Generative AI for Beginners

An Introduction to the Exciting World of Generative Artificial Intelligence

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May 22, 2023

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PRESENTATION CONTENTS

10 KEY HISTORY POINTS

1956: Dartmouth Workshop - The term "artificial intelligence" is coined, marking the birth of AI as a field.

1960s-1970s: Expert Systems - Development of AI systems that simulate human expertise in specific domains.

1970s-1980s: The AI Winter - Progress in AI slows, leading to a decline in funding and public interest.

1990s: Machine Learning Resurgence - Advancements in machine learning, including neural networks and statistical learning algorithms.

2000s-2010s: Deep Learning Breakthroughs - Deep learning techniques, such as CNNs and RNNs, revolutionize image and speech recognition.

2014: Generative Adversarial Networks (GANs) - Ian Goodfellow introduces GANs, enabling the generation of realistic and diverse content.

2015: Style Transfer and Neural Art - Neural style transfer techniques allow the transfer of artistic styles between images.

2015-present: OpenAI and GPT - OpenAI's release of the GPT series, starting with GPT-2 and GPT-3, showcases the power of large-scale language models.

2017-present: Deepfake Controversies - Deepfake technology raises concerns regarding the manipulation of audiovisual content.

Present: Current Applications and Advancements - Generative AI finds applications in content generation, art, fashion, virtual reality, and data augmentation. Ongoing research focuses on ethical considerations, interpretability, and model advancements.

7 TYPES OF ARTIFICAL INTELLIGENCE

BASED ABILITY = 3 TYPES

1. **Narrow AI (also known as Weak AI):** Designed to perform specific tasks or solve specific problems. These systems are trained to excel in a particular domain, such as image recognition, speech recognition, or playing chess. They are focused on narrow and well-defined tasks and lack the ability to generalize beyond their specific area of expertise. Narrow AI is what we commonly encounter in our daily lives, like voice assistants, recommendation systems, and self-driving cars.

2. **General AI (also known as Strong AI):** Possess the ability to understand, learn, and perform any intellectual task that a human being can do. This level of AI would have human-like intelligence and be capable of reasoning, learning from diverse experiences, and applying knowledge to various domains. General AI is limited to specific tasks but can handle a wide range of tasks, similar to how a human can adapt and learn different skills.

3. **Super intelligent AI: Surpass human intelligence in almost all aspects.** This level of AI would have intellectual capabilities far beyond what humans can achieve. Possess not only general intelligence but also an exceptional ability to learn, process information, and solve complex problems. Potentially outperform humans in virtually every intellectual task, leading to significant advancements in science, technology, and societal impact. **The development of super intelligent AI raises questions about its impact on society and the need for careful ethical considerations.**

TYPES OF ARTIFICAL INTELLIGENCE

BASED FUNCTIONALITY = 4 TYPES

1. **Reactive machines** are the most basic type of AI. They can only respond to the present moment and do not have any memory of the past or the ability to plan for the future. Examples of reactive machines include chess-playing computers and self-driving cars.

2. **Limited memory** AIs can remember past events and use that information to make decisions in the present. However, they cannot plan for the future or understand the thoughts and feelings of others. Examples of limited memory AIs include spam filters and medical diagnosis systems.

3. **Theory of mind** AIs can understand the thoughts and feelings of others. This allows them to interact with the world in a more sophisticated way, such as by negotiating with other AIs or empathizing with humans. However, theory of mind AIs are still limited in their ability to plan for the future.

4. **Self-aware** AIs are the most advanced type of AI. They have a complete understanding of themselves and their place in the world. This allows them to make decisions that are in their own best interests and to plan for the future. Self-aware AIs do not yet exist, but they are a goal of many AI researchers.

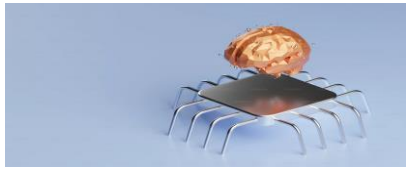
WHAT IS GENERATIVE AI ?

Generative AI refers to the field of artificial intelligence that focuses on creating models and algorithms capable of generating new and original content. Unlike traditional AI systems that are mainly focused on analyzing and making predictions based on existing data, generative AI goes a step further by generating entirely new data that resembles the patterns and characteristics of the training data it has learned from.

5 KEY COMPONENTS

1. **Generative Models:** These models form the core of generative AI systems and are trained on large datasets to learn the underlying patterns and generate new content. Popular generative models include GANs, Variational Autoencoders (VAEs), and Autoregressive models.

2. **Training Data:** High-quality and diverse training data is crucial for training generative models effectively. The training data should capture the patterns, structures, and characteristics of the content that the model aims to generate.



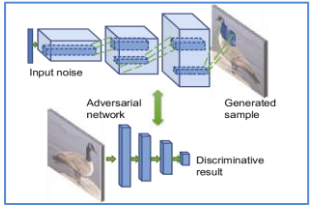
3. **Loss Functions:** Generative models are trained using loss functions that quantify the difference between the generated output and the desired output. These loss functions guide the model to improve over time by adjusting the model's parameters through optimization algorithms.

4. **Evaluation Metrics:** Evaluating the quality and performance of generative AI systems can be challenging. Various evaluation metrics have been developed, such as Inception Score, Frechet Inception Distance, or Perceptual Path Length, to assess the fidelity, diversity, and novelty of the generated content.

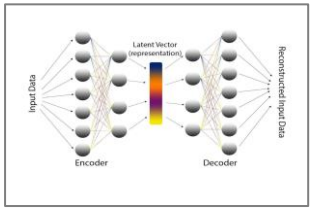
5. **Post-Processing Techniques:** After generating content, post-processing techniques can be applied to enhance and refine the output. For example, image or text editing techniques can be used to modify and improve the generated content based on specific criteria or constraints.

POPULAR MODELS

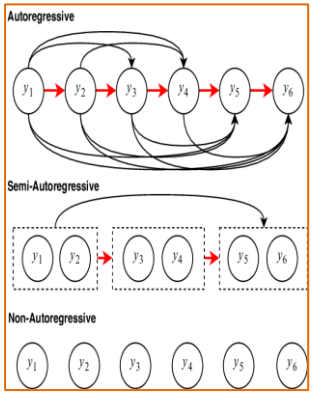
1. **GANs (Generative Adversarial Networks):** GANs are a type of generative model composed of two neural networks: a generator and a discriminator. The generator network takes random noise as input and generates synthetic data, such as images. The discriminator network is trained to distinguish between real data (from a training dataset) and fake data generated by the generator. The two networks are trained together in a competitive manner, with the generator trying to produce more realistic data to fool the discriminator, and the discriminator getting better at distinguishing real from fake. This back-and-forth training process helps the generator to progressively generate more realistic and high-quality content.



2. **VAEs (Variational Autoencoders):** VAEs are generative models that are also capable of learning from data. They consist of two main components: an encoder and a decoder. The encoder network takes input data, such as images, and compresses it into a lower-dimensional representation called a latent space or latent code. The latent code captures the essential features of the input data. The decoder network then takes a point in the latent space and reconstructs the original input data. During training, VAEs aim to learn a distribution of latent codes that can effectively generate realistic data. VAEs have the advantage of being able to generate new content by sampling from the learned latent space, allowing for controlled exploration and interpolation of data points.



3. **Autoregressive Models:** Autoregressive models are a class of generative models that generate data by modeling the conditional probability of each element in the data sequence given the previous elements. These models generate data one element at a time, with each element being conditioned on the previously generated elements. For example, in the case of text generation, an autoregressive model would predict the next word in a sentence based on the previous words. Autoregressive models can be implemented using recurrent neural networks (RNNs) or transformer models. They are effective in generating sequential data, such as text, music, or speech, and can capture long-range dependencies in the data by leveraging the context of previously generated elements.



SUMMARY:

1. GANs generate data by training a generator network to produce realistic content that can fool a discriminator network.
2. VAEs learn a compressed representation of input data and generate new content by sampling from the learned latent space.
3. Autoregressive models generate data one element at a time, conditioned on the previously generated elements, and are commonly used for sequential data generation.

POPULAR & DIVERSE APPLICATIONS

1. **Content Generation:** Generative AI is used to create new and original content in fields such as art, music, and writing. Artists, musicians, and writers can leverage generative models to inspire creativity, generate ideas, and produce unique pieces of work.

2. **Data Augmentation:** Generative AI can generate synthetic data that resembles real-world data. This synthetic data can be used to augment training datasets for machine learning models, improving their performance, and addressing data scarcity or bias issues.

3. **Image and Video Generation:** Generative models, like GANs, can generate realistic images and videos. This has applications in various domains, such as entertainment, gaming, virtual reality, and product design. For example, generative AI can be used to create lifelike virtual characters or generate synthetic visual content for virtual environments.

4. **Chatbots and Virtual Assistants:** Generative AI enables chatbots and virtual assistants to generate human-like responses in natural language conversations. This helps improve the conversational capabilities and user experience of these systems, making them more engaging and effective in assisting users.

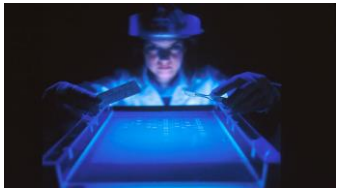
5. **Anomaly Detection:** Generative AI can be used for anomaly detection by learning the patterns of normal data and generating expectations. When new data deviates significantly from these expectations, it can be flagged as an anomaly, indicating potential fraud, cybersecurity threats, or system failures.

6. **Personalization and Recommendation Systems:** Generative AI can help create personalized recommendations by generating content tailored to individual users' preferences. For example, in e-commerce, generative AI can generate product recommendations based on a user's browsing and purchase history.

7. **Drug Discovery and Molecular Design:** Generative AI is increasingly being applied in pharmaceutical research and development. It can generate new molecular structures with desired properties, accelerating the process of drug discovery and design.

8. **Simulation and Gaming:** Generative AI is used in simulation and gaming environments to generate realistic and dynamic content. It can create virtual characters, generate natural landscapes, or simulate complex behaviors and interactions, enhancing the immersion and realism of the virtual worlds.

9. **Fashion and Design:** Generative AI can assist in fashion design by generating new clothing designs, patterns, and styles. It can help designers explore a vast range of options, streamline the design process, and create innovative fashion concepts.



ETHICAL CONSIDERATIONS

1. **Bias and Fairness:** Generative AI models are trained on vast amounts of data, and if that data is biased, it can result in biased outputs. It is crucial to address and mitigate biases in training data to ensure fairness and prevent perpetuation of existing social biases or stereotypes.

2. **Misinformation and Manipulation:** Generative AI has the potential to generate highly realistic fake content, including deepfake videos or manipulated text. This raises concerns about the spread of misinformation, forgery, and the ability to deceive or manipulate individuals and the public.

3. **Privacy and Data Protection:** Generative AI often requires large amounts of data to train effectively. Ensuring privacy and data protection is crucial to avoid the misuse or unauthorized access of personal information, as well as the potential re-identification of individuals in generated content.

4. **Intellectual Property:** Generative AI can create content that may infringe upon copyright or intellectual property rights. Balancing the need to foster creativity and innovation with respecting existing legal frameworks is an important consideration.

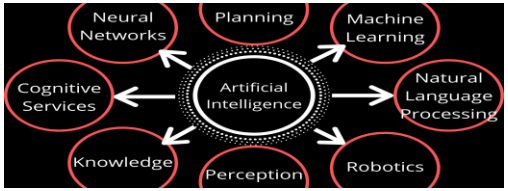
5. **Consent and Authorization:** The use of generative AI in creating or modifying content raises questions about consent and authorization. For example, using AI to generate fake reviews or endorsements without proper consent can be unethical and potentially illegal.

6. **Accountability and Transparency:** The decision-making processes within generative AI systems can be complex and opaque. Ensuring accountability and transparency in the development, deployment, and use of these systems is important to build trust and facilitate responsible AI practices.

7. **Social Impact and Accessibility:** Generative AI has the potential to impact society in various ways, including the job market, creative industries, and accessibility to technology. It is essential to consider the potential social consequences and ensure that the benefits and risks are distributed equitably.

8. **Human Responsibility and Oversight:** While generative AI systems can create content autonomously, it is crucial to emphasize human responsibility and oversight. Humans should remain accountable for the decisions made by AI systems and be involved in the development, monitoring, and regulation of generative AI technologies.

LIMITATIONS & CHALLENGES



1. **Data Dependence:** Generative AI models require large amounts of high-quality training data to produce meaningful and coherent outputs. Insufficient or biased training data can lead to suboptimal or inaccurate results.

2. **Generalization and Overfitting:** Generative AI models often struggle with generalizing beyond the training data. They may become overly focused on capturing specific patterns in the training data, resulting in overfitting and limited ability to generate diverse and novel content.

3. **Ethical Concerns:** As mentioned earlier, generative AI raises significant ethical concerns, such as the potential for bias, misinformation, privacy violations, and misuse of generated content. Addressing these ethical challenges requires careful consideration and proactive measures.

4. **Interpretability and Explainability:** Many generative AI models, such as deep neural networks, are often considered black boxes because they lack interpretability. Understanding and explaining the decision-making processes or reasoning behind the generated outputs can be challenging, limiting trust and adoption in critical applications.

5. **Control and Intention:** Generating AI systems can struggle with fine-grained control and faithfully capturing user intentions. Controlling specific attributes, styles, or generating content with precise specifications can be difficult, leading to limitations in customization and desired outputs.

6. **Computing Power and Resource Requirements:** Training and deploying generative AI models typically require substantial computational resources, including high-performance hardware and significant energy consumption. This can pose challenges for scalability, accessibility, and environmental sustainability.

7. **Adversarial Attacks:** Generative AI models can be vulnerable to adversarial attacks, where malicious actors intentionally manipulate inputs to deceive or exploit the system. Adversarial attacks can compromise the reliability and trustworthiness of generative AI outputs.

8. **Legal and Intellectual Property Issues:** The use of generative AI raises complex legal questions, particularly related to intellectual property and copyright. Determining ownership, attribution, and potential infringement of generated content can be challenging within existing legal frameworks.

9. **Robustness and Resilience:** Generative AI models may exhibit sensitivity to slight changes in input data, resulting in significant variations in the generated outputs. Ensuring robustness and resilience in generative AI systems remains an ongoing challenge.

10. **Human-AI Collaboration:** Integrating generative AI systems into human workflows and decision-making processes poses challenges in terms of collaboration, trust, and determining appropriate roles for humans and AI. Striking the right balance between human expertise and AI capabilities is crucial.

TOP TRENDS

1. **Deep Reinforcement Learning for Generative AI:** Researchers are exploring the combination of deep reinforcement learning techniques with generative models. This approach allows AI systems to learn and improve their generative capabilities through interaction with the environment, leading to more adaptive and intelligent outputs.

2. **Few-Shot and Zero-Shot Learning:** Traditional generative AI models require a large amount of labeled training data. However, recent advancements focus on developing models that can generate content with minimal or no training examples, enabling more efficient and flexible generation in scenarios with limited data availability.

3. **Multimodal Generative Models:** Multimodal generative AI models aim to generate content across multiple modalities, such as text, images, and audio. These models have the potential to create more diverse and coherent content by leveraging the correlations and interactions between different modalities.

4. **Improved Text Generation:** Text generation models have witnessed significant advancements, particularly with the development of models such as GPT (Generative Pre-trained Transformer). Continual research focuses on enhancing the coherence, contextuality, and controllability of generated text, enabling applications in natural language processing, creative writing, and conversational agents.

5. **Style Transfer and Domain Adaptation:** Generative AI models are being developed to transfer styles from one domain to another, enabling tasks like artistic style transfer in images or transforming the style of text to match a particular writing style or genre. This capability has implications for creative expression, content personalization, and data augmentation.

6. **Interactive and Co-Creative AI:** Researchers are exploring generative AI models that can actively collaborate and interact with humans in creative tasks. These models enable real-time feedback and iterative refinement, fostering a co-creative process where AI systems enhance human creativity and vice versa.

7. **Adversarial Defense and Robustness:** As generative AI models become more widely used, efforts are being made to improve their robustness against adversarial attacks. Research focuses on developing methods to detect and mitigate adversarial inputs that aim to deceive or manipulate the generative AI system.

8. **Ethical and Responsible Generative AI:** With the increasing concerns about bias, misinformation, and misuse of generative AI, there is a growing emphasis on developing ethical and responsible generative AI frameworks. Research and industry initiatives aim to address fairness, transparency, accountability, and the societal impact of generative AI technologies.

9. **Integration with Augmented Reality (AR) and Virtual Reality (VR):** Generative AI models are being integrated with AR and VR technologies to create immersive and interactive experiences. These applications range from generating realistic virtual environments to enhancing AR experiences with generated content.

10. **Edge Computing and On-Device Generative AI:** To address the challenges of scalability, privacy, and latency, there is a trend towards deploying generative AI models directly on edge devices, such as smartphones or Internet of Things (IoT) devices. This enables real-time generation without relying on cloud infrastructure and enhances privacy by keeping data on the device.

CASE USE EXAMPLES

Supply Chain Optimization - Demand Forecasting

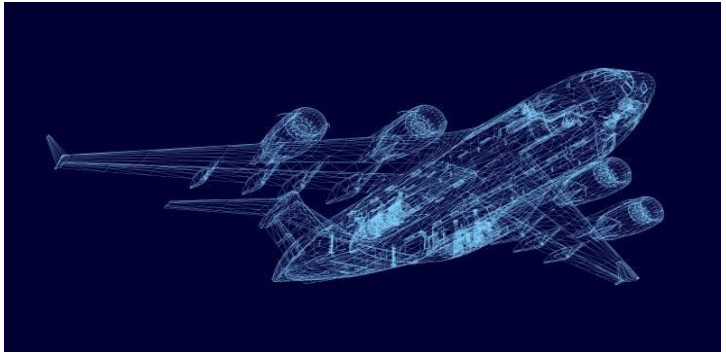
Problem: A large retail chain struggles with forecasting demand for its products, leading to issues with inventory management, stockouts, and excess inventory. Traditional forecasting methods are not effective in capturing complex patterns and dynamic changes in consumer behavior.

Actions using Generative AI: The retail chain utilizes Generative Adversarial Networks (GANs) to generate synthetic data based on historical sales, market trends, and external factors like weather and promotions. The generative model learns the underlying patterns and fluctuations in demand.

Value Solutions:

1. Accurate Demand Forecasting: Generative AI helps the company accurately predict future demand, considering both historical data and external factors. This enables better inventory planning, reducing stockouts and excess inventory while improving customer satisfaction.
2. Scenario Analysis and Risk Mitigation: By leveraging generative AI, the retail chain can simulate different scenarios and assess the potential impact on demand. This allows them to proactively adjust their supply chain strategies, mitigate risks, and optimize operations.

CASE USE EXAMPLES



Advanced Manufacturing - Product Design Optimization

Problem: An advanced manufacturing company aims to optimize the design of a complex product, such as an aircraft engine, while considering multiple performance criteria and constraints. Traditional design approaches are time-consuming, costly, and often yield suboptimal results.

Actions using Generative AI: The company utilizes generative AI techniques, such as generative design algorithms, to explore a wide range of design possibilities. By inputting constraints and performance criteria into the generative model, it generates innovative designs that meet requirements and constraints.

Value Solutions:

1. Faster and Efficient Design Iterations: Generative AI enables rapid exploration of design alternatives, automating the iterative process. The company can quickly evaluate numerous design variations, saving time and resources compared to manual design iterations.
2. Optimal Design Solutions: Generative AI helps identify design configurations that maximize performance while satisfying constraints. This leads to improved product performance, reduced material waste, and enhanced manufacturing efficiency.

REFERENCE MATERIAL

GENERATIVE AI TOOLS

Sampler

AI CHAT AND SEARCH

- **ChatGPT:** Conversational AI trained on a large set of text from 2021 and earlier. Free, but priority costs $20 per month to speed up responses and use during peak demand.
- **The new Bing:** ChatGPT-based conversations and search results inside Bing. Limited beta requires joining a waitlist.
- **Perplexity.ai:** Ask questions and follow-ups, get direct responses with citations. Free to use with no limitations.
- **YouChat:** Ask questions and follow-ups, and engage in ChatGPT-style conversations. Free; sign-in required.
- **NeevaAI:** Get direct, AI-generated responses with citations, followed by standard search results. Free; sign-in required.
- **Poe:** Conversational AI from Quora that includes multiple assistants with differing strengths. Free; currently iPhone only.

Reference: FAST COMPANY Article, 02/27/2023

GENERATIVE AI TOOLS

Sampler

AI ARTWORK GENERATORS

- **Stable Diffusion Online:** Free Stable Diffusion artwork generator; no login required.
- **El Pintador:** Free Stable Diffusion artwork generator for iOS with a “Learn” section that provides prompt crafting advice.
- **DiffusionBee:** Stable Diffusion artwork generator for MacOS, works offline with no usage limits.
- **Craiyon:** Online artwork generator that uses the Dall-E Mini model. Removing watermarks requires a $5-per-month subscription.
- **Dall-E:** Create up to 15 free images per month with OpenAI’s image-generation tool.
- **Nvidia Canvas:** Windows software that turns brushstrokes into artwork. Requires an Nvidia RTX graphics card.
- **Playform:** Online app that turns sketches into artwork. Free to try, but requires paid credits to download watermark-free images.

Reference: FAST COMPANY Article, 02/27/2023

GENERATIVE AI TOOLS

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AI WRITING TOOLS

- **PicsArt AI Writer:** Generate marketing copy, slogans, product descriptions, LinkedIn headlines, Instagram captions, and more. Free.
- **NotionAI:** Use prompts to create text inside any Notion document, activated by pressing Space on a new line. Free for up to 20 prompts, then $10 per month.
- Chatbot tools like ChatGPT, YouChat, and Poe can be used to generate copy as well.

AI CONTENT SUMMARIZERS

- **Eightify:** Create text summaries of YouTube videos, with highlights you can click on to jump to the relevant video section. Up to three free summaries per week (on videos less than an hour and with more than 30,000 views), then pay as you go.
- **Summarize.tech:** Another YouTube summarizer. Less in-depth than Eightify, but with no usage limits.
- **Gimme Summary:** Chrome extension for summarizing web articles, seemingly works by asking ChatGPT to condense the article content. Free to use, but slow.
- **SkimIt.ai:** Email an article link to go@skimit.ai, get a summary in 10 minutes.
- **WordTune Read:** View article and PDF summaries next to the full text, with excerpts highlighted. Three free summaries per month, then $120 per year.
- **OtterPilot:** Feature of the Otter meeting assistant that transcribes and summarizes video calls. Free for up to 30 minutes per call and 300 transcription minutes per month, then $17 per month.
- **Sonoteller.ai**: Paste a link to a song on YouTube, get an analysis of its lyrical content, instrumentation, genres, and moods. Free to use.

Reference: FAST COMPANY Article, 02/27/2023

GENERATIVE AI TOOLS
Sampler

AI SPEECH-TO-TEXT TRANSCRIPTIONS

- **Whisper:** Online transcription of audio files using language models from OpenAI. Free.
- **Buzz:** Offline version of Whisper for Windows, free unlimited use.
- **MacWhisper:** Offline version of Whisper for Mac. Pay what you want, or $14 for larger language models and translation.

AI VISUAL EDITORS

- **Runway:** Photo and video editor with an array of AI tools, including green screen, image expansion, and 3D texture creation. Free with limitations on export resolution and AI tool use, then $15 per month.
- **Genmo:** Turn still images into animations using text prompts. Free with usage limits.

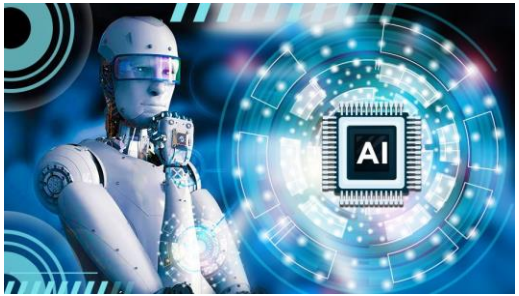
AI AUDIO TOOLS

- **Eleven Labs:** Generate speech from text, free for up to 10,000 characters of text per month. A $5-per-month subscription lets users clone an existing voice.
- **Riffusion:** Generate music from text descriptions using Stable Diffusion. Free.
- **Boomy:** Generate music tracks by specifying the genre, instruments, and production values. Free.
- **Beatoven:** Create music by specifying the genre and mood. Free to use with up to 15 minutes of monthly downloads, then $20 per month.

Reference: FASTCOMPANY ARTICLE, 02/27/2023

TOP AI TRADE JOURNALS TO EXPLORE !

- **AI Magazine** - AI Magazine is a publication of the Association for the Advancement of Artificial Intelligence (AAAI). It covers a broad range of topics in AI, including research, applications, and societal implications. Web address: https://www.aaai.org/Magazine/magazine.php
- **IEEE Intelligent Systems** - IEEE Intelligent Systems is a publication of the Institute of Electrical and Electronics Engineers (IEEE). It covers topics in AI, including intelligent systems, machine learning, and natural language processing. Web address: https://www.computer.org/csdl/magazine/ex
- **Journal of Machine Learning Research** - The Journal of Machine Learning Research is a peer-reviewed publication that covers research in machine learning and related fields, including statistics, computer vision, and natural language processing. Web address: https://www.jmlr.org/
- **Neural Computing and Applications** - Neural Computing and Applications is a publication that covers the theory, design, and applications of neural networks and related fields, including deep learning and cognitive computing. Web address: https://www.springer.com/journal/521
- **AI Trends** - AI Trends is a publication that covers the latest trends in AI, including research, applications, and business use cases. It covers a broad range of topics, including machine learning, robotics, and natural language processing. Web address: https://www.aitrends.com/
- **ACM Transactions on Intelligent Systems and Technology** - ACM Transactions on Intelligent Systems and Technology is a peer-reviewed publication that covers research in intelligent systems and related fields, including machine learning, natural language processing, and computer vision. Web address: https://dl.acm.org/journal/tist
- **Machine Learning** - Machine Learning is a peer-reviewed publication that covers research in machine learning and related fields, including statistics, computer vision, and natural language processing. Web address: https://www.springer.com/journal/10994

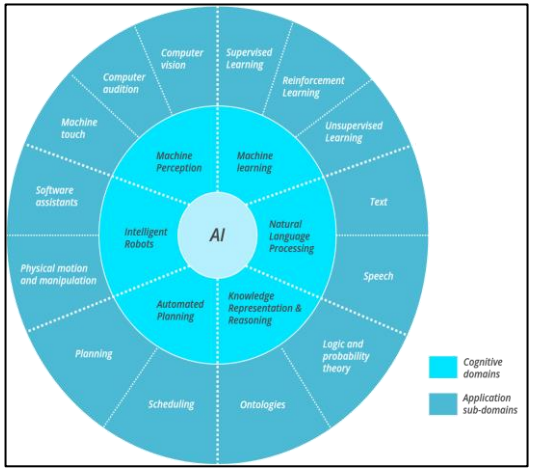


5 KEY TAKE AWAYS ABOUT GEN AI

1. Generative AI is a type of artificial intelligence that can create new content, such as text, images, and music.
2. Generative AI is often used to create realistic and creative content that can be used in a variety of applications, such as marketing, entertainment, and education.
3. Generative AI is still under development, but it has the potential to revolutionize the way we create and consume content.
4. Generative AI can be used for both good and bad purposes, so it is important to be aware of its potential risks.
5. **It is important to use generative AI responsibly and ethically.**

THINK THE AI OPPORTUNITIES FOR YOUR ORGANIZATION

- **AI-powered customer analytics** for optimizing products, services, and marketing strategies.
- **Predictive analytics** for demand forecasting, identifying sales opportunities, and optimizing pricing strategies.
- **NLP** (Natural Language Processing) for automating and streamlining customer communication channels.
- **Automated decision-making systems** for data-driven decision-making.
- **Sentiment analysis** for gauging customer satisfaction and sentiment towards the brand.
- **RPA (Robotic Process Automation)** for automating routine and repetitive tasks.
- **Knowledge management systems** for organizing and managing knowledge assets.



John R. Choate

John started his Supply Chain – Manufacturing – Technology/Innovation career journey after college in combat/support units as a USAF Global Logistics-Transportation/Data System officer. 1st in USAF history to be career certified as a Logistics-Transportation Data Systems SME.

In the commercial/private sector, he was fortunate to be in OEM/EMS companies, On/Near/Off Shore from IPO to global public Corporations that were leaders and innovators in all areas of Business, Supply Chain & Advanced-Digital Manufacturing, using Hardware/Software Innovation as an enabler. Some Examples:

- Advanced planning and business systems, cell automation and process manufacturing in Telecommunications Industry/Fiber Optics. Startup to captured world market. Validated "Class A" Advanced-Digital manufacturing facility. Case study in Harvard Business Review.
- 3D simulation modeling for automated line flow and integrated cell line manufacturing in F16 modernized component Factories. Benchmark for Aerospace/Defense Industry.
- Set up & managed "World Class" Lean Six Sigma SMT/Box Advanced Supply Chain- Advanced Manufacturing operations, On, Near and Off shore. IPO to $780M global public EMS corporation in 10 countries in 3 years. 36 months of consecutive profitability ,100% on-time delivery, and quality. Co-Author NPI Handbook.
- Augmented Reality development and implementation in unprofitable Mobile Telecommunications R&D unit. Turnaround & full profitable SBU in parent global corporation.
- Predictive analytics and agile methodology to optimize processes and reduce inventory $50M over 1000 dealerships, 5 DC's, and 3 factories. Agriculture/Automotive Industries.
- Global NPI/demand-supply integrated planning system & integrated SAP ERP for Medical Device SBU growing 15% per quarter. No missed 72 hour JIT surgeries in 2 years.
- Robotic cell automation for NASA certified laser welding cell in Advanced Medical Device Manufacturing facilities for increased product and patient safety.
- Digital warehouse in top Retail/Distribution global corporation for increased personnel productivity, inventory accuracy, and quality.

Customer and business goals 1st, but use innovative hardware and software solutions for "VALUE" solutions to increase customer service, revenue/profit, new product introduction/manufacturability, and team productivity/efficiency.

John is currently Project Lead, LTTS LLC, Supply Chain-Advanced/Digital Manufacturing Management. He has a EMBA from Pepperdine University, MS from Troy State University , and BS from Washington State University. Certified Digital Scrum Master (CSM). Active in Phoenix community thru participation in ASCM, ASQ, ISM, PMI and SCORE.

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May 22, 2023

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