Generative AI Foundations

Instructor Resources

Generative AI Foundations

Enter Dates

Instructor Information

Instructor	**Email**	**Office Location & Hours**
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General Information

Description

Unlock the potential of Generative AI with a comprehensive introduction to cutting-edge AI technologies. This course equips you with the skills and knowledge needed to thrive in the rapidly evolving field of artificial intelligence. It covers everything from understanding the differences between Generative AI and other types of AI to exploring the models that drive text, image, and video generation.

You'll be guided through the core methodologies behind Generative AI models, from transformers to GANs, gaining a deeper understanding of how they generate text, images, audio, and more.

In addition to foundational knowledge, you'll master prompt engineering, learning to craft, refine, and optimize prompts to elicit specific outputs for various tasks. The course also covers the practical applications of these tools in real-world scenarios, from creating content to transforming media formats.

Beyond technical proficiency, this course emphasizes the ethical and societal implications of Generative AI. You'll explore key concerns such as data privacy, intellectual property, and the potential biases that AI systems can introduce.

Whether you're just starting out, curious to expand your expertise to stay ahead in an AI-driven future, or aiming to understand the broader impact of these technologies, this course provides a solid foundation to help you succeed in both professional and creative contexts as AI continues to transform industries.

Course Objectives

This course teaches the skills you will need to successfully complete the Generative AI Foundations certification offered by Certiport. These skill sets are introduced using multiple types of exercises and review materials.

After completing this course, you will understand the following:

- Understand Core Generative AI Concepts: Explore essential AI methods, including transformers, GANs, and diffusion models, and how they produce outputs like text, images, video, and audio.
- Master Basic Prompt Engineering: Learn how to create and modify effective prompts to generate and transform content, tailoring outputs for specific tasks and media formats.
- Refine Prompt Techniques: Improve prompt clarity and precision using common strategies, such as zero-shot and few-shot prompting, for more accurate and targeted AI responses.
- Recognize Ethical and Societal Impacts: Understand key ethical considerations, such as bias, data privacy, and legal implications, and explore the broader societal impacts of AI use in various fields.

Expectations and Goals

Upon completion of this course, learners are expected to complete the Generative AI Foundations certification exam. This certification exam validates that the candidate has a fundamental understanding of generative AI, its applications in both personal and professional contexts, and the responsible and ethical management of this technology. It also establishes a foundational skill set that candidates can build upon in the future. To learn more about the Generative AI Foundations certification, visit CCS Generative AI Foundations Certification: Critical Career Skills: Certiport (pearsonvue.com)

Certifications provide significant advantages to professional and job candidates. These include:

- Higher grade point average for certified high school students
- Higher graduation rates for certified high school students
- Increased post-secondary enrollment
- Reduced dropout rates

Additional information: **The value of certification**

Course Materials

Required materials
• XperienceED account

• Computing Device

• Internet Connection

Optional materials
• Headset

Schedule

Dates	Unit
	Unit 1: Methods
	Unit 2: Prompt Engineering
	Unit 3: Prompt Refinement
	Unit 4: Ethics

Course Structure

The course is structured to learn by doing, practice the learned skill, then apply the skills.

- Unit
  - Lesson
    - Learn Tasks
    - Practice Exercises
    - Practice Questions
  - Objective Assessment
  - Create Project

Each unit contains lessons. The lessons are introduced by lesson topics where you can learn through doing or learn through study materials (eBook, QuickDeck or QuickClip). Each lesson concludes with a Practice Exercise that incorporates the tasks you have learned throughout the lesson. Once you have completed the lessons in the unit, you are assessed through a question-based Objective Assessment and a Create Project.

Weights and Grading

Add your course weight and grading here

Additional information and resources

Add a subheading

Add text.

Instructor Overview

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Delivery

The course is created so it can be customized to meet the needs of the instructor and the learner.

- **Direct Instruction:** Utilize the PowerPoint presentations to introduce each lesson topic, then have the learners review the study materials and complete the task.

- **Flipped Classroom:** Learners complete online lessons outside of class time. Learners utilize the class time to discuss learned tasks, allow learners to teach concepts, expand concepts through learning stations, and work on unit extension or unplugged activities.

- **Learner-Centered Approach:** Use the prescriptive learning model so learners can focus on new skills and skip the skills they already know. Learners can work at their own pace on their own schedule to complete the course. Instructors support learners by utilizing the answer keys to identify struggles and guide learners through the solutions.

Differentiation

- **Study Materials:** Study materials are available in eBook, QuickDeck and QuickClip format. Each study material provides the same concepts and allows the learners to choose the modality that best fits their learning style. The eBook introduces concepts in bite-sized readings. QuickDecks display materials in a flashcard format. QuickClips provide a video and audio-based clip.

- **Course Progression:** Learners can complete the learn task to demonstrate understanding before reviewing the study materials or they can review one or all the study materials before attempting the learn tasks.

- **Grouping:** Create groups for different learning levels or styles. Customize each group setting to best meet the needs of the learners.

- Provide struggling learners with answer keys to follow step-by-step instructions to complete tasks and exercises.

- Encourage learners to showcase their newly learned skills by creating additional real-world projects, teach others how and why to use new skills, and explore beyond their learning.

Prepare for Delivery

- Begin with the unit overview to understand the structure and flow of the unit, the topics covered, the approximate time to complete and the exam objectives reviewed.

- Review the lesson PowerPoint presentation to give you an in-depth look at each lesson topic and the comprehensive topic notes included.

- Review the answer keys to familiarize yourself with the tasks learners will complete throughout the lesson.

- Complete the lesson.

Instructor Resources Overview

Instructor Resources File Structure	🗁 Instructor Resources
	📄 Course Syllabus
	📄 Course Overview
	📄 Course Key Terms
	📄 Course Instructor Guide
	🗁 Unit
	🗁 Unit Assessment Answer Keys
	📄 Create Project
	📄 Objective Assessment
	🗁 Lesson
	🗁 Answer Keys
	📄 Lesson Practice Exercises
	📄 Learn Tasks
	📄 Lesson Practice Questions
	🗁 Study Guides
	📄 Study Guide Complete
	📄 Study Guide Fill-In Explanation
	📄 Study Guide Fill-In Topic
	📄 Lesson PowerPoint Presentations
	🗁 Unplugged Activities
	📄 Unit Overview
	📄 Unit Learning Plan
	📄 Unit Key Terms
Unit Assessment Answer Keys	Each unit includes two types of assessments for learners to apply their knowledge.

