

POLICY BRIEF

**Guinn**  
CENTER

# ARTIFICIAL INTELLIGENCE

*General Overview*

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# REPORT ACKNOWLEDGMENTS



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# INTRODUCTION

What comes to mind when you think about artificial intelligence (AI)? Perhaps your impressions are positive, given the advancements AI has enabled in healthcare, in the form of precision diagnostic tools, or innovations in transportation, such as autonomous vehicles. Your views may also trend toward wariness and caution, fueled by concerns around data privacy, algorithmic bias, or fears that the worst-case scenarios offered by science fiction—HAL 9000 or Skynet—could eventually resemble fact.

[A 2023 Pew Research poll](#) showed that 52 percent of Americans surveyed “are more concerned than excited about AI in daily life,” 10 percent said they were “more excited than concerned,” and 36 percent of those surveyed “feel a mix of excitement and concern.”<sup>1</sup>

While public opinion still takes shape and AI capabilities rapidly advance, policymakers and the broader public would benefit from understanding the definitions, origins, and historical development of artificial intelligence. This policy brief provides an overview of the roots of AI, tracing it from theoretical concepts to practical applications, and informs discussion around possible policies and regulations in a rapidly evolving AI landscape.

## ARTIFICIAL INTELLIGENCE DEFINED

The term “artificial intelligence” has carried many definitions over the years, but centers around a primary theme: the mimicking, imitating, or impersonation of human thought and behavior. The [AI Guide for Government](#) by the IT Modernization Centers of Excellence, for example, defines AI as a field that “combines three disciplines—math, computer science, and cognitive science—to mimic human behavior through various technologies.”<sup>2</sup> A 2018 report from the Brookings Institution, [How artificial intelligence is transforming the world](#), notes the following as key qualities of artificial intelligence: intentionality, intelligence, and adaptability.<sup>3</sup>

When it comes to the analysis of AI applications and the development of AI regulations, it’s important to distinguish between *artificial intelligence* and *automation*. AI—specifically, machine learning—uses algorithms to find patterns in large data sets and is useful in making predictions, plans, and solving problems. Conversely, automation describes a classification of technology that is largely task-focused, and used for routine, repetitive functions.<sup>4</sup> Because these two classes of technology differ in how they impact the workforce, regulatory efforts will attempt to clarify the distinctions as well as the nexus between AI and automation (i.e. how far policies should go to either advance or limit the reach of AI).

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<sup>1</sup> “What the Data Says About Americans’ Views of Artificial Intelligence,” Pew Research Center, November 21, 2023, <https://www.pewresearch.org/short-reads/2023/11/21/what-the-data-says-about-americans-views-of-artificial-intelligence/>.

<sup>2</sup> IT Modernization Centers of Excellence, “AI Guide for Government,” Key AI terminology | GSA - IT Modernization Centers of Excellence, n.d., <https://coe.gsa.gov/coe/ai-guide-for-government/what-is-ai-key-terminology/>.

<sup>3</sup> Darrell M. West and John R. Allen, “How artificial intelligence is transforming the world” (Brookings Institution, April 24, 2018), <https://www.brookings.edu/articles/how-artificial-intelligence-is-transforming-the-world/>.

<sup>4</sup> Brookings, “Automation and Artificial Intelligence Sound Similar but May Have Vastly Different Impacts on the Future of Work,” Brookings (accessed April 3, 2024), <https://www.brookings.edu/articles/automation-and-artificial-intelligence-sound-similar-but-may-have-vastly-different-impacts-on-the-future-of-work/>.

# AI TIMELINE AND EVOLUTION

While AI would appear, on the surface, to be a relatively new technology, its more modern applications<sup>5</sup> are rooted in activities and concepts from the early- and mid-1900s. [Tableau's](#) article "[What is the history of artificial intelligence \(AI\)?](#)"<sup>6</sup> summarizes the evolution of AI in recent decades, categorizing advancements into seven periods:



<sup>5</sup> Encyclopedia Britannica, "Is Artificial General Intelligence (AGI) Possible?," Artificial intelligence - Machine Learning, Robotics, Algorithms | Britannica, January 13, 2024, <https://www.britannica.com/technology/artificial-intelligence/is-artificial-general-intelligence-agi-possible>.

<sup>6</sup> Tableau, "What Is the History of Artificial Intelligence (AI)?"

# KEY TERMS, CONCEPTS & EXAMPLES

Understanding AI terminology is important when grasping the overall concept of AI and its many applications. Below is a list of key terms and concepts to provide more clarity.

TERM	DEFINITION	EXAMPLE(S)
<b><i>Machine Learning</i></b>	A key field within artificial intelligence defined as “the part of AI that studies how computer systems can improve their perception, knowledge, decisions, or actions based on experience or data.” <sup>7</sup>	Common uses of machine learning include product recommendations on websites, email automation, and spam filtering. <sup>8</sup>
<b><i>“Strong” Artificial Intelligence (AI)</i></b>	Artificial intelligence models can perform tasks with an intelligence equal to (or beyond) that of humans; currently, this AI is purely theoretical. <sup>9</sup>	“If researchers are able to develop Strong AI, the machine would require an intelligence equal to humans; it would have a self-aware consciousness that has the ability to solve problems, learn, and plan for the future,” according to IBM. <sup>10</sup>
<b><i>Transformer</i></b>	A “neural net architecture,” which allows for “powerful and computationally efficient analysis and generation of sequences” (such as words in a paragraph) via a flexible neural net architecture. <sup>11</sup>	For example, when inputting the question “What is the color of the sky?” a transformer model identifies the relevancy and relationship between the words “color,” “sky,” and “blue.” It uses that knowledge to generate the output: “The sky is blue.” This technology is used in speech recognition and protein sequence analysis. <sup>12</sup>
<b><i>“Weak” or “Narrow” Artificial Intelligence (AI)</i></b>	Artificial intelligence models that are trained to focus on and perform specific tasks. All current instances of AI fall under this category. <sup>13</sup>	Digital assistants like Siri or Alexa are examples of weak or narrow AI, as is the facial recognition used by social media platforms or search engines.

<sup>7</sup> Stanford Institute for Human-Centered Artificial Intelligence (HAI), “Artificial Intelligence Definitions.”

<sup>8</sup> “Machine Learning Examples,” Tableau, accessed April 3, 2024, <https://www.tableau.com/learn/articles/machine-learning-examples>.

<sup>9</sup> International Business Machines (IBM), “What Is Artificial Intelligence (AI)?”

<sup>10</sup> “Strong AI,” IBM, accessed April 3, 2024, <https://www.ibm.com/topics/strong-ai>.

<sup>11</sup> Stanford Institute for Human-Centered Artificial Intelligence (HAI), “Artificial Intelligence Definitions.”

<sup>12</sup> “Transformers in Artificial Intelligence,” Amazon Web Services, accessed April 3, 2024, <https://aws.amazon.com/what-is/transformers-in-artificial-intelligence/#:~:text=Transformers%20are%20a%20type%20of,sequence%20into%20an%20output%20sequence.>

<sup>13</sup> International Business Machines (IBM), “What Is Artificial Intelligence (AI)?”

<b>Chatbot</b>	A computer program that “simulates human conversation with an end user.” Not all chatbots are equipped with AI, although the use of AI within chatbots has become increasingly common in recent years. <sup>14</sup>	<a href="#">ChatGPT</a> is an example of a chatbot powered by <a href="#">OpenAI</a> . Additional chatbots powered by AI have since been released including <a href="#">Google Gemini</a> . <sup>15</sup> Chatbots can be used in a variety of circumstances and, within limits, can be tailored to address the specific needs of users. Government agencies can use chatbots to help citizens navigate services or to provide language translation. <sup>16</sup>
<b>Computer Vision</b>	A field of artificial intelligence that “enables computers and systems to derive meaningful information from digital images, videos, and other visual inputs,” as well as process that information to take corresponding actions or make recommendations. <sup>17</sup>	Facial recognition technology supported, in part, by computer vision techniques has been used increasingly by local law enforcement for improved identification of potential criminal suspects. <sup>18</sup>
<b>Deep Learning (DL)</b>	“Deep learning is a method in artificial intelligence that teaches computers to process data in a way that is inspired by the human brain. Deep learning models can recognize complex patterns in pictures, text, sounds, and other data to produce accurate insights and predictions.” <sup>19</sup>	Deep learning enables several common AI uses, such as digital assistants, automatic facial recognition, the ability of self-driving cars to detect road signs and surroundings, and the detection of cancer cells in medical imaging.
<b>Foundation Model</b>	An emerging class of deep learning models that, rather than developing artificial intelligence from scratch, rely on existing data sets to understand language and create text and images. <sup>20</sup>	The <a href="#">GPT-4</a> language model released by OpenAI is an example of a foundation model. <sup>21</sup> It analyzes data from existing sources to synthesize its responses.
<b>Generative Artificial Intelligence (GenAI)</b>	Models within deep learning that, based on the data on which they are trained, can generate high-quality text, images, and other related content. <sup>22</sup>	GenAI is becoming a key focus of local and state governments across the United States. Potential uses include fraud detection in healthcare claims and the simulation of tax records for training tax auditing AI through synthetic data generation. <sup>23</sup>

<sup>14</sup> International Business Machines (IBM), “What Is a Chatbot?,” What is a chatbot? | IBM, n.d., <https://www.ibm.com/topics/chatbots>.

<sup>15</sup> Google, “Google Gemini - About Page,” n.d., <https://gemini.google.com>.

<sup>16</sup> Ben Miller, “Government Chatbots Now a Necessity for States, Cities, Counties,” *Government Technology*, February 2021, sec. Emerging Tech, <https://www.govtech.com/products/Government-Chatbots-Now-a-Necessity-for-States-Cities-Counties.html>.

<sup>17</sup> International Business Machines (IBM), “What Is Computer Vision?,” What is Computer Vision? | IBM, n.d., <https://www.ibm.com/topics/computer-vision>.

<sup>18</sup> Cameron Probert, “Benton County, Wash., Sheriff May Use AI Photo Searches,” *Government Technology*, January 23, 2024, <https://www.govtech.com/artificial-intelligence/benton-county-wash-sheriff-may-use-ai-photo-searches>.

<sup>19</sup> Amazon Web Services, “What is Deep Learning?” accessed April 3, 2024, <https://aws.amazon.com/what-is/deep-learning/#:~:text=Deep%20learning%20is%20a%20method,produce%20accurate%20insights%20and%20predictions>.

<sup>20</sup> “Foundation Models,” Amazon Web Services, accessed April 3, 2024, <https://aws.amazon.com/what-is/foundation-models/#:~:text=The%20term%20foundation%20model%20was,and%20conversing%20in%20natural%20language>.

<sup>21</sup> Stanford Institute for Human-Centered Artificial Intelligence (HAI).

<sup>22</sup> International Business Machines (IBM), “What Is Generative AI?,” *IBM Research Blog* (blog), April 20, 2023, <https://research.ibm.com/blog/what-is-generative-ai>.

<sup>23</sup> “State of California: Benefits and Risks of Generative Artificial Intelligence Report” (California Government Operations Agency, November 2023), [https://www.govops.ca.gov/wp-content/uploads/sites/11/2023/11/GenAI-EO-1-Report\\_FINAL.pdf](https://www.govops.ca.gov/wp-content/uploads/sites/11/2023/11/GenAI-EO-1-Report_FINAL.pdf).

<b>GPT</b>	Generative, Pre-trained Transformer.	Broader interest in AI was sparked in late 2022 with the launch of the ChatGPT chatbot by OpenAI, followed by their release of the language model GPT-4 in 2023. Government use of AI models such as ChatGPT is currently restricted in many cases due to ongoing data privacy concerns. However, some guidance has been developed to allow public sector officials to use these tools. Example prompts may guide employees to complete certain tasks, such as drafting press releases, generating summaries, and identifying interests of stakeholders, while limiting risks concerning data security and privacy. <sup>24</sup>
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## FURTHER RESEARCH

As AI technology evolves, so do proposed policies and regulations around its uses, benefits, and risks. In the coming months, the Guinn Center will continue to explore AI in this series of policy briefs, outlining the factors listed above, as well as legislative efforts across the U.S. around the following topics:

- Governance
- Workforce Development
- Education
- Elections
- Healthcare

Similarly, these briefs will continue to evolve as we learn new information. Visit our website, [Guinncenter.org](https://www.guinncenter.org), for ongoing updates on our AI research.

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<sup>24</sup> Dustin Haisler, “Making ChatGPT Work for You” (Center for Digital Government, n.d.), [https://media.erepublic.com/document/CDG23\\_GUIDE\\_ChatGPT\\_V.pdf?\\_\\_hstc=59400946.3a8f38820252c5de0da0b7abca3eab0e.1706157796045.1710878746728.1710902387439.35&\\_\\_hssc=59400946.3.1710902387439&\\_\\_hsfp=3391455533](https://media.erepublic.com/document/CDG23_GUIDE_ChatGPT_V.pdf?__hstc=59400946.3a8f38820252c5de0da0b7abca3eab0e.1706157796045.1710878746728.1710902387439.35&__hssc=59400946.3.1710902387439&__hsfp=3391455533).



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