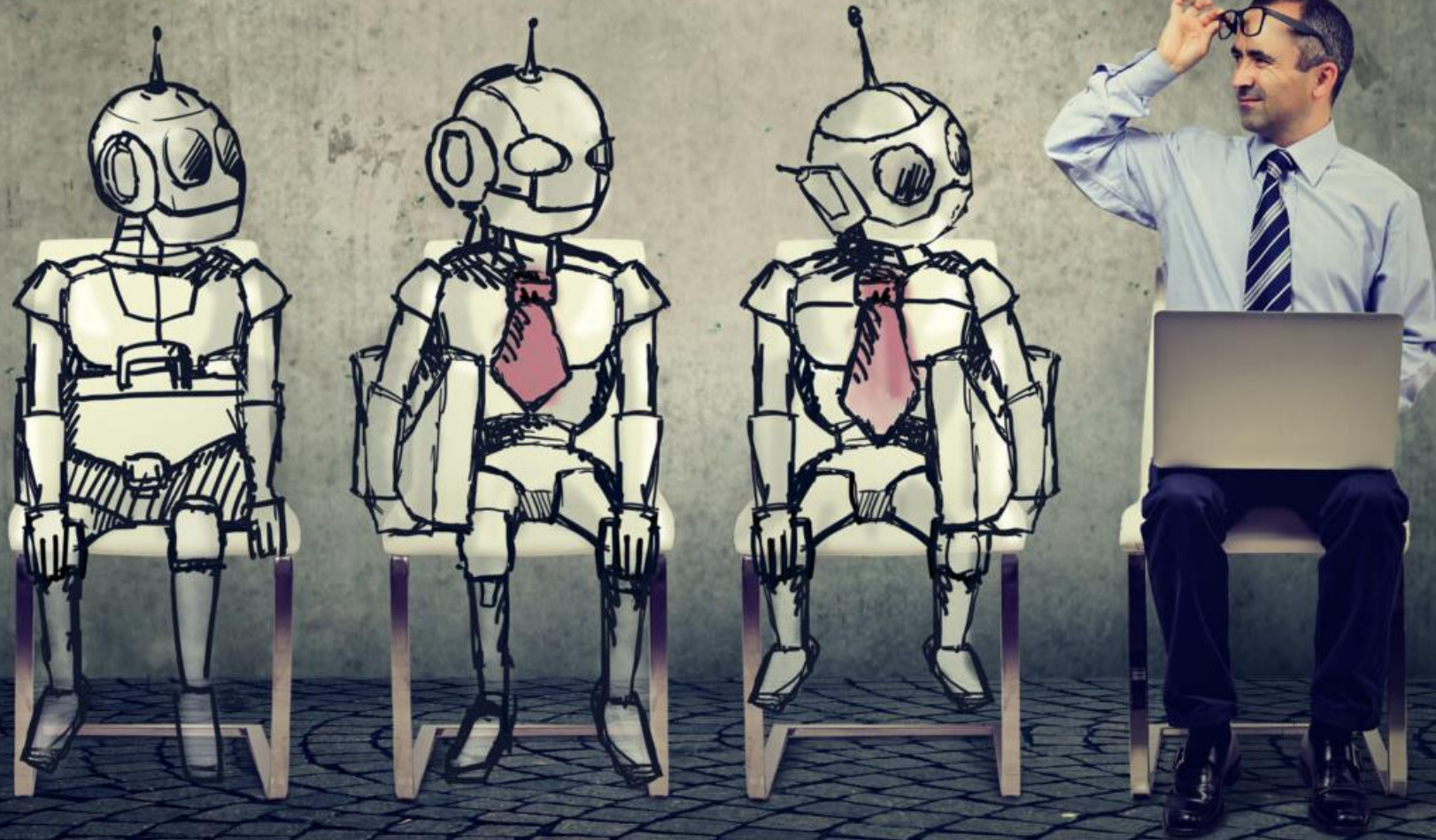


# Applying Human Intelligence to Realize Sound Artificial Intelligence



**TAKA ARIGA**

Chief Data Scientist  
Director of Innovation Lab  
Government Accountability Office

# We are living in a golden era of algorithmic renaissance



**SKILLED DIGITAL  
WORKFORCE**

**PRIVACY &  
REGULATIONS**

**DATA  
QUALITY**

**IT INFRASTRUCTURE  
& CYBERSECURITY**

**ACQUISITION  
PRACTICES**

**OVERSIGHT &  
MONITORING**

# What is the difference between AI and ML?

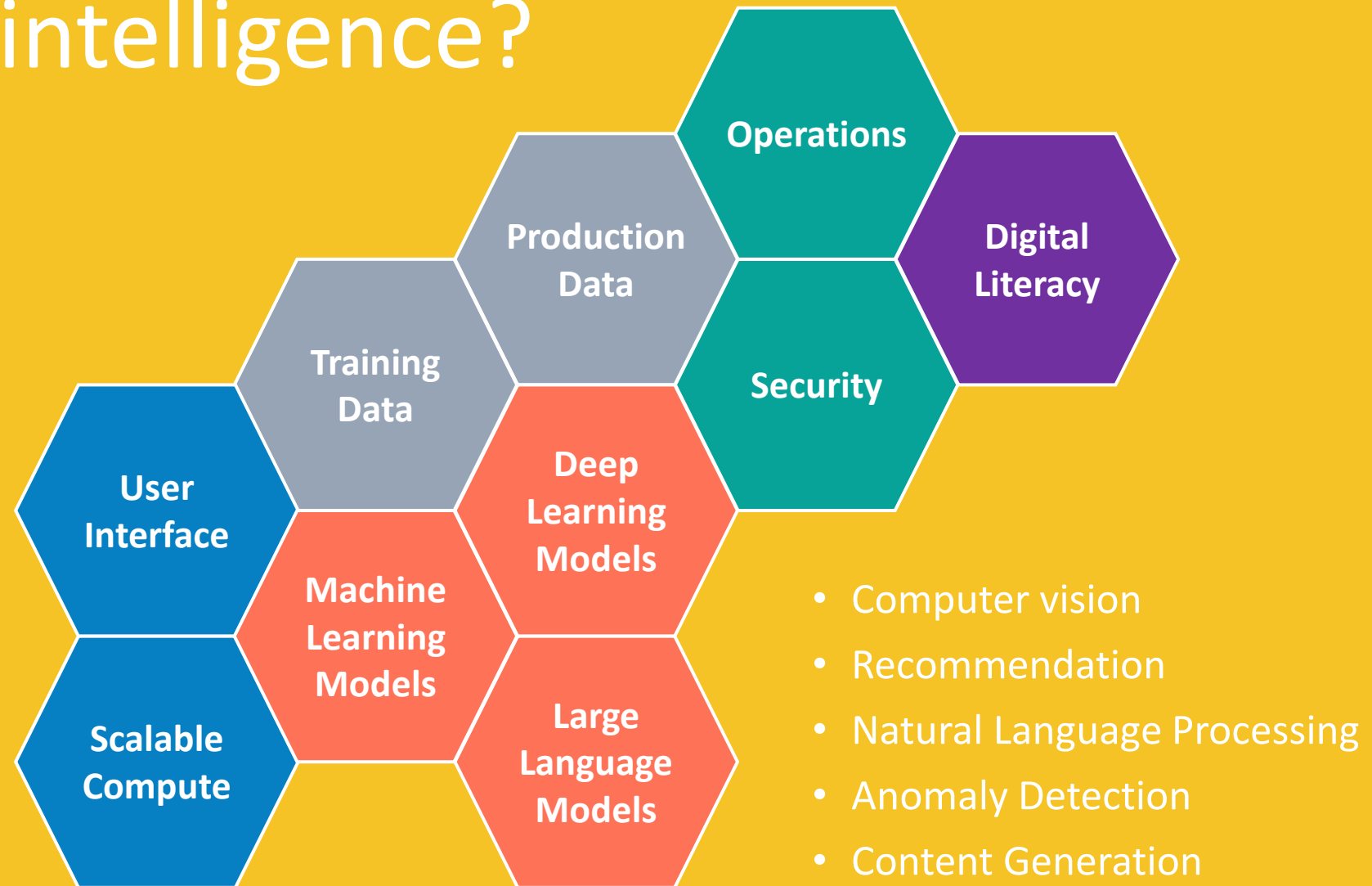
## Artificial Intelligence



## Machine Learning



# What constitutes artificial intelligence?



# Transformation Modernization Productivity Gains

An iceberg floating in the ocean. The tip of the iceberg is above the water surface, and the much larger base is submerged. Seven horizontal orange bars with white text labels are connected to the submerged part of the iceberg by thin orange lines. The bottom-most bar is yellow.

GOVERNANCE

BUY vs. BUILD

DIGITAL LITERACY


REGULATORY COMPLIANCE

CYBERSECURITY

OPERATIONS & MAINTENANCE

EQUITY & ETHICS

# Trust but verify as an effective lever



**GAO@100**  
A Century of Non-Partisan Fact-Based Work

## ARTIFICIAL INTELLIGENCE

An Accountability Framework for Federal Agencies and Other Entities

June 2021  
GAO-21-519SP

Including insights from the Comptroller General's Forum on the Oversight of Artificial Intelligence

Available at [www.gao.gov](http://www.gao.gov)



GAO  
United States Government Accountability Office  
TECHNOLOGY ASSESSMENT  
December 2020

### Artificial Intelligence in Health Care

Benefits and Challenges of Machine Learning in Drug Development



GAO  
United States Government Accountability Office  
TECHNOLOGY ASSESSMENT  
November 2020

### Artificial Intelligence in Health Care

Benefits and Challenges of Technologies to Improve Patient Care

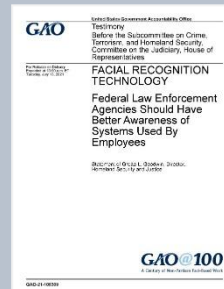


GAO  
United States Government Accountability Office  
TECHNOLOGY ASSESSMENT  
May 2020

### Forensic Technology

Algorithms Used in Federal Law Enforcement

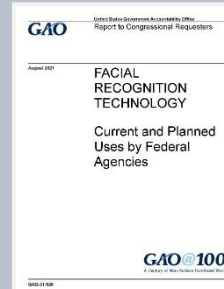
FORESIGHT



GAO  
United States Government Accountability Office  
Testimony Before the Subcommittee on Crime, Terrorism, Homeland Security, and Investigations, Committee on the Judiciary, House of Representatives  
February 2021

### FACIAL RECOGNITION TECHNOLOGY

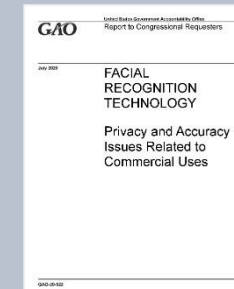
Federal Law Enforcement Agencies Should Have Better Awareness of Systems Used by Employees



GAO  
United States Government Accountability Office  
Report to Congressional Requesters  
April 2021

### FACIAL RECOGNITION TECHNOLOGY

Current and Planned Uses by Federal Agencies



GAO  
United States Government Accountability Office  
Report to Congressional Requesters  
July 2020

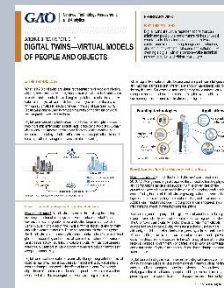
### FACIAL RECOGNITION TECHNOLOGY

Privacy and Accuracy Issues Related to Commercial Uses

OVERSIGHT



GAO  
United States Government Accountability Office  
DEEPFAKES  
February 2021



GAO  
United States Government Accountability Office  
DIGITAL TWINS—VIRTUAL MODELS OF PEOPLE AND OBJECTS  
February 2021



GAO  
United States Government Accountability Office  
GENERATIVE AI  
February 2021

INSIGHT



AI USE CASE	POTENTIAL BENEFITS	MATURITY PHASE	RELEVANT TECHNIQUES
Organizes large volumes of text, such as public comments from Regulations.gov	<ul style="list-style-type: none"> <li>Groups contents by similar themes.</li> <li>Prioritizes reviews based on relevant hierarchical topics.</li> </ul>	Late-stage prototype	<ul style="list-style-type: none"> <li>Natural language processing</li> <li>Topic modeling</li> <li>Sentiment analysis</li> <li>Semantic matching</li> </ul>
Summarizes draft GAO legislative mandates	<ul style="list-style-type: none"> <li>Increases efficiency and reduces manual processes.</li> <li>Highlights potentially fragmented and duplicative mandates.</li> </ul>	Late-stage prototype	<ul style="list-style-type: none"> <li>Natural language processing</li> <li>Large language model</li> <li>Semantic matching</li> <li>Regular expressions</li> </ul>
Assists with copyediting according to GAO's style guide	<ul style="list-style-type: none"> <li>Automates select copyediting tasks.</li> <li>Enables staff to focus on narrative structure and clarity.</li> </ul>	Late-stage prototype	<ul style="list-style-type: none"> <li>Natural language processing</li> <li>Neural network modeling</li> <li>Sentiment analysis</li> </ul>
Provides automated responses to chat questions on published GAO work	<ul style="list-style-type: none"> <li>Summarizes published GAO contents.</li> <li>Enhances specificity and accuracy of results.</li> </ul>	Early-stage prototype	<ul style="list-style-type: none"> <li>Large language model configuration</li> <li>Prompt engineering</li> <li>Retrieval Augmented Generation</li> <li>User telemetry measurement</li> </ul>
Summarizes qualitative responses from annual GAO Employee Experience Survey	<ul style="list-style-type: none"> <li>Identifies trends, patterns, and sentiments quickly.</li> <li>Improves survey interpretation with less manual intervention.</li> <li>Assists with root-cause analyses.</li> </ul>	Early-stage prototype	<ul style="list-style-type: none"> <li>Natural language processing</li> <li>Large language model</li> </ul>
Monitors information about congressional committee calendars, press releases, and web contents	<ul style="list-style-type: none"> <li>Matches congressional interests with relevant GAO work.</li> <li>Enhances timeliness of outreach and technical assistance.</li> </ul>	Early-stage prototype	<ul style="list-style-type: none"> <li>Natural language processing</li> <li>Large language model</li> <li>Semantic matching</li> </ul>
Enhances GAO auditing through use of extended reality glasses	<ul style="list-style-type: none"> <li>Improves collaboration across locations.</li> <li>Reduces costs and risks.</li> <li>Enables new data capturing and analysis opportunities.</li> </ul>	Concept exploration	<ul style="list-style-type: none"> <li>Computer vision and object recognition</li> <li>Real-time image, video, and sensor data processing</li> </ul>
Triage IT help desk requests and answers internal GAO policy questions	<ul style="list-style-type: none"> <li>Provides 24/7 self-service assistance to GAO employees.</li> <li>Allows support staff to focus on more complex requests.</li> </ul>	Concept exploration	<ul style="list-style-type: none"> <li>Natural language processing</li> <li>Large language model</li> <li>Sentiment analysis</li> <li>Integrated workflow and escalation</li> </ul>



AI is here to stay but traversing a winding road ahead