	• **Create Project -** These are project prompts and sample solution files. Create projects also include "show me" videos for learner reference. You have the option to enable/disable this feature. • **Objective Assessment -** A comprehensive question and answer-based assessment for the unit. Objective Assessments include "show solution" for learner reference. You have the option to enable/disable this feature.
Answer Keys	Documents containing answers, step-by-step instructions, and correct answers for Instructor reference or to offer additional support material for learners. • **Learn Tasks -** Each lesson topic includes an opportunity to apply what they have just learned in-app or by answering questions. Learn Tasks also include "show me" videos and "show solution" for learner reference. • **Lesson Practice Exercises -** End of lesson in-app or scenario-based assessment. Lesson Practice Exercises also include "show solution" videos for learner reference. You have the option to enable/disable this feature. • **Lesson Practice Questions -** End of lesson question-based assessment. Lesson Practice Questions also include "show solution" for learner reference. You have the option to enable/disable this feature.
Study Guides	Printable and customizable study guides mapped to lesson topics and exam objectives are provided in three formats. • **Complete -** This version includes the topic and the explanation. • **Fill-In Topic -** Learners can fill in the topics as they learn or as a review. • **Fill-In Explanation -** This allows learners to complete the explanation of each lesson topic in their own words and images.
Unit Learning Plan	Customizable unit learning plan outlining the objectives and topics covered, essential questions, learning targets, methods and materials, extension activities, formative and summative assessments, mapping to STEAM, Work Readiness, 5 C's, and Bloom's Taxonomy Levels.
Lesson PowerPoint	A PowerPoint Presentation that complements the lesson. Each lesson topic is included in the presentation as well as comprehensive speaker notes.
Unplugged Activities	A variety of activities and necessary resources to get learners off the computers while still reinforcing unit learning objectives.
Unit Key Terms	A comprehensive list of key terms throughout the unit.
Unit Overview	A spreadsheet containing the overview of the flow of the unit that includes lesson topics, certification objectives mapping, and approximate timings for self-paced and instructor-led scenarios.

Generative AI Foundations Learning Plan

Unit 1: Methods

Instructor:	Class:	Duration: 7-13 hours

Unit Objectives:
Learners will acquire the knowledge, understanding, and skills necessary for the basic concepts, processes, and tools of generative AI to practical use.

Essential Questions:
- What distinguishes generative AI from other types of AI, like predictive or analytical AI?
- How does generative AI differ from search engines in generating outputs?
- What processes do generative AI models use to create text and images?
- Why do large language models require so much data for training?
- How are image models trained using text-image pairs?
- What are the energy and computational demands of training generative AI?
- What are inputs and outputs?
- What input types can generative AI models process?
- How can generative AI be customized for specific tasks?
- What should you consider when choosing an AI tool for a task?
- What are the main limitations of generative AI?
- How can rapid AI advancements make previous work obsolete?

Learning Targets:
I will explore different types of generative AI models and tools
So I can understand their processes, applications, and limitations.
I know I succeeded when I can effectively select and customize the appropriate AI tool for a specific task, recognize the potential biases and limitations in AI outputs, and explain how generative AI differs from other tools.

Methods and Materials:	Formative Assessments:	Summative Assessments:
- Lectures - Reading - Videos - Hand-on activities - Creating - Analyzing - Discussing - Teaching	- Learn Tasks - Practice Questions - Practice Exercises	- Objective Assessment - Create Project

STEAM	Work Readiness	5 C's	Blooms Level
☒ Science ☒ Technology ☒ Engineering ☒ Art ☒ Math	☒ Communication ☒ Problem-solving ☒ Teamwork ☒ Work ethic ☒ Empathy ☒ Conflict resolution ☒ Active listening ☒ Time management ☒ Adaptability	☒ Critical Thinking ☒ Creativity ☒ Communication ☒ Collaboration ☒ Citizenship	☒ Remembering ☒ Understanding ☒ Applying ☒ Analyzing ☒ Evaluating ☒ Creating

☒ Reading		
☒ Mathematics		

Learning Activities

Lesson	Time Allowed	Content
Lesson 1: Types of AI	60-130 minutes	• Artificial Intelligence • Generative AI • Predictive AI • Discriminative AI • Analytical AI • Statistical AI • AI vs. Search Engines
Lesson 2: Processes	70-160 minutes	• Text Models • Image Models • Large Language Models • Diffusion • Transformer • Variational Autoencoders • Generative Adversarial Networks • Convolutional Neural Networks • Model Training
Lesson 3: Input and Output	55-115 minutes	• Understand Input and Output • Inputs • Outputs • Customization • AI Tools • Select a Tool
Lesson 4: Tools and Systems	80-190 minutes	• Conversational Models • ChatGPT • Microsoft Copilot • Google Gemini • Meta AI • Adobe Express • Claude • Microsoft Azure AI Studio • Stable Diffusion • DALL-E • Adobe Firefly
Lesson 5: Limitations	55-115 minutes	• Reliability • Tech Requirements • Privacy • Lack of Standards • Consistency • Obsolescence

Warm-Up Activities

1. Brainstorm and list as many different types of inputs (text, images, audio) and outputs (generated images, text, video) as you can think of.
2. Think about the last time you used AI and what you used it for. Share your experience with the group. If you have never used AI before, explain why.
3. Predict the next big development in AI. Think creatively: What do you think AI will be able to accomplish in the future? Share your prediction with the group.
4. Participate in short discussions related to the following questions:
   - Is it fair to use AI to complete a homework assignment? Why or why not?
   - Do you think AI is as intelligent as a human? Defend your position.
   - What are your biggest fears or worries about AI?

Extension Activities

1. Create a portfolio for the course. Portfolios should include evidence of work, reflect on learned skills and how you can incorporate the skills in a current or future project. This is an ongoing extension activity. Continue to add to the portfolio throughout the course.
2. Select one topic learned throughout the unit then create an instructional video, tutorial, lecture, or hands-on activity to teach others about the skill.
3. Create a meme related to AI using online tools or drawing. Share the memes with the group and discuss what they reveal about perceptions of AI.
4. Use a tool like DALL-E or Adobe Firefly to generate an original artwork based on a theme of your choice. Share your artwork and your experience of making it with the group.
5. Write one page analyzing a real-world application of generative AI, such as deepfakes or AI-generated music. Explore the benefits, challenges, and ethical considerations associated with the case.
6. Create a marketing campaign for an imaginary product of your choice using generative AI tools to develop slogans, images, and promotional materials. Present your campaign to the group, explaining how AI was integrated into the process.

Unit Evaluation and Reflection

What went well	What needs to change

Unit 1 Lesson 1 Learn Tasks

OD	OD Description	Lesson Topic	Assessment Details	Answer Key
1.1	Define Generative AI	Artificial Intelligence	Which of the following tasks can artificial intelligence perform? a) Visual Perception b) Speech Recognition c) Decision-Making d) All of the options	a) Visual Perception b) Speech Recognition c) Decision-Making **d) All of the options (correct)** Explanation: AI refers to the development of computer systems that can perform tasks that typically require human intelligence such as visual perception, speech recognition, decision-making, and language translation.
			What type of AI is designed to perform any intellectual task that a human can do? a) Narrow AI b) Artificial General Intelligence (AGI) c) Machine Learning d) Predictive AI	a) Narrow AI **b) Artificial General Intelligence (AGI) (correct)** c) Machine Learning d) Predictive AI Explanation: AGI is a type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI.
			Narrow AI is capable of performing a wide range of tasks similar to human intelligence. • True • False	• True • **False (correct)** Explanation: Narrow AI is designed for specific tasks, not for a wide range of intellectual tasks.
			True/False: Artificial intelligence can only be used in the technology sector. • True • False	• True • **False (correct)** Explanation: AI has applications across multiple industries, including healthcare, finance, and entertainment.
			Match the terms to their correct definitions. a) Automation b) Data Analysis c) Personalization d) Algorithm _____A process assisted by AI tools, whereby information is examined and interpreted to extract	**Data Analysis (correct)** A process assisted by AI tools, whereby information is interpreted to extract useful insights **Automation (correct)** A way to use technology powered by AI, to perform tasks without human intervention **Algorithm (correct)** A set of instructions an AI system is

OD	OD Description	Lesson Topic	Assessment Details	Answer Key
			useful facts and insights	programmed with, to help it learn and make decisions
			_____A way to use technology powered by AI, to perform tasks without human intervention _____A set of instructions an AI system is programmed with, to help it learn and make decisions _____A process whereby services or content is modified according to individual preferences, sometimes using AI	**Personalization (correct)** A process whereby services or content is modified according to individual preferences, sometimes using AI
1.1	Define Generative AI	Generative AI	What is the primary focus of generative AI? a) To predict future events b) To analyze data sets c) To create a variety of content formats d) To classify information	a) To predict future events b) To analyze data sets c) **To create a variety of content formats (correct)** d) To classify information Explanation: The focus of generative AI is on creating new content such as text, images, and music.
			Generative AI produces content that is always original and reliable. • True • False	• True • **False (correct)** Explanation: Generative AI can sometimes create unreliable or unoriginal content.
			On what type of content is generative AI trained? a) Human-Generated Content b) Historical Data c) Statistical Models d) Unlabeled Information	a) **Human-Generated Content (correct)** b) Historical Data c) Statistical Models d) Unlabeled Information Explanation: Generative AI learns by analyzing existing human-generated content.
1.1	Define Generative AI	Predictive AI	Predictive AI is primarily used to: a) Generate new data or images b) Forecast trends or future events c) Sort existing data into categories and labels d) Create content for entertainment and social media	a) Generate new data or images b) **Forecast trends or future events (correct)** c) Sort existing data into categories and labels d) Create content for entertainment and social media Explanation: Predictive AI focuses on forecasting future

OD	OD Description	Lesson Topic	Assessment Details	Answer Key
				events based on historical data.
			Which of the following is often used in predictive modeling? a) Image Recognition b) Generative Algorithms c) Sentiment Analysis d) Regression Analysis	a) Image Recognition b) Generative Algorithms c) Sentiment Analysis **d) Regression Analysis (correct)** Explanation: Predictive models use various algorithms, including regression analysis, to estimate the likelihood of future events.
			Fill in the blanks with the correct words. Regression analysis is a _____ process for estimating the relationships among variables, often used in _____ modeling. • Numerical • Statistical • Predictive • Generative	Regression analysis is a **statistical (correct)** process for estimating the relationships among variables, often used in **predictive (correct)** modeling. Explanation: In contrast to generative AI, which creates new data, predictive AI focuses on interpreting existing data to provide predictions.
1.1	Define Generative AI	Discriminative AI	What is the primary function of discriminative AI? a) To create new media content b) To distinguish between data categories c) To predict future events d) To generate new data models	a) To create new media content **b) To distinguish between data categories (correct)** c) To predict future events d) To generate new data models Explanation: Discriminative AI focuses on classifying data by distinguishing between different categories or classes within a dataset.
			In which of the following tasks is discriminative AI most likely used? a) Image Recognition b) Music Composition c) Trend Prediction d) Text Generation	**a) Image Recognition (correct)** b) Music Composition c) Trend Prediction d) Text Generation Explanation: Discriminative AI is commonly used in image recognition to classify objects or elements within an image.

OD	OD Description	Lesson Topic	Assessment Details	Answer Key
			Match the terms to the AI function with its task. a) Classification b) Sentiment Analysis c) Spam Detection _____Identify malicious emails from legitimate messages _____Determine the emotional tone expressed in an article _____Predict the category of a given data point	**Spam Detection (correct)** Identify malicious emails from legitimate messages **Sentiment Analysis (correct)** Determine the emotional tone expressed in an article **Classification (correct)** Predict the category of a given data point
1.1	Define Generative AI	Analytical AI	What is analytical AI used for most? a) To create new content for social media b) To distinguish between categories of images c) To process complex data to extract insights d) To predict future events from historical data	a) To create new content for social media b) To distinguish between categories of images **c) To process complex data to extract insights (correct)** d) To predict future events from historical data Explanation: Analytical AI is designed to process and interpret large and complex datasets to provide actionable insights.
			Which industry will most likely benefit from analytical AI? a) Healthcare b) Music c) Marketing d) Manufacturing	**a) Healthcare (correct)** b) Music c) Marketing d) Manufacturing Explanation: AI-powered analytics can identify significant trends and patterns in healthcare data which can aid physicians and researchers in making informed decisions.
			Analytical AI is essential for making data-driven decisions in fields like finance. • True • False	• **True (correct)** • False Explanation: These systems are commonly used in fields such as finance, healthcare, and business intelligence.
			Information not organized in a pre-defined manner is often called structured data. • True • False	• True • **False (correct)** Explanation: Unstructured data makes it difficult to analyze the information using traditional data processing methods.

OD	OD Description	Lesson Topic	Assessment Details	Answer Key
1.1	Define Generative AI	Statistical AI	What is statistical AI primarily based on? a) Understanding uncertainty through probability and statistical models b) Predicting future events using regression analysis and large data sets c) Generating content like text or images based on text prompts	**a) Understanding uncertainty through probability and statistical models (correct)** b) Predicting future events using regression analysis and large data sets c) Generating content like text or images based on text prompts Explanation: Statistical AI relies on statistical methods and probability theory to make decisions and predictions.
			Which of the following best describes probability? a) The study of cause-and-effect relationships b) The prediction of future events with certainty c) The measure of the likelihood of an event occurring d) The analysis of deterministic systems	a) The study of cause-and-effect relationships b) The prediction of future events with certainty **c) The measure of the likelihood of an event occurring (correct)** d) The analysis of deterministic systems Explanation: Probability theory is a branch of mathematics that deals with the analysis and interpretation of random events.
			Data variability is the extent to which points in a set differ from each other, indicating diversity or inconsistency within the set. • True • False	• **True (correct)** • False Explanation: Statistical AI focuses on data variability to process and classify data.
1.1	Define Generative AI	AI vs. Search Engines	What is the primary difference between AI and search engines? a) Search engines retrieve information, while AI can understand, generate, and analyze it b) Search engines are advanced, while AI uses basic algorithms c) Search engines need powerful GPUs to function, while AI is mobile app based	**a) Search engines retrieve information, while AI can understand, generate, and analyze it (correct)** b) Search engines are advanced, while AI uses basic algorithms c) Search engines need powerful GPUs to function, while AI is mobile app based Explanation: While both AI and search engines deal with

OD	OD Description	Lesson Topic	Assessment Details	Answer Key
				large volumes of information, AI offers more sophisticated capabilities. Search engines primarily retrieve and rank relevant information, while AI can understand, generate, and analyze information, providing more complex responses and performing tasks.
			Match the terms to their correct definitions. a) Query b) Relevance Ranking c) Integration d) Google e) Search Engine _____A software system that finds information from a database in response to user inquiries _____A search engine that retrieves and indexes vast amounts of information from web queries _____A request for information submitted to a search engine _____A combination of various systems, tools, or data sources to work together seamlessly _____A system of organization that sorts search results based on how well they match with the query	**Search Engine (correct)** A software system that finds information from a database in response to user inquiries **Google (correct)** A search engine that retrieves and indexes vast amounts of information from web queries **Query (correct)** A request for information submitted to a search engine **Integration (correct)** A combination of various systems, tools, or data sources to work together seamlessly **Relevance Ranking (correct)** A system of organization that sorts search results based on how well they match with the query
			AI can perform more sophisticated tasks than traditional search engines. • True • False	• **True (correct)** • False Explanation: AI can perform complex tasks, such as understanding natural language, generating creative content, and making decisions based on data analysis.

Unit 1 Lesson 1 Practice Exercise

Bernadette, an archaeologist at the Natural History Museum, is passionate about preserving ancient artifacts and unraveling the stories of lost civilizations. Recently, Bernadette has been tasked with integrating cutting-edge AI tools to enhance research capabilities, analyze artifact data, and create engaging exhibits for museum visitors. As this is new territory for her, Bernadette must carefully choose the right AI tools for the job.

1) What should Bernadette consider first when selecting an AI tool for the museum's research and exhibit needs?
   a) Using an AI tool that generates virtual exhibits for visitors
   b) Understanding the museum's specific research goals (correct)
   c) Choosing an AI tool to predict when the museum will receive the most visitors

   Explanation: Identifying the target audience and the specific goal of the museum is foundational, as this information will guide all subsequent decisions from content creation to distribution.

After consulting with the museum directors, Bernadette learns that the museum's primary goal is improving artifact analysis by leveraging data from previous archaeological digs. Thereafter, creating interactive experiences for visitors using AI-generated content will need to be addressed. With this knowledge, Bernadette must choose which type of AI tool will be the most suitable to achieve the first goal.

2) Given the museum's goals, which AI tool should Bernadette investigate further?
   a) Generative AI
   b) **Predictive AI (correct)**
   c) Statistical AI

   Explanation: Predictive AI can be used to analyze historical data and predict future trends or outcomes. This would be beneficial for the museum's goal of improving artifact analysis by identifying potential new archaeological sites or trends based on past discoveries.

Bernadette turns her focus to predictive AI to help the museum plan future archaeological digs by analyzing historical data from previous digs.

3) What is the most important factor Bernadette should consider when using predictive AI to improve artifact analysis?
   a) **The accuracy of the historical data used to train the AI model (correct)**
   b) The ability of the AI model to generate creative content
   c) The speed at which the AI model can process data

   Explanation: The quality of the data is crucial for the AI model to make accurate predictions.

Next, Bernadette decides to explore and implement generative AI to digitally reconstruct artifacts for virtual displays.

4) What is a potential outcome Bernadette should be aware of when using generative AI for digital reconstructions?
    a) **The AI might generate inaccurate or unreliable content (correct)**
    b) The AI will automatically produce historically accurate content
    c) The AI will limit the creative interpretation of historical artifacts

    Explanation: Generative AI can produce inaccurate reconstructions if not carefully monitored. Bernadette will need to work closely with historians and other archaeologists to ensure the digital models are accurate.

Bernadette has successfully implemented both generative AI for digital reconstructions and predictive AI for archaeological trend analysis. Now, as part of the museum's future strategy, she's comparing the capabilities of AI tools with traditional systems like search engines, which the museum staff uses to retrieve academic papers and historical data.

5) How does AI differ from traditional search engines in its function?
    a) AI retrieves information accurately, while search engines may make retrieval mistakes
    b) AI generates input that can be used in search engines, while search engines generate text outputs
    c) **AI analyzes data and generates new content, while search engines retrieve existing information (correct)**

    Explanation: AI systems can analyze data, generate new content, and make decisions, while search engines retrieve pre-existing information based on user queries.

Congratulations! Bernadette's journey into AI integration at the Natural History Museum has been a success. By implementing both generative and predictive AI tools, she has not only enhanced the museum's ability to digitally recreate ancient artifacts but also improved the museum's strategic approach to archaeological research. Thanks to Bernadette's careful planning and execution, the museum is now at the forefront of blending ancient history with cutting-edge technology.

Unit 1 Lesson 1 Practice Questions

Chappel, a renowned graphic designer at the prestigious advertising agency Brandtopia, wants to elevate her creative output. She stumbles on groundbreaking AI-powered software capable of generating unique visuals for marketing campaigns, social media content, and product packaging. Intrigued by the potential, Chappel delves into the realm of generative AI, eager to harness its capabilities for creating innovative and eye-catching designs that resonate with her clients. To stay ahead of the curve, she also explores predictive AI tools that can forecast emerging design trends, ensuring her work remains at the forefront of the industry.

1) What is the purpose of Chapell's use of generative AI?
   a) To predict future design trends based on statistical data
   b) **To generate designs with input prompts (correct)**
   c) To analyze client feedback from online meeting notes
   d) To translate branding into other languages

   Explanation: Generative AI is designed to create new content by learning patterns from existing data. In Chappel's case, she will generate design images based on the text prompts she inputs.

2) How will predictive AI benefit Chapell?
   a) By automating client communications
   b) By generating invoices for her projects
   c) **By forecasting possible design trends (correct)**
   d) By creating social media posts

   Explanation: Predictive AI analyzes historical and current data to predict future outcomes. Chapell will use predictive AI to anticipate what styles or themes will become popular and tailor her work accordingly.

3) Which of the following best describes artificial intelligence?
   a) Human intelligence demonstrated in robots
   b) Computers running without any human input
   c) Software that only performs calculations
   d) **Machines mimicking cognitive functions (correct)**

   Explanation: Artificial Intelligence involves machines mimicking human cognitive functions such as learning, reasoning, and problem-solving. It enables computers to perform tasks that typically require human intelligence.

4) Generative AI can help Chappel create original designs by learning from existing data.
   - **True (correct)**
   - False

   Explanation: Generative AI models learn patterns from existing datasets and use this knowledge to generate new, original content. This capability allows Chappel to create unique designs based on learned patterns from previous works.

5) Predictive AI is mostly used for real-time language translation.
   - True
   - **False (correct)**

   Explanation: Predictive AI is specifically used to forecast future events or trends by analyzing current and historical data.

6) Match the terms to their correct descriptions.
   a) Predictive AI
   b) Discriminative AI
   c) Generative AI

   Generative AI (correct) Creates new data or content by learning from existing patterns
   Predictive AI (correct) Forecasts future outcomes or trends

Lionel is developing a new search engine that aims to deliver more accurate results to users searching for antique shops. He incorporates discriminative AI to filter out irrelevant information. By using analytical AI, he can interpret complex data patterns to understand user behavior. Lionel also integrates statistical AI methods to improve the efficiency of search algorithms.

1) What role does discriminative AI play in Lionel's search engine?
   a) Generating new web content
   b) **Distinguishing relevant search results from irrelevant ones (correct)**
   c) Predicting future search queries
   d) Translating languages

   Explanation: Discriminative AI is used to classify or differentiate between categories of data. In a search engine, it filters out irrelevant results, ensuring users receive accurate and pertinent information.

2) How will analytical AI assist Lionel's project?
   a) By creating visual graphics
   b) By storing large amounts of data
   c) By securing the search engine against cyber threats
   d) **By analyzing data to gain insights into user preferences (correct)**

   Explanation: Analytical AI processes complex datasets to extract meaningful patterns and insights. In Lionel's search engine, it analyzes user behavior to improve search result relevance and personalization.

3) In what way does an AI-powered search engine differ from traditional search engines?
   a) **It offers personalized and more accurate search results (correct)**
   b) It operates slower due to complex computations
   c) It works with voice commands
   d) It ignores user data for privacy reasons

   Explanation: AI-powered search engines leverage machine learning to understand user intent and context, providing more personalized and accurate results compared to traditional keyword-based search engines.

4) Statistical AI uses mathematical models to improve search algorithms.

- **True (correct)**
- False

Explanation: Statistical AI applies numerical methods and mathematical models to analyze data, enhancing the performance and efficiency of algorithms, such as those used in search engines.

5) Traditional search engines provide more personalized results than AI-powered ones.

- True
- **False (correct)**

Explanation: AI-powered search engines are generally more adept at personalization because they utilize user data and machine learning to tailor results, unlike traditional search engines.

6) Match the following terms to their correct explanations.

a) Statistical AI
b) Analytical AI
c) Discriminative AI
d) Generative AI

Discriminative AI (correct) Classifies data into distinct categories or labels
Analytical AI (correct) Analyzes complex data to derive insights and patterns
Statistical AI (correct) Refines algorithms and improves accuracy using mathematical calculations

Generative AI Foundations

GAI

Lesson 1: Types of AI

Unit 1: Methods

Artificial Intelligence

- AI computer systems learn from data to perform tasks that require human intelligence

- Various versions of AI have the capacity to perform a variety of tasks dependent on the industry

Generative AI

- Trained on human-generated examples to create content such as images, text or video

- Content creation follows patterns but may be inconsistent and unreliable
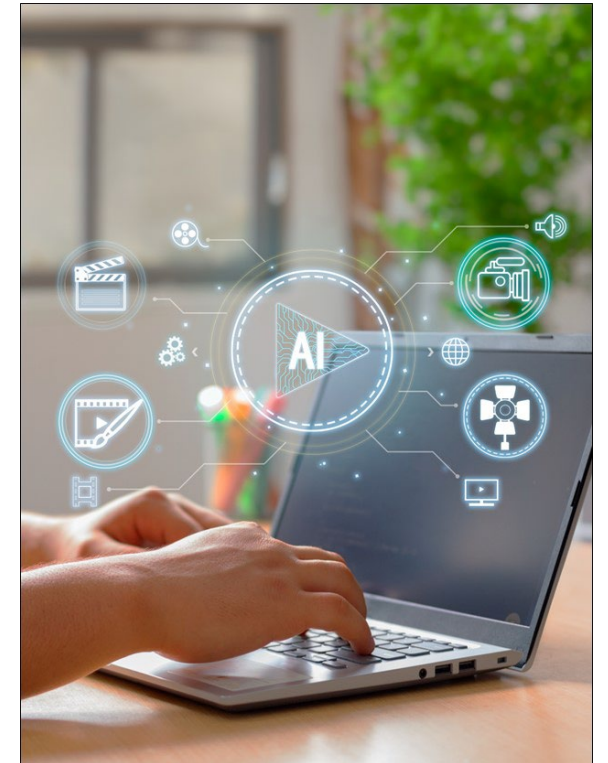
Predictive AI

- Makes predictions based in data trends

- Predictions are algorithm based, and interprets existing data to forecast events

Discriminative AI
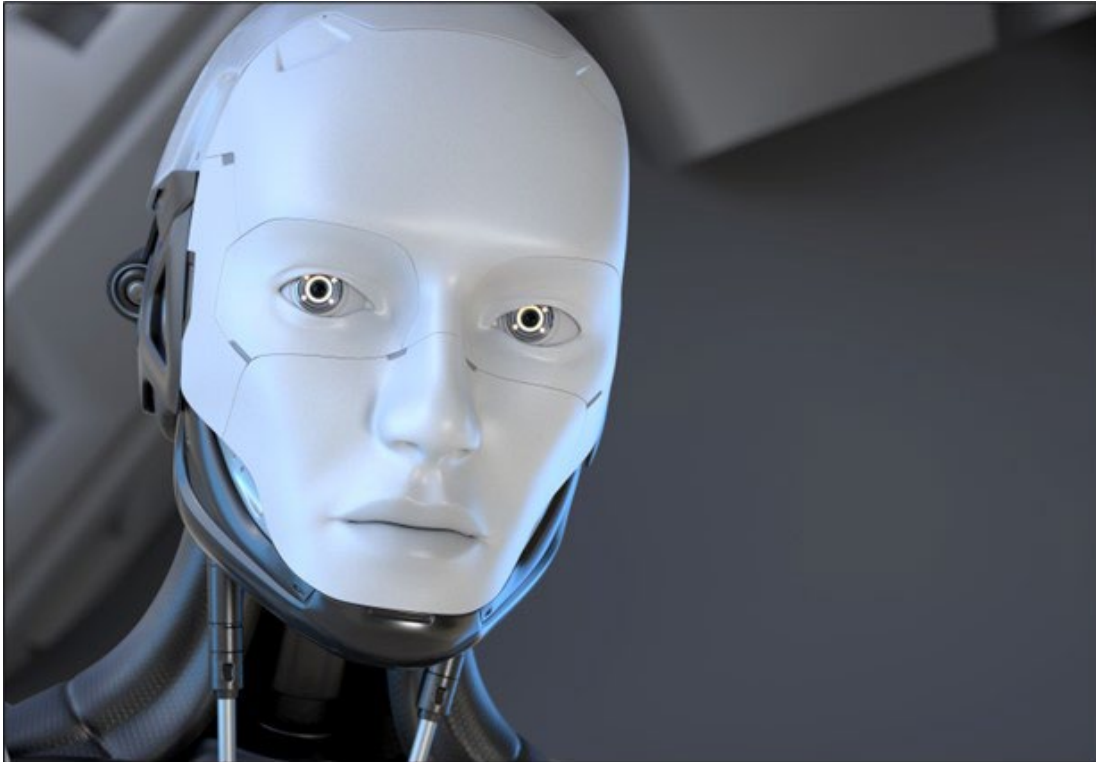
- Classifies different categories within datasets by learning from labeled data

- Although it may maximize accuracy in its predictions, it may make mistakes that need verification

Analytical AI

- Processes, analyzes and interprets complex datasets for decision-making purposes

- Predictions are based on data, patterns and trend extraction via algorithms

Statistical AI

- Makes predictions, classifications or decisions based on statistical methods like probability theory

- Historical data is analyzed to estimate the probability of events and understand data variability

AI vs. Search Engines

- Search engines use algorithms to retrieve, rank existing information based on basic user queries

- AI systems understand, interpret, generate and analyze information in sophisticated responses or through complex tasks

Unit 1 Lesson 1 Study Guide Complete

| Topic	Explanation
Artificial Intelligence	
Understanding Artificial Intelligence	• AI computer systems learn from data to perform tasks that require human intelligence. • Various versions of AI have the capacity to perform a variety of tasks dependent on the industry.
Artificial Intelligence	The simulation of human intelligence processes by computer systems.
Visual Perception	The ability to interpret and understand graphical information from the surrounding environment, such as images or video.
Speech Recognition	The process of converting spoken language into text by recognizing and interpreting human language.
Decision-Making	The ability to make choices or recommendations based on data.
AI System	A computer-based system that uses algorithms and data to perform tasks typically requiring human intelligence.
Narrow AI	A type of artificial intelligence designed to perform a specific task or a narrow range of tasks.
AGI (Artificial General Intelligence)	A type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI.
Automation	The use of technology to perform tasks without human intervention, often powered by AI.
Personalization	The process of tailoring services or content to individual preferences, sometimes using AI.
Data Analysis	The process of examining and interpreting information to extract useful facts and insights, often assisted by AI tools.
Machine Learning	A subset of AI that enables systems to learn from data and improve their performance over time without being explicitly programmed.
NLP (Natural Language Processing)	A field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language.
Generative AI	
Understanding Generative AI	• Trained on human-generated examples to create content such as images, text, or video. • Content creation follows patterns but may be inconsistent and unreliable.
Generative AI	A subset of artificial intelligence focused on creating content, such as images, text, music, or videos.
Predictive AI	
Understanding Predictive AI	• Makes predictions based on data trends. • Predictions are algorithm based and interpret existing data to forecast events.
Predictive AI	A type of artificial intelligence that analyzes existing data to forecast future events or trends.
Regression Analysis	A statistical process for estimating the relationships among variables, often used in predictive modeling.
Predictive Modeling	The process of creating, testing, and validating a model to best predict the probability of an outcome.
Discriminative AI	
Understanding Discriminative AI	• Classifies distinct categories within datasets by learning from labeled data.

	• Although it may maximize accuracy in its predictions, it makes mistakes that need verification.
Discriminative AI	A type of artificial intelligence that focuses on distinguishing between different classes or categories within a dataset.
Class	A distinct group or category that data points are organized into based on shared characteristics or features.
Classification	The task of predicting the category of a given data point.
Image Recognition	The process of identifying and classifying objects, people, or other elements within an image using AI.
Spam Detection	The use of AI to identify and filter out unwanted or malicious emails from legitimate messages.
Sentiment Analysis	The process of using AI to determine the emotional tone or opinion expressed in a piece of text.

Analytical AI

Understanding Analytical AI	• Processes, analyzes, and interprets complex datasets for decision-making purposes. • Predictions are based on data, patterns, and trend extraction via algorithms.
Analytical AI	A type of artificial intelligence focused on processing and interpreting complex data to extract meaningful insights and support decision-making.
Unstructured Data	Information that is not organized in a pre-defined manner, making it difficult to analyze using traditional data processing methods.
Actionable	Clear, specific, and able to be directly used to make decisions or take steps.

Statistical AI

Understanding Statistical AI	• Makes predictions, classifications or decisions based on statistical methods like probability theory. • Historical data is analyzed to estimate the probability of events and understand data variability.
Statistical AI	A type of artificial intelligence that uses statistical models and methods to make predictions, decisions, or classifications based on data.
Probability	A measure of the likelihood that a specific event will occur.
Probability Theory	A branch of mathematics that deals with the analysis and interpretation of random events and the likelihood of different outcomes.
Uncertainty	The degree of unpredictability in outcomes or events, often modeled and quantified in AI using probability.
Data Variability	The extent to which points in a set differ from each other or from a central value, indicating diversity or inconsistency within the set.

AI vs. Search Engines

AI vs. Search Engines	• Search engines use algorithms to retrieve and rank existing information based on basic user queries. • AI systems understand, interpret, generate, and analyze information in sophisticated responses or through complex tasks.
Search Engine	A software system that searches a database or the internet for information based on user queries and returns relevant results.
Google	A widely used search engine that indexes and retrieves vast amounts of information from the web in response to user queries.
Query	A request for information or data submitted to a search engine or database.

Search Algorithm	A set of rules and processes used by a search engine to determine and rank the most relevant results for a given query.
Information Retrieval	The process of obtaining relevant data or documents from a database in response to a user query.
Integration	The process of combining different systems, tools, or data sources to work together.
Query Understanding	The ability of a search engine to interpret the intent and context of a user's question to deliver the most relevant results.
Relevance Ranking	The process by which a search engine orders search results based on their relevance to the user's query.

Unit 1 Lesson 1 Study Guide
Fill-In Explanation

Topic	Explanation
Artificial Intelligence	
Understanding Artificial Intelligence	
Artificial Intelligence	
Visual Perception	
Speech Recognition	
Decision-Making	
AI System	
Narrow AI	
AGI (Artificial General Intelligence)	
Automation	
Personalization	
Data Analysis	
Machine Learning	
NLP (Natural Language Processing)	
Generative AI	
Understanding Generative AI	
Generative AI	
Predictive AI	
Understanding Predictive AI	
Predictive AI	
Regression Analysis	
Predictive Modeling	
Discriminative AI	
Understanding Discriminative AI	
Discriminative AI	
Class	
Classification	
Image Recognition	
Spam Detection	
Sentiment Analysis	
Analytical AI	
Understanding Analytical AI	
Analytical AI	

Unstructured Data	
Actionable	

Statistical AI

Understanding Statistical AI	
Statistical AI	
Probability	
Probability Theory	
Uncertainty	
Data Variability	

AI vs. Search Engines

AI vs. Search Engines	
Search Engine	
Google	
Query	
Search Algorithm	
Information Retrieval	
Integration	
Query Understanding	
Relevance Ranking	

Unit 1 Lesson 1 Study Guide Fill-In Topic

Topic	Explanation
Artificial Intelligence	
	• AI computer systems learn from data to perform tasks that require human intelligence. • Various versions of AI have the capacity to perform a variety of tasks dependent on the industry.
	The simulation of human intelligence processes by computer systems.
	The ability to interpret and understand graphical information from the surrounding environment, such as images or video.
	The process of converting spoken language into text by recognizing and interpreting human language.
	The ability to make choices or recommendations based on data.
	A computer-based system that uses algorithms and data to perform tasks typically requiring human intelligence.
	A type of artificial intelligence designed to perform a specific task or a narrow range of tasks.
	A type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI.
	The use of technology to perform tasks without human intervention, often powered by AI.
	The process of tailoring services or content to individual preferences, sometimes using AI.
	The process of examining and interpreting information to extract useful facts and insights, often assisted by AI tools.
	A subset of AI that enables systems to learn from data and improve their performance over time without being explicitly programmed.
	A field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language.
Generative AI	
	• Trained on human-generated examples to create content such as images, text, or video. • Content creation follows patterns but may be inconsistent and unreliable.
	A subset of artificial intelligence focused on creating content, such as images, text, music, or videos.
Predictive AI	
	• Makes predictions based on data trends. • Predictions are algorithm based and interpret existing data to forecast events.
	A type of artificial intelligence that analyzes existing data to forecast future events or trends.
	A statistical process for estimating the relationships among variables, often used in predictive modeling.
	The process of creating, testing, and validating a model to best predict the probability of an outcome.
Discriminative AI	
	• Classifies distinct categories within datasets by learning from labeled data.

	• Although it may maximize accuracy in its predictions, it makes mistakes that need verification.
	A type of artificial intelligence that focuses on distinguishing between different classes or categories within a dataset.
	A distinct group or category that data points are organized into based on shared characteristics or features.
	The task of predicting the category of a given data point.
	The process of identifying and classifying objects, people, or other elements within an image using AI.
	The use of AI to identify and filter out unwanted or malicious emails from legitimate messages.
	The process of using AI to determine the emotional tone or opinion expressed in a piece of text.

Analytical AI

	• Processes, analyzes, and interprets complex datasets for decision-making purposes. • Predictions are based on data, patterns, and trend extraction via algorithms.
	A type of artificial intelligence focused on processing and interpreting complex data to extract meaningful insights and support decision-making.
	Information that is not organized in a pre-defined manner, making it difficult to analyze using traditional data processing methods.
	Clear, specific, and able to be directly used to make decisions or take steps.

Statistical AI

	• Makes predictions, classifications or decisions based on statistical methods like probability theory. • Historical data is analyzed to estimate the probability of events and understand data variability.
	A type of artificial intelligence that uses statistical models and methods to make predictions, decisions, or classifications based on data.
	A measure of the likelihood that a specific event will occur.
	A branch of mathematics that deals with the analysis and interpretation of random events and the likelihood of different outcomes.
	The degree of unpredictability in outcomes or events, often modeled and quantified in AI using probability.
	The extent to which points in a set differ from each other or from a central value, indicating diversity or inconsistency within the set.

AI vs. Search Engines

	• Search engines use algorithms to retrieve and rank existing information based on basic user queries. • AI systems understand, interpret, generate, and analyze information in sophisticated responses or through complex tasks.
	A software system that searches a database or the internet for information based on user queries and returns relevant results.
	A widely used search engine that indexes and retrieves vast amounts of information from the web in response to user queries.
	A request for information or data submitted to a search engine or database.

	A set of rules and processes used by a search engine to determine and rank the most relevant results for a given query.
	The process of obtaining relevant data or documents from a database in response to a user query.
	The process of combining different systems, tools, or data sources to work together.
	The ability of a search engine to interpret the intent and context of a user's question to deliver the most relevant results.
	The process by which a search engine orders search results based on their relevance to the user's query.

Unit 1 Create Project

In this Create Project, imagine you are part of a development team tasked with creating an AI tool for a healthcare startup. This tool will assist medical professionals by generating personalized patient treatment plans based on health data and medical history.

Project Specifications:

Your role as the lead designer is to ensure the AI tool meets ethical standards, mitigates bias, and is transparent in its decision-making processes while maintaining the privacy of sensitive health information. Create a proposal for this AI tool, focusing on the need for strategies for bias mitigation, data privacy, and accountability. The proposal should be concise, avoid jargon and use clear, basic language.

Sample Solution:

The goal of this AI tool is to generate personalized patient treatment plans while prioritizing **ethical** practices, data **privacy**, **transparency**, and **accountability**. To ensure ethical considerations are upheld, the tool will use a **diverse** dataset and implement **bias** mitigation strategies. Transparency will be maintained by providing clear explanations for treatment recommendations and allowing healthcare providers to monitor data usage.

Additionally, the tool will adhere to strict data privacy **regulations** and implement robust security measures. To ensure accountability, the tool will have mechanisms for reporting errors, undergoing regular audits, and providing a dedicated support team. By addressing these key factors, the tool aims to provide a reliable, secure, and ethical solution for enhancing patient care while maintaining trust and integrity.

Keywords	Variations
Ethical	Moral Principled
Transparency	Clarity Openness Honesty
Accountability	Responsibility Liability Duty
Diverse	Varied Multifaceted Assorted
Bias	Prejudice Perspective Subjective Opinions
Privacy	Protection Safety
Regulations	Standards Rules Directives

Unit 1 Objective Assessment

1) Which of the following tasks is generative AI most likely used for?
   a) Categorizing images or video
   b) **Creating new visual or audio content (correct)**
   c) Classifying emails as spam or not spam
   d) Forecasting market or business trends

   Explanation: Generative AI focuses on creating content, such as images, text, music, or videos, by recognizing patterns in existing human-generated data.

2) What is the primary difference between narrow AI and general AI?
   a) Narrow AI can learn from data, while general AI cannot
   b) **Narrow AI is designed for specific tasks, while general AI aims to perform any intellectual task (correct)**
   c) Narrow AI creates new data, while general AI categorizes data

   Explanation: Narrow AI is designed to handle specific tasks, whereas general AI aims to replicate human-like intelligence across a broad range of tasks.

3) Predictive AI creates new data similar to how generative AI does.
   - True
   - **False (correct)**

   Explanation: Predictive AI does not create new data. It analyzes existing data to make predictions about future events, whereas generative AI creates new content.

4) Discriminative AI can make mistakes, so its conclusions should be confirmed in sensitive scenarios.
   - **True (correct)**
   - False

   Explanation: Discriminative AI can misclassify data, especially in high-risk situations, so it is important to verify its outputs.

5) Fill in the blank with the correct word(s).
   Machine learning allows AI systems to learn from data, adapt to new **input types (correct)**, and improve over time.
   - Output Types
   - Subsets
   - Input Types
   - Date Sets

   Explanation: Machine learning is a subset of AI that enables systems to improve based on the data they process.

6) Fill in the blank with the correct word.
   Unlike generative AI, which creates new content, discriminative AI focuses on defining the **differences (correct)** between categories of data.
   - Differences
   - Parallels
   - Trends
   - Overlaps

   Explanation: As a result, discriminative AI can be used for spam detection, sentiment analysis, and medical diagnosis.

7) What kind of AI is used for classifying and distinguishing between distinct categories of data?
   a) Predictive AI
   b) Generative AI
   c) Discriminative AI (correct)
   d) Statistical AI

   Explanation: Discriminative AI is designed to classify data into categories, such as identifying objects within images or filtering spam emails.

8) Which AI system focuses on processing and interpreting complex datasets to provide actionable insights?
   a) Analytical AI (correct)
   b) Generative AI
   c) Discriminative AI
   d) Predictive AI

   Explanation: Analytical AI processes complex data to extract meaningful insights and support decision-making.

9) Statistical AI relies on probability theory to handle uncertainty and make predictions based on historical data.
   - **True (correct)**
   - False

   Explanation: Statistical AI uses probability and statistical models to infer relationships and predict future outcomes based on historical data.

10) Match the following terms to their correct definitions.
    a) Visual Perception
    b) Speech Recognition
    c) Sentiment Analysis
    d) Regression Analysis
    e) Decision-Making
    f) Automation
    g) Data Analysis

    Automation (correct) The use of technology powered by AI to perform tasks without human intervention.
    Data Analysis (correct) The process of examining and interpreting information to extract useful facts and insights.
    Decision-Making (correct) The ability to make choices or recommendations based on data.
    Regression Analysis (correct) The process for estimating the relationships among variables in predictive modeling.
    Sentiment Analysis (correct) The process of determining the emotional tone or opinion expressed in a piece of text.
    Speech Recognition (correct) The process of converting spoken language into text by recognizing and interpreting human language.
    Visual Perception (correct) The interpretation of graphical information such as images or video.

11) What is the primary function of a text model?
    a) **To process and understand human language (correct)**
    b) To generate and export images
    c) To perform and execute mathematical calculations
    d) To analyze and predict financial data

    Explanation: Text models work with input based on language data.

12) OpenAI is a technology company that develops social media platforms.
    • True
    • **False (correct)**

    Explanation: OpenAI is primarily focused on AI research.

13) What is the process of adjusting a pre-trained AI model to improve its performance on a specific task called?
    a) Model Evaluation
    b) Data Augmentation
    c) **Fine-Tuning (correct)**
    d) Hyperparameter Tuning

    Explanation: Fine-tuning is the process of adjusting a pre-trained model.

14) LLaMA is a language model developed by Google.
    • True
    • **False (correct)**

    Explanation: LLaMA is a language model developed by Meta.

15) Multilingualism refers to the ability to understand and generate text in multiple languages.
- **True (correct)**
- False

Explanation: Language AI models, like Gemini, can understand and generate text in multiple languages.

16) Which AI tool is designed to enhance creative workflows by generating images, effects, and visual content from text-based inputs?
a) DALL-E
b) Adobe Firefly (correct)
c) Google Gemini
d) GPT

Explanation: Adobe Firefly is an AI-powered tool designed by Adobe to generate and enhance visual content based on text inputs.

17) The discriminator in a GAN evaluates the generated data and distinguishes between real and fake samples.
- **True (correct)**
- False

Explanation: The discriminator in a GAN evaluates the generated data to distinguish between real and fake samples and provides feedback to the generator.

18) Match the following terms to their correct functions.
a) GAN (Generative Adversarial Network)
b) GPUs (Graphics Processing Units)
c) GPT (Generative Pre-trained Transformer)
d) LLM (Large Language Model)
e) CNN (Convolutional Neural Network)
f) VAE (Variational Autoencoder)

VAE (Variational Autoencoder) (correct) Compresses data then decodes it to create new, similar data
GAN (Generative Adversarial Network) (correct) Creates realistic data via competing neural networks
GPT (Generative Pre-trained Transformer) (correct) Generates human-like text based on large-scale training
LLM (Large Language Model) (correct) Performs advanced linguistic tasks
CNN (Convolutional Neural Network) (correct) Analyzes visual data by learning features through layers
GPUs (Graphics Processing Units) (correct) Accelerates AI training when using large datasets

19) Match the following terms to their correct definitions.
a) Purpose
b) Quality
c) Functionality
d) Updates

Purpose (correct) The intended use of an AI tool
Functionality (correct) The range of tasks that a tool can perform
Updates (correct) The regular improvements that enhance performance or security
Quality (correct) The degree to which a tool produces reliable and accurate results

20) What is the primary purpose of inputs in AI models?
   a) To process data then generate outputs
   b) To provide data for the model to work on (correct)
   c) To train the AI model
   d) To evaluate the model's performance

   Explanation: Inputs serve as the raw material that AI models process to generate outputs.

21) How do outputs relate to inputs in AI models?
   a) Outputs are the same as inputs
   b) Outputs are independent of inputs
   c) Outputs are used to train the model
   d) Outputs are generated based on the inputs (correct)

   Explanation: The quality and nature of the output depend directly on the input provided to the AI model.

22) What is the main benefit of customizing AI models?
   a) To make them more exclusive
   b) To make them more complex
   c) To make them more need-specific (correct)
   d) To make them more efficient

   Explanation: Customization allows AI models to be tailored to specific tasks and preferences, making them more relevant and effective for individual users.

23) Match the following terms to their correct definitions.
   a) Virtual Assistant
   b) Prototyping
   c) Content Moderation
   d) Conversational AI
   e) API (Application Programming Interface)
   API (Application Programming Interface) (correct) Protocols that allow different software applications to communicate with each other
   Conversational AI (correct) Models that interact with users in natural language, simulating human dialogue
   Virtual Assistant (correct) Software that can perform tasks or services for an individual based on user input
   Prototyping (correct) Models in preliminary form with which to test ideas before full-scale development
   Content Moderation (correct) Oversight monitoring of user-generated content to ensure it complies with standards and policies

24) ChatGