Annai Hajira Women's College

Melapalayam, Tirunelveli – 05

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(A Unit of As-Sathiq Educational Society)
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Business Analytics with AI

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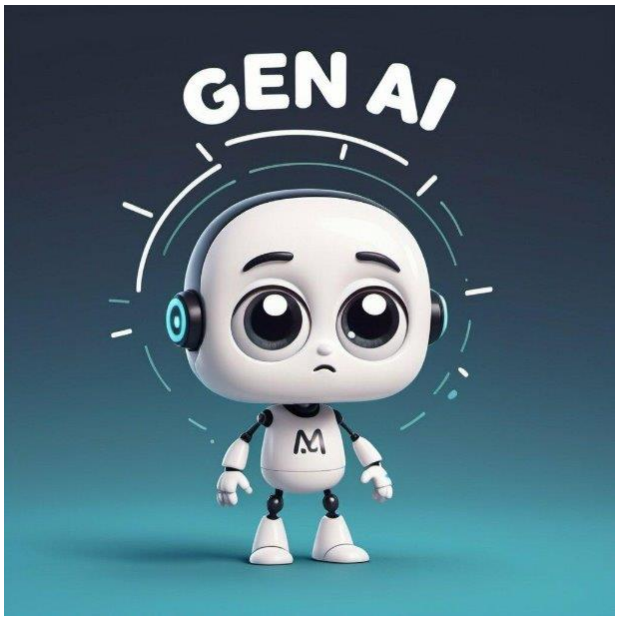
AI and Gen AI

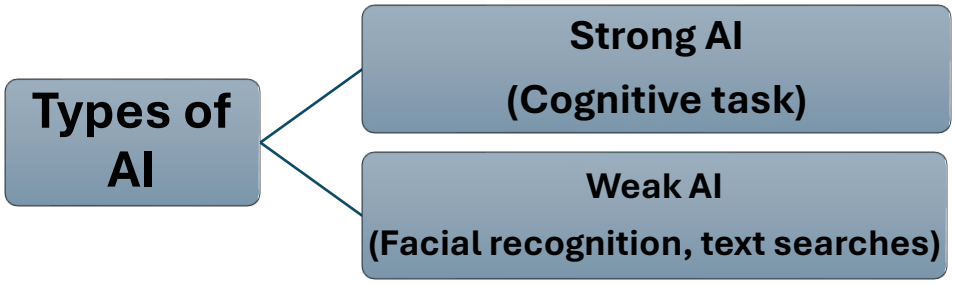


Contents

Module 1: Introduction to Artificial Intelligence

1. **Overview of Artificial Intelligence**
    - **What is AI?**
      AI (Artificial Intelligence), is the branch of computer science that aims to answer Turing's question from 1950: "Can machines think?".
    - **Why AI?**
      AI enables machines to perform tasks that normally require human intelligence.
        1. This includes things like recognizing speech, making decisions, and translating languages, etc.
        2. To achieve this, scientists use algorithms and vast amounts of data to train computers. Think of it as teaching a child through examples.
2. **Types of AI**
    - Is AI the ultimate tool that will enhance human capabilities? Or does it pose risks that we are yet to fully understand?
        1. AI changes the way we live and work, and it opens up a new frontier in our quest for innovation.
        2. As we continue to integrate AI into our lives, it is essential to guide its development with careful thought, considering ethical implications and societal impacts.

    Two types of AI are
        1. Weak AI
        2. Strong AI



2. AI related terminologies - ML

- Imagine a world where machines can learn from experience, adapt to new situations, and perform human-like tasks.
- This isn't just science fiction; it's the reality of Machine Learning, or ML, a core component of artificial intelligence.

- Think of machine learning as teaching a child to ride a bike. At first, the child wobbles and might even fall. But each attempt is a learning experience. Over time, the child adapts and masters balancing, steering, and pedaling.
- Similarly, machine learning allows computers to learn and make decisions from data — ML uses algorithms that can process, analyze, and learn from data.

- Here's how ML works:

  You feed data into the algorithm. This could be anything from images, numbers, or words. The algorithm makes predictions based on this data. Initially, its predictions may be off. But, just like the child on the bike, it learns from mistakes.
- Basically, ML involves a feedback loop. When the algorithm makes a mistake, it adjusts its calculations to improve future predictions.
- Over time, with more data and adjustments, the algorithm becomes more accurate and efficient at its task.

  For instance, a spam filter in your email, learns to identify and block unwanted emails better over time, and a chatbot learns from various interactions to provide better responses.

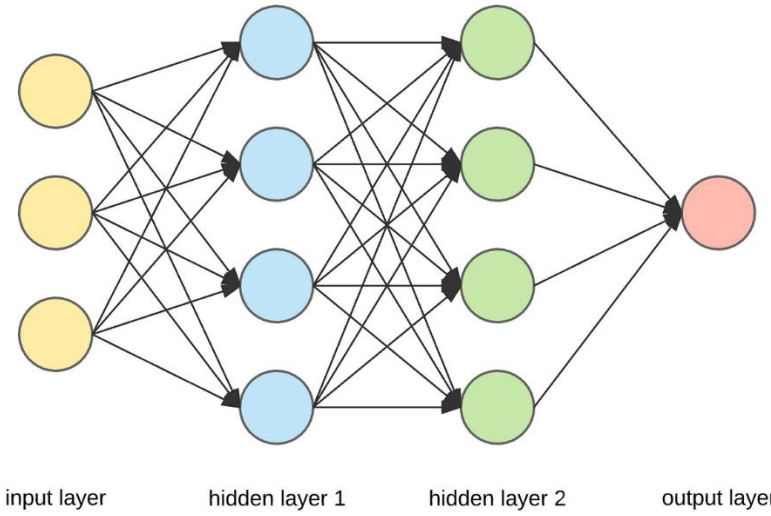
ML can be broadly classified into three main types:

- **Supervised Learning**: This involves training a model on a labeled dataset, the model learns to produce the correct output from the given inputs. For example, email classification, fraud detection, performance prediction, medical diagnosis etc.
- **Unsupervised Learning**: In this case, the model tries to learn patterns and structures from data without any explicit instructions on what outputs are desired. Example, Market Basket Analysis, anomaly detection in cybersecurity, Social network analysis.
- **Semi-supervised and Few-shot Learning**: These are techniques that use both labeled and unlabeled data to improve learning efficiency and effectiveness. Some of the real-world examples include text classification, sentiment analysis, image classification, Satellite imagery analysis.

3. AI related terminologies - DL

- Deep Learning (DL) mimics the way human brains operate, using structures called neural networks.
- Imagine the human brain as a complex network of neurons, each making tiny decisions based on the inputs it receives.

- Neurons are replaced with nodes, and the connections between them with weights and biases. These nodes are arranged in layers—input layers, hidden layers, and an output layer.



- The process begins at the input layer, where the model receives raw data—be it images, sound, or text. As this data travels through each hidden layer, the model adjusts the weights, which are essentially the importance assigned to different features of the data.
- Through a process called training, the network adjusts these weights based on the feedback it gets in terms of errors in its predictions.
- This training involves a massive amount of data and is facilitated by a technique called backpropagation, which fine-tunes the weights to minimize error.
- Each hidden layer in the network transforms the inputs into more abstract and composite representations. For example, when processing an image, the first layer might recognize edges, the next layer shapes, and further layers might identify textures and complex objects like faces or trees.
- By the time the data reaches the output layer, the deep learning model has a sophisticated understanding of what it's analyzing. This allows it to make highly accurate predictions or decisions based on what it has learned.

Module 2: Generative AI

1. ***What is GEN AI***

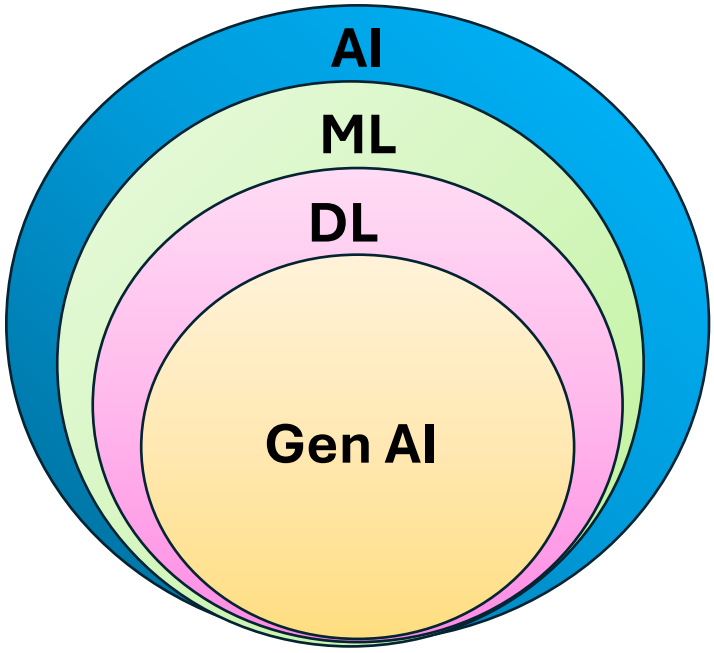
Gen AI – Buzz word

Foundational reasons for the introduction of Generative AI.

1. Advances in Deep learning
2. Abundance of training data
3. Enhanced Computing power

- Historically, artificial intelligence was tasked with understanding the world as it is — analyzing data, recognizing patterns, and making decisions.
- But as technology progressed, a new possibility emerged —
- What if AI could not just analyze, but also create?
- What if it could generate new content, not just understand existing content?
- What if it could respond to our suggestions and regenerate the content?
- What if it could provide suggestions for further exploration on top of the responses?

Generative AI was introduced as a response to all these questions



- Generative AI was introduced as a response to all these questions. At its core, the technology is designed to mimic human creativity, to generate new data that resembles the training data, be it in text, images, music, or even ideas. Developments in Deep learning applied on abundant data allows models to learn from diverse sources and generate novel outputs. Powerful GPUs accelerate the model trainings.

- One of the fundamental breakthroughs in generative AI is the creation of Generative Adversarial Networks (GANs) in 2014 by an American computer. It is an unsupervised machine learning algorithm that engages two neural networks that are in competition with each other. One network is a generative model that generates content and the other is discriminative that tries to figure out whether it is an authentic sample or not.
- Another breakthrough in generative AI and in the development of NLP was the introduction of GPT (Generative Pre-trained Transformer) models. In 2018, the first version of GPT was created by OpenAI. GPT is a large language model built using a transformer algorithm that is trained in a self-supervised mode on a heap of textual data from the Internet. The model performs a language modeling task, i.e. predicts the next word (or part of a word) given the previous context. In 2023, GPT 4 was released, capable of generating up to 25,000 words of text, which is a significant improvement over previous versions.

1. **Generative AI**

Generative AI is designed to mimic human creativity, to generate new data that resembles the training data, be it in text, images, music, or even ideas.

- Developments in Deep learning applied on abundant data allows models to learn from diverse sources and generate novel outputs. Powerful GPUs accelerate the model trainings.
- Subset of DL, a type of artificial intelligence techniques.
- Shift from AI systems that understand the world, to AI systems that help reimagine.
- Focus on creating new content, in the form of images, text, music, etc.
- Opens the door to co-creation between humans and machines
- Enhance human creativity
- Offer new tools to artists, designers, and writers.
- Push the boundaries of what's possible in creative fields.
- Catalyst for transformative changes.
- Redefine the landscape of creation and collaboration.

In industries like Oil, Gas, Power, Entertainment, Automotive, and healthcare etc., the ability to generate new, tailored content is sure to ascertain better efficiency, innovation, and personalization.

Sample Image created using Gen AI Tool

2. **Generative AI Fundamentals**
    - One of the fundamental breakthrough in generative AI is creation of Generative Adversarial Networks (GAN), 2014.
        - This is an unsupervised Machine Learning algorithm that involves two neural networks which are in competition with one other.
        - One network is generative model to generate content, and another one is discriminative which tries to determine whether the generated content is an authentic content or not.
    - Another breakthrough in Gen AI and the development of NLP was GPT (Generative Pre-trained Transformer) models.
        - The first version of GPT was created in 2018, by OpenAI. GPT is a Large Language Model (LLM) built using transformer algorithm which is trained in self-supervised mode on heap of textual data extracted from the Internet.
        - The model performs language modeling task, which predicts the next part of word based on the previous context.
3. **How Generative AI works?**

Generative AI is a branch of artificial intelligence that focuses on generating new content, such as images, videos, music, or text, that mimics human creativity. Unlike traditional AI models that rely on predefined rules and structures, generative AI models learn from vast amounts of data to create new and original outputs."

Generative AI works by utilizing advanced deep learning models, primarily based on neural networks, to generate content that resembles human-created data. Let's delve into the underlying mechanisms.

I. Training Data: Generative AI models require a substantial amount of training data to learn from. This data can be in the form of images, text, or any other type of content that the model aims to generate.
II. Neural Networks: Deep neural networks are the foundational component of generative AI models. These networks consist of multiple layers of interconnected nodes, or artificial neurons. Each layer processes the input data and progressively learns more complex patterns, allowing the model to generate more sophisticated outputs.
III. Generative Adversarial Networks (GANs): One popular approach in generative AI is the use of Generative Adversarial Networks, or GANs. GANs consist of two neural networks: **a generator network** and **a discriminator network**. The generator network creates the content, and the discriminator network evaluates and provides feedback on the generated content.
IV. Training Process: During the training process, the generator network initially produces random outputs that are passed to the discriminator network. The discriminator then

evaluates these outputs and provides feedback to the generator regarding their authenticity. This feedback helps the generator improve its outputs over time.

V. Feedback Loop: As training progresses, the generator network keeps producing outputs, and the discriminator network continues to evaluate them. This iterative process creates a feedback loop that helps the model refine its understanding of the desired content and generate more accurate, realistic, and creative outputs.

4. Applications of Gen AI

Generative AI has a wide range of applications across various industries. Let's explore a few examples.

Image Generation: Generative AI models can create realistic images, such as human faces, landscapes, or even artwork, that are virtually indistinguishable from real images.

Music Composition: By learning from large music databases, generative AI models can compose original pieces of music in different genres, imitating the style of famous musicians.

Text Generation: Generative AI can also be used to generate human-like text, such as writing articles, poems, or even dialogues for conversational agents.

While generative AI offers exciting possibilities, there are also ethical considerations to keep in mind.

Data Bias: "Generative AI models learn from existing data, which means they can inherit any biases present in the training data. It is essential to ensure that the training data is diverse and representative to avoid perpetuating biases in the generated content."

Misuse and Manipulation: "Generative AI models can be used to create deepfake content or maliciously generate false information. It is crucial to have robust safeguards and policies in place to prevent misuse and manipulation.

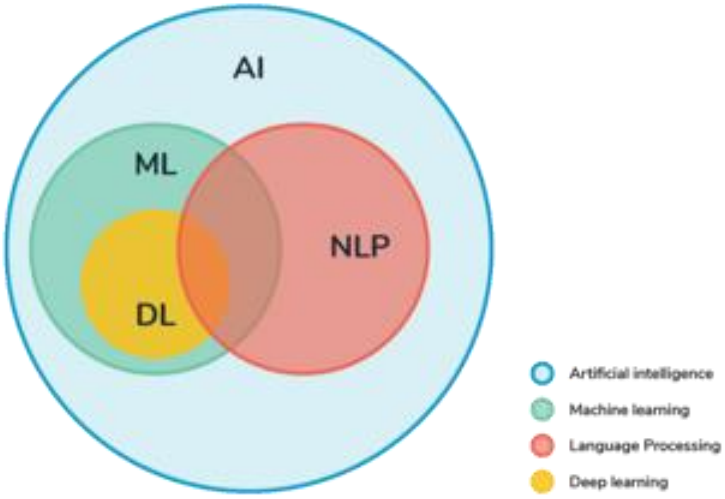
In conclusion, Generative AI is revolutionizing the field of artificial intelligence by enabling machines to generate creative and original content. By harnessing the power of deep learning and neural networks, generative AI models can create images, music, and text that closely resemble human creations.

Understanding how generative AI works and its applications can help us leverage its potential while being mindful of the ethical considerations involved. As the field continues to advance, we can expect generative AI to shape various industries and redefine creativity.

Module 3: Natural Language Processing (NLP)

Natural Language Processing (NLP) is a field of artificial intelligence that focuses on enabling machines to understand, interpret, and generate human language. It involves the interaction between computers and human languages, allowing machines to process, analyze, and respond to text or speech.

At its core, NLP uses algorithms to allow computers to process, understand, and generate human language in a way that is valuable. It's about bridging the human-computer communication gap.



1. **Key concepts of NLP**
   - Tokenization: Break down a text into smaller units, such as words or phrases, to facilitate analysis.
   - Part-of-Speech Tagging: Assign grammatical categories (e.g., noun, verb, adjective) to each word in a sentence
   - Named Entity Recognition (NER): Identify and classify entities in text, like names of people, places, organizations, etc.
   - Sentiment Analysis: Determine the sentiment or emotion expressed in a piece of text (positive, negative, neutral).
   - Machine Translation: Automatic translation of text from one language to another.
   - Chatbots and Conversational AI: AI-driven programs that interact with humans in a natural manner

1. Tokenization

Text being split into sentences, then words

This process involves dividing text into sentences, phrases, or words, called tokens. These tokens help the machine to understand the structure of the language and prepare the data for further processing.

Example: Tokenizing "She sells seashells on the seashore"

In this sentence, using a basic tokenization approach like whitespace or punctuation-based tokenization would typically result in the tokens:
She
Sells
Seashells
On
The
seashore
2. Part-of-Speech Tagging : Next is Part-of-Speech Tagging. Each token is assigned a part of speech, such as noun, verb, or adjective, based on its definition and context. This step is crucial for the subsequent parsing and helps in understanding grammatical structures. Example sentence tokens are tagged as below:

1. **She** - stands for "Personal Pronoun." Personal pronouns are used to substitute for specific nouns mentioned earlier in the text, which are usually the names of people or things that are being talked about. They help in avoiding repetition in speech and writing. Examples: "He," "she," "it," "they," "me," "you," "us“

2. **Sells** - VBZ (Verb, 3rd Person Singular Present) VBZ is the tag used for a verb in the third person singular present tense. This form of the verb often ends in -s or -es, conforming to the grammatical rules of subject-verb agreement in English. Examples: "Runs," "speaks," "causes," "tries“
3. **Seashells** - NNS (Noun, Plural) NNS stands for "Noun, Plural." This tag is used for nouns that denote more than one person, place, thing, or idea. It is crucial for identifying subjects or objects in a sentence that are plural. Examples: - "Cars," "children," "women," "computers“
4. **On** - IN Preposition or Subordinating Conjunction. IN tags are used for words that are prepositions, showing relationships between other words, or subordinating conjunctions, which connect clauses in a way that makes one clause dependent on the other. Examples: "in", "on", "at", "between", "with"
5. **The** – DT Determiner, DT tags are used for determiners, which modify nouns to indicate reference to something specific or something of a particular type. Examples: "the", "a", "an", "this", "that", "these", "those", "my", "your", "his", "her", "its", "our", "their"
6. **Seashore** NN - Noun, Singular or Mass, NN tags are used for common nouns that are either in singular form or uncountable mass nouns. Examples: - "dog", "city", "coffee", "information", "music", "rice"

3. Named Entity Recognition (NER) involves identifying important named entities in the text—like names of people, places, organizations, or dates. This information can be crucial for understanding the meaning of a text or for categorizing content.

For Example: I have a flight to **New York** at **5pm**, in this sentence “New York” and “5pm” are used for NER

4. Sentiment Analysis, this is used to detect the sentiment of a text—be it positive, negative, or neutral. This technology is widely used in monitoring social media, market research, and customer service to gauge public opinion.

5. Machine Translation, this is another vital area of NLP. It’s the automatic translation of text from one language to another. With advancements in AI, these translations are becoming more accurate and contextually appropriate.

6. Chatbots and Conversational AI: These are AI-driven programs that can interact with humans in a natural manner, used widely in customer service and personal assistants.

Module 4: Large Language Model (LLM)

Understanding LLM

- LLM is a specialized ML model that concentrates on Natural Language Processing (NLP).
- ChatGPT is one example of LLM application
- LLMs are used in chatbots, language translation, summarization, report generation etc..
- They "understand" context and produce relevant responses through
    - Self-Attention Mechanism (Transformer Architecture)
    - Positional encoding
    - Autoregressive decoding
    - Context window
    - Fine-Tuning on specific tasks

Lets explore one of the major contributing component of Generative AI, Large Language Models, or LLMs. Though both are interconnected, each plays a unique role in how machines understand and interact with the world. Lets delve into these technologies to uncover their capabilities and how they are reshaping industries.

LLMs are advanced AI systems designed to understand, generate, and interact with human language in a way that is both profound and nuanced. These models are trained on vast datasets of text from the internet, books, and other media to learn the intricacies of language.

Through their training, LLMs can compose text that is not only coherent but also contextually appropriate, whether it's drafting an article, creating poetry, or even coding software. The potential is immense, from enhancing communication tools to revolutionizing content creation.

While LLMs focus specifically on text and language processing, Generative AI spans a wider array of media, pushing the boundaries of what AI can create. Both are powerful tools, but their applications differ based on their capabilities and the type of content they generate.

Large Language Models (LLMs) handle context in text generation through sophisticated mechanisms that allow them to understand and incorporate context from previous words or sentences. Here are some ways they achieve this:

1. **Self-Attention Mechanism (Transformer Architecture)**:
   - LLMs, such as the popular **Transformer** architecture, use self-attention mechanisms to weigh the importance of each word in a sentence relative to others.
   - By attending to relevant words, the model captures context dependencies effectively.
   - Self-attention allows the model to consider the entire input sequence simultaneously, enabling it to understand context across long distances.
2. **Positional Encoding**:
   - Since LLMs don't inherently understand word order, they incorporate positional information using positional encodings.
   - These encodings provide a way for the model to differentiate between words based on their position in the sequence.
   - Positional encodings are added to the word embeddings before feeding them into the model.
3. **Autoregressive Decoding**:
   - During text generation, LLMs generate one word at a time, conditioned on the previously generated words.
   - The model maintains an internal state (hidden representation) that encodes the context from previous tokens.
   - Autoregressive decoding ensures that the generated output aligns with the context provided by earlier tokens.
4. **Context Window**:
   - LLMs have a limited context window due to computational constraints.
   - For very long sequences, the model may lose some distant context.
   - However, the self-attention mechanism helps mitigate this limitation by allowing the model to attend to relevant context even beyond the immediate window.
5. **Fine-Tuning on Specific Tasks**:
   - LLMs are pretrained on massive amounts of text data, but they need fine-tuning for specific tasks.
   - During fine-tuning, the model learns task-specific context and adapts its understanding accordingly.

In summary, LLMs use a combination of attention mechanisms, positional encodings, autoregressive decoding, and fine-tuning to handle context effectively during text generation. These techniques enable them to produce coherent and contextually relevant output based on the input context

Module 5: Fascinating AI Models

Generative Pre-trained Transformer (GPT)

GPT-3 is a powerful language model developed by OpenAI, an AI research and deployment company.

It excels in natural language understanding and generation.

Capabilities:

1. Text Generation
2. Task Instructions
3. Adaptability
4. Continuous Learning

Example: ChatGPT, powered by GPT-3, is an application of this technology

GPT-4 is the next iteration of the GPT series, developed by OpenAI. It builds upon the success of GPT-3

Capabilities:

1. Enhanced Context Understanding.
2. Fine-Tuning
3. State-of-the-Art Performance

   Example: DALL·E 3, which incorporates GPT-4, further advances text-to-image generation.

Generative Pre-trained Transformer (GPT)

GPT-3 is a powerful language model developed by OpenAI. It excels in natural language understanding and generation.

Capabilities:

- Text Generation: GPT-3 generates coherent and contextually relevant text.
- Task Instructions: It can perform various text generation tasks based on instructions.
- Adaptability: GPT-3 adapts to different contexts and scenarios.
- Continuous Learning: It improves with more data and interactions.

  Example: ChatGPT, powered by GPT-3, is an application of this technology

1. **GPT-4 (Generative Pre-trained Transformer 4)**:
   - **Definition**: GPT-4 is the next iteration of the GPT series, developed by OpenAI. It builds upon the success of GPT-3.
   - **Capabilities**:
     - **Enhanced Context Understanding**: GPT-4 improves context handling and understanding.
     - **Fine-Tuning**: It fine-tunes for specific tasks, making it versatile.
     - **State-of-the-Art Performance**: GPT-4 is one of the best Large Language Models (LLMs) available.

- **Example**: DALL·E 3, which incorporates GPT-4, further advances text-to-image generation.

In summary, DALL·E focuses on image synthesis from text, GPT-3 excels in language understanding, and GPT-4 enhances context processing and performance. These models represent exciting advancements in AI research and applications.

DALL-E 3

DALL·E is an impressive neural network developed by OpenAI that creates images from text captions. It can generate a wide range of visual concepts based on natural language descriptions.

Prompt used:

Generate colorful image depicting oil, gas and power sector operations. includes elements such as oil rigs, gas pipelines, power plants, and wind turbines, along with workers in safety gear.

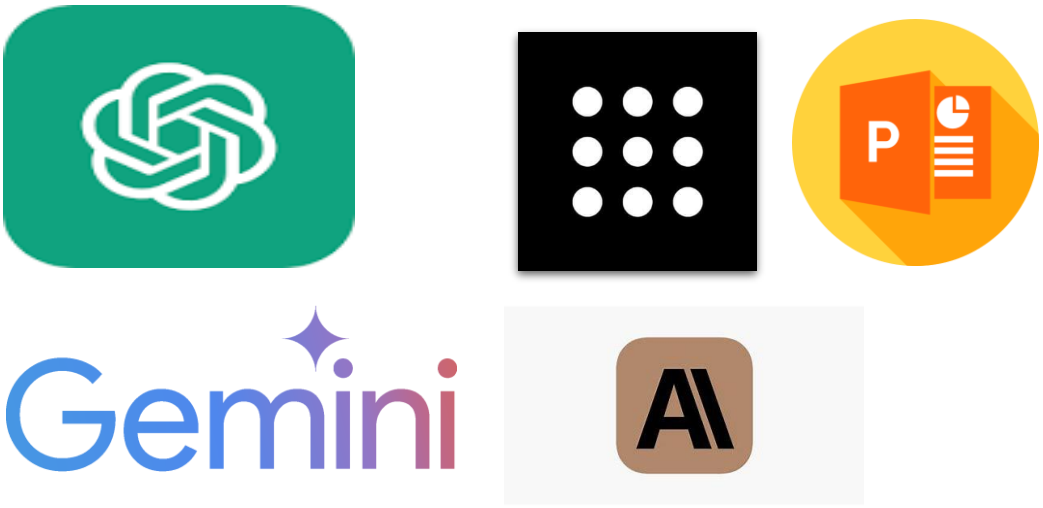
- DALL·E is an impressive neural network developed by OpenAI that creates images from text captions. It can generate a wide range of visual concepts based on natural language descriptions.
- **Capabilities**:
  - **Image Synthesis**: DALL·E generates images from scratch using textual prompts.
  - **Anthropomorphism**: It can create anthropomorphized versions of animals and objects.
  - **Concept Combination**: DALL·E combines unrelated concepts in plausible ways.
  - **Text Rendering**: It renders text within images.
  - **Image Transformations**: It applies transformations to existing images.
  - **Architecture**: DALL·E is a 12-billion parameter version of GPT-3, trained on a dataset of text–image pairs

Example Prompts:

- "An illustration of a baby daikon radish in a tutu walking a dog."
- "An armchair in the shape of an avocado."
- "A store front with the word 'openai' written on it."
- "The exact same cat as a sketch on the top and a photograph on the bottom."

Module 6: Introduction to Prompts

A prompt is a set of instructions or input provided to an AI model to generate a response.
Act as a bridge between human users and AI systems.
Shapes the way AI processes and generates information.
Associate role in prompts, to harness the full potential of AI models to obtain desired outcomes and insights across various applications.
The art and science of crafting prompts that guide AI models to produce desired outputs is referred to as "Prompt Engineering".
Popular Gen AI tools are ChatGPT, Gemini, Claude AI, Perplexity etc.



1. **Prompting Techniques**
   - **Key blocks to follow while prompting**
     - Role
     - Need
     - Task
     - Details
     - Do / Do not
     - Format

Additional thumb rule for prompting - **ASK**

1. **Action** - Explain what you want the tool to do
2. **Style** - Describe the format you want the response presented in
3. **Key details** - Set the stage with more context about your situation.

2. **Examples of prompt based interactions**

Language Translation:
Prompt: "Translate the following English text into French: 'Hello, how are you today?'"
Output: The AI responds with the translated text, "Bonjour, comment ça va aujourd'hui ?"

Code Generation:
Prompt: "Write a Python function that calculates the factorial of a given number."
Output: The AI generates a Python function that computes the factorial of a number as per the given prompt.

Content Summarization:
Prompt: "Summarize the key points of the article on climate change provided below."
Output: Gen AI tool produces a concise summary of the article's main ideas and findings. Article can be pasted or uploaded (within organization policy)

Conversational Agents:
User Prompt: "Can you tell about current weather condition and prediction for next 3 hrs at my location"
AI Response: The AI accesses weather data and provides a real-time weather forecast for New York City.

3. Importance of Crafting Effective Prompts

Effective prompts are essential for obtaining the desired results from AI models. Here are key reasons why crafting effective prompts is crucial.

Attribute	Description	Example
Clarity of Intent	Clear and well-structured prompts communicate your intent to the AI model effectively. Ambiguous or vague prompts can lead to unpredictable or irrelevant outputs. Crafting a precise prompt ensures the AI understands your request.	**Ineffective**: "Tell me about the weather." **Effective**: "Provide a 7-day weather forecast for San Francisco."
Controlling Output Style	Crafting prompts allows you to control the style, tone, or format of the AI-generated content. You can instruct the AI to mimic a specific writing style, such as formal, casual, or technical.	**Ineffective**: "Write a poem about an animal." **Effective**: "Write a humorous poem about cats."
Mitigating Bias and Ethical Concerns	Crafting prompts thoughtfully can help mitigate potential biases in AI-generated content. By framing prompts in an unbiased and ethical manner, you can promote fair and responsible AI interactions.	**Ineffective:** "Describe the typical characteristics of a criminal." **Effective**: "Provide an objective overview of factors contributing to criminal behavior."
Clarity and Precision	Prompts should be concise and unambiguous. Avoid vague language or jargon that might confuse the AI model.	**Ineffective**: **Ineffective:** "Tell me about the latest trends." **Effective**: "Provide a summary of the top fashion trends for 2024".
Contextual Information	Include context when necessary to guide the AI's response. Specify relevant details or constraints to narrow down the focus.	**Ineffective**: "Write a recipe for cookies." **Effective**: "Write a recipe for chocolate chip cookies, including the ingredients and baking instructions."
Iterative Refinement	Experimenting with different prompts allows you to refine and improve the AI's responses over time. You can iterate on prompts based on the AI's previous outputs to achieve the desired results.	**Initial Prompt**: "Explain the concept of quantum entanglement." **Output**: The AI provides a basic explanation. **Revised Prompt**: "Provide a more in-depth explanation of quantum entanglement, including its implications in quantum physics."

Module 7: Prompting Techniques

Action	Description	Prompt example
Initiating Interaction	Prompts serve as the initial input that users provide to Gen AI tool. They act as conversation starters or requests for specific tasks, setting the context for the AI's response.	"Assume you are an energy sector blogger....."
Defining Task	Instruct the tool on what task or action is expected. Whether it's generating text, translating languages, coding, summarizing content, or answering questions, the prompt conveys the user's intent.	"Assume you are an energy sector blogger, provide a blog post on renewable energy resources ....."
Setting Boundaries	Define boundaries for the GEN AI tool's response. We can specify word limits, request a summary, or ask for content in a particular format, helping users get the information they need efficiently.	"Assume you are an energy sector blogger, provide a blog post on renewable energy resources in 2 paragraphs of 100 words each, ..."
Controlling Style and Tone	Users can use prompts to guide the style, tone, or voice of the AI-generated content. Whether it should be formal, informal, humorous, or technical, the prompt can steer the AI's output accordingly.	**"Assume you are an** energy sector blogger, provide a blog post on renewable energy resources in 2 paragraphs of 100 words each, **include technical aspects for the energy resources mentioned ....."**
Customization	Prompts enable customization to suit specific needs. Whether it's tailoring a news article summary, adjusting the complexity of a code generation task, or fine-tuning the details of a story, prompts allow users to personalize interactions.	"Assume you are an energy sector blogger, provide a blog post on renewable energy resources in 2 paragraphs of 100 words each, include technical aspects for the energy resources mentioned, **provide a tabular column of energy resources used, benefits and its global availability".**

Action	Description	Prompt example
Filtering Biases	Thoughtful prompts help mitigate biases in AI responses. By framing requests in a neutral and unbiased manner, users can reduce the risk of AI-generated content that reflects or amplifies societal biases.	
Iterative Refinement	Users can iterate and refine prompts based on the AI's initial responses. If the output doesn't meet expectations, users can modify the prompt to provide clearer instructions or narrow down the focus.	
Enhancing Productivity	In professional contexts, prompts can enhance productivity by quickly generating content, summary, quotes, or answers to common questions, saving time and effort..	
Problem Solving	For technical or complex problem-solving tasks, prompts can be used to present AI models with specific challenges, encouraging creative solutions or in-depth analyses.	
Adapting to User Feedback	Gen AI models can learn from user feedback on prompts. If users consistently refine their prompts for better results, Gen AI tools will adapt and improve over time through continuous learning.	
Navigating Ethical Concerns	Prompts can be crafted with ethical considerations in mind. By framing requests responsibly, users can help ensure AI-generated content aligns with ethical guidelines and avoids harm.	
Enhancing User Experience	Effective prompts lead to more accurate and relevant AI responses, ultimately enhancing the overall user experience and satisfaction when interacting with AI models.	

1. Open-ended Prompts

Definition: An open-ended prompt is a type of question or instruction that does not have a predetermined answer and allows for a wide range of responses. It encourages exploration, creativity, and critical thinking, as it does not constrain the respondent to a specific direction or outcome.

Applications: useful in the early stages of exploration, where broad analysis and innovative thinking are needed. They help in generating ideas, exploring different scenarios, and considering multiple factors that could influence the outcome.

Example Prompt: "Describe the various factors that could influence the success of a hydrocarbon exploration project in a new offshore basin

More example prompts

- **Exploration Strategy:** "What are the potential challenges and opportunities in implementing a new drilling technology in a mature hydrocarbon field?"
- **Risk Assessment:** "How can geological and market risks be balanced when planning a new hydrocarbon extraction project?"
- **Sustainability Considerations:** "Discuss the impact of carbon capture technologies on the future of hydrocarbon extraction and their role in reducing the environmental footprint."
- **Innovation in Exploration:** "How might advances in AI and machine learning transform the process of hydrocarbon exploration and reservoir management?"

2. Close-ended Prompts

Definition: A close-ended prompt is a type of question or instruction that has a limited set of possible responses, often yes/no or multiple-choice answers. It is designed to gather specific information and typically requires a direct and concise answer.

Application: More effective during the decision-making process, where specific information is required to move forward. They are used to confirm hypotheses, validate data, and make clear, actionable decisions based on known variables.

Example Prompt: "Is the identified reservoir in the target area primarily composed of sandstone? (Yes/No)"

Practical Application

1. **Practice prompts for the following tasks:**
2. **Write a poem about a flower.**
3. **Write a short story about a robot.**
4. **Generate a code snippet to reverse a string.**
5. **Translate this sentence from English to Spanish.**
6. **Translate this paragraph from French to German.**
7. **Translate this document from Chinese to Japanese.**
8. **Scenario: Content Generation**

   Challenge: Design a prompt for generating a blog post about sustainable fashion trends.
9. **Scenario: News Summary**

   Challenge: Develop a prompt for summarizing the latest developments in renewable energy research.
10. **Develop a video on energy efficiency**