteem: Others will think ill of you if you don't comply.	

$$Y_i = \beta_0 + \beta_1 X_i + \epsilon_i$$

Dependent Variable
Population Y intercept
Population Slope Coefficient
Independent Variable
Random Error term

Linear component
Random Error component





Input Signals: x_1, x_2, x_3

Synaptic Weights: w_1, w_2, w_3

Summation Junction: $\sum w_i x_i$

Activation Function: $f(y_{sum})$

Output: y_{out}

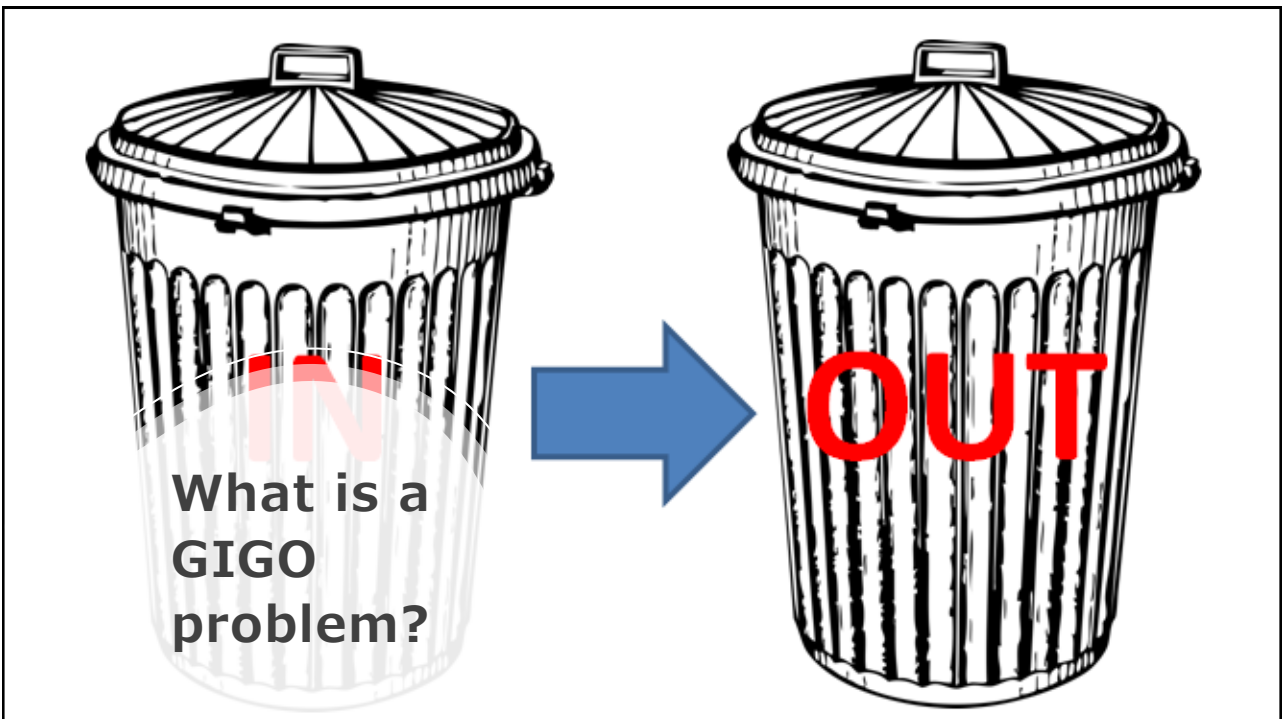
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Leading & Managing Change, Transformation & Transition

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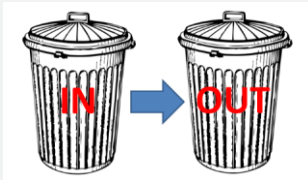


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What is a GIGO problem?



If we feed poor-quality data or incorrectly selected data into our models, we can expect that the result will also be of poor quality.

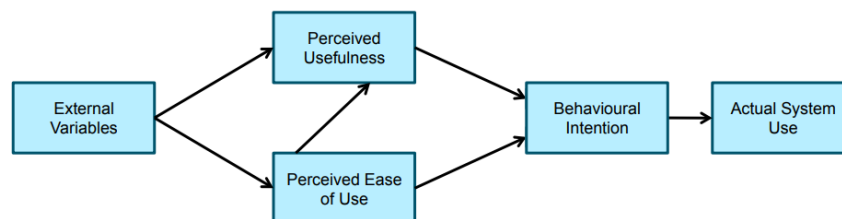
Two Petty Theft Arrests

VERNON PRATER	BRISHA BORDEN
LOW RISK 3	HIGH RISK 8
VERNON PRATER	BRISHA BORDEN
Prior Offenses 2 armed robberies, 1 attempted armed robbery	Prior Offenses 4 juvenile misdemeanors
Subsequent Offenses 1 grand theft	Subsequent Offenses None
LOW RISK 3	HIGH RISK 8

Borden was rated high risk for future crime after she and a friend took a kid's bike and scooter that were sitting outside. She did not reoffend.

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Technology Acceptance Model

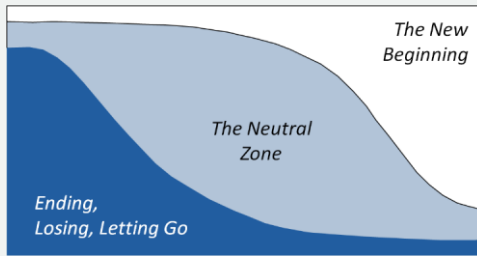


Final Version of Technology Acceptance Model (TAM). Source: (Venkatesh & Davis, 1996)

- Technology Acceptance Model (TAM)
 - External Variables include “system characteristics, training, user involvement in design, and the nature of the implementation process” (Venkatesh & Davis, 1996)
 - These ‘[...] directly influence the perceived usefulness and perceived ease of use’, in turn mediating behavioural intention to use” (Davis, 1993)

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Bridges' Transition Model

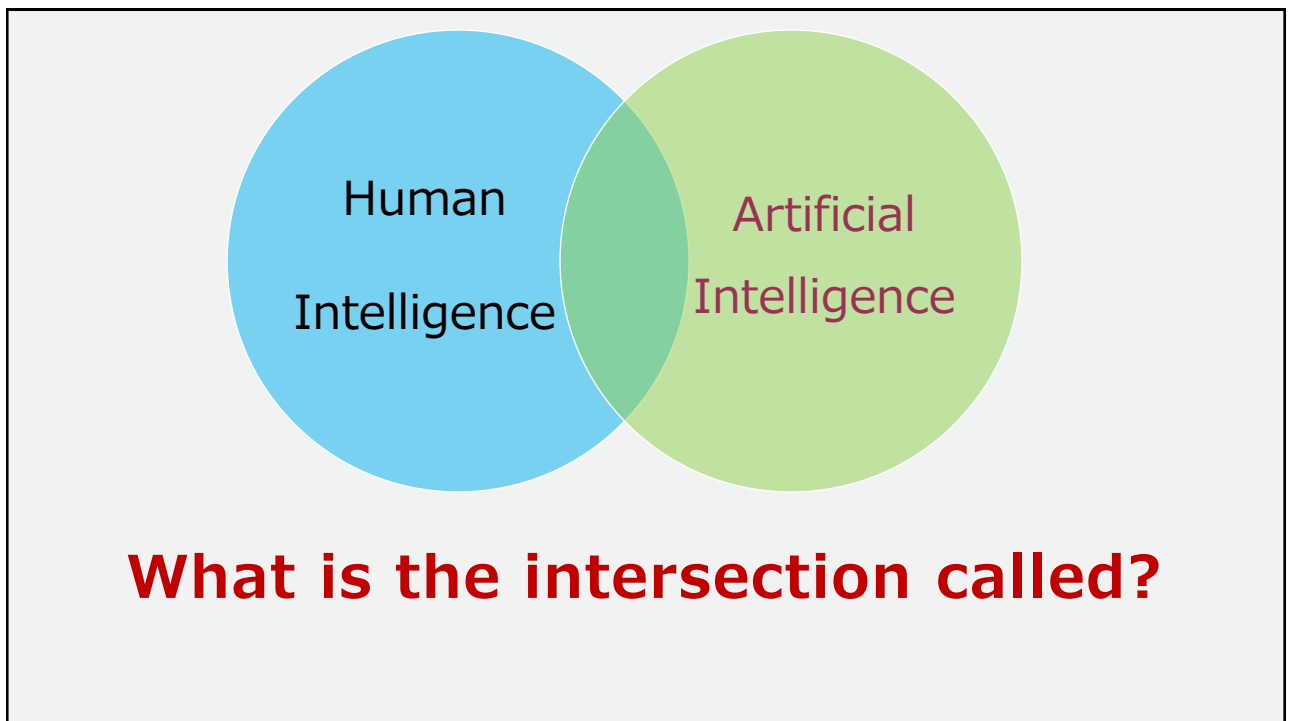


PEOPLE DON'T RESIST CHANGE
THEY RESIST LOSS

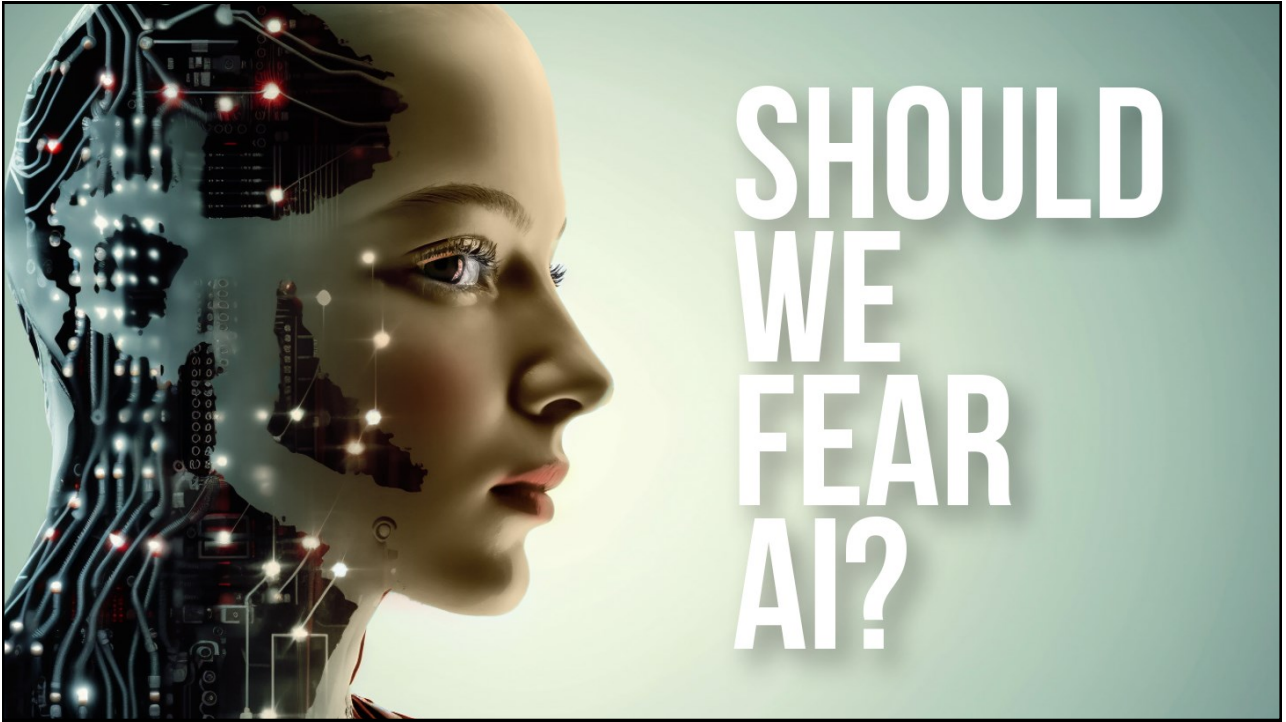
Stage	What people may experience...	How leaders can respond...
1	Grief Shock Anxiety Relief Denial Chaos	<ul style="list-style-type: none"> Empathy Validation Vision Clarity about the future Listen
2	Instability / Worry Highs/Lows Uncertainty Curiosity Exhilaration	<ul style="list-style-type: none"> Information Communication What is known / not known Next steps Training
3	Trepidation Excitement Optimism Purpose Hope	<ul style="list-style-type: none"> Role Clarity Coaching Support Recognition Celebration Vision

<https://berlineaton.com/wp-content/uploads/2021/11/William-Bridges-Transition-Model-11-22-2021-Final.pdf>

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SHOULD WE FEAR AI?

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Jobs in U.S. that are likely to have high, medium or low exposure to AI

High exposure

- Budget analysts
- Data entry keyers
- Tax preparers
- Technical writers
- Web developers

Medium exposure

- Chief executives
- Veterinarians
- Interior designers
- Fundraisers
- Sales managers

Low exposure

- Barbers
- Child care workers
- Dishwashers
- Firefighters
- Pipelayers

Note: Occupations are grouped by the relative importance of work activities with low, medium or high exposure to AI.
Source: Pew Research Center analysis of O*NET (Version 27.3).
"Which U.S. Workers Are More Exposed to AI on Their Jobs?"

PEW RESEARCH CENTER

Should we fear AI?

What do you notice?

Where do physicians and surgeons fall regarding job loss exposure to AI?

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65 JOBS WITH THE LOWEST RISK OF AUTOMATION BY ARTIFICIAL INTELLIGENCE AND ROBOTS

The following 65 occupations were all determined to have an automation risk probability of 0% based on the abilities, knowledge, skills, and activities required in order to do the job. With the same low risk of automation, they are ranked in order of their projected growth by 2031 to see which occupations will continue to thrive through the age of robots and artificial intelligence (AI).

	2021 MEDIAN ANNUAL WAGE (U.S.)	PROJECTED GROWTH BY 2031
1 Nurse Practitioners	\$120,468	45.70%
2 Choreographers	\$42,700	29.70%
3 Physician Assistants	\$121,538	27.60%
4 Mental Health Counselors	\$48,520	22.10%
5 Nursing Instructors and Teachers, Post-Secondary	\$77,440	21.50%
6 Coaches and Scouts	\$39,970	20.00%
7 Athletic Trainers	\$49,420	17.50%
8 Physical Therapists	\$95,620	16.90%
9 Orthotists and Prosthetists	\$76,440	16.80%
10 Occupational Therapists	\$85,570	15.90%
10 Marriage and Family Therapists	\$49,880	15.90%
12 Art Therapists	\$59,500	11.20%
12 Music Therapists	\$59,500	11.20%
14 Health-Care Social Workers	\$68,840	11.10%
14 Mental Health and Substance Abuse Social Workers	\$49,130	11.10%
16 Bioengineers and Biomedical Engineers	\$97,410	9.80%
17 Psychology Teachers, Post-Secondary	\$77,800	9.60%
18 Fitness and Wellness Coordinators	\$60,360	9.50%
19 Soil and Plant Scientists	\$66,750	9.10%
20 Social Work Teachers, Post-Secondary	\$71,010	8.90%
21 Art, Drama, and Music Teachers, Post-Secondary	\$75,940	8.80%
22 Psychiatrists	\$249,760	8.70%
23 Anthropology and Archaeology Teachers, Post-Secondary	\$97,340	8.30%
24 Physicists	\$152,430	8.20%
25 Architecture Teachers, Post-Secondary	\$95,160	7.80%
26 Nurse Midwives	\$112,830	7.50%
27 Emergency Medical Technicians	\$35,470	7.00%
28 Security Managers	\$97,930	6.90%
28 Civil Engineers	\$88,900	6.90%

28 Transportation Engineers	\$88,050	6.90%
31 Adapted Physical Education Specialists	\$61,720	6.80%
32 Paramedics	\$46,770	6.40%
33 Clinical Nurse Specialists	\$77,600	6.20%
33 Critical Care Nurses	\$77,600	6.20%
33 Advanced-Practice Psychiatric Nurses	\$77,600	6.20%
36 Dentists, General	\$160,370	6.10%
37 Set and Exhibit Designers	\$54,860	5.20%
38 Prosthodontists	\$100,950	5.10%
39 Education Administrators, Kindergarten Through Secondary	\$98,420	4.90%
40 Oral and Maxillofacial Surgeons	\$311,460	4.60%
41 Firefighters	\$50,700	4.30%
42 First-Line Supervisors of Firefighting and Prevention Workers	\$78,230	4.10%
43 Urban and Regional Planners	\$78,500	3.80%
44 Recreational Therapists	\$47,940	3.60%
44 Directors, Religious Activities and Education	\$46,980	3.60%
46 Dermatologists	\$302,740	3.10%
47 Neurologists	\$267,660	3.00%
48 First-Line Supervisors of Police and Detectives	\$99,330	2.80%
48 Neuropsychologists	\$102,900	2.80%
48 Clinical Neuropsychologists	\$102,900	2.80%
51 Orthopedic Surgeons, Except Pediatric	\$306,220	2.70%
52 Architects, Except Landscape and Naval	\$80,180	2.70%
53 Surgeons, All Other	\$297,800	2.60%
54 Emergency Management Directors	\$76,730	2.50%
55 Preventive Medicine Physicians	\$183,655	2.40%
56 Physical Medicine and Rehabilitation Physicians	\$231,500	2.40%
57 Hospitalists	\$247,741	2.40%
58 Sports Medicine Physicians	\$249,738	2.40%
59 Pediatric Surgeons	\$290,310	2.20%
60 Obstetricians and Gynecologists	\$296,210	1.70%
61 Interior Designers	\$60,340	0.90%
62 Landscape Architects	\$67,950	-0.10%
63 Fish and Game Wardens	\$60,730	-3.50%
64 Chief Executives	\$179,520	-7.30%
65 Manufactured Building and Mobile Home Installers	\$36,360	-20.30%

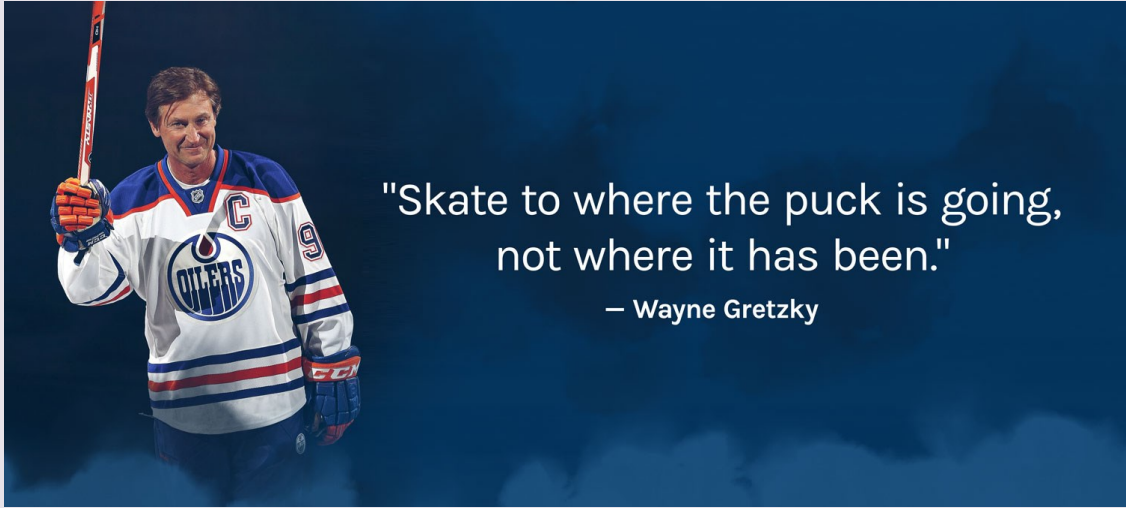
SOURCES:
<https://www.bls.gov/occupations/lowest-risk-jobs>
 Salaries for occupations earning more than \$200,000 found at www.bls.gov and www.salary.com

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LUDDITES

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"Skate to where the puck is going,
not where it has been."

— Wayne Gretzky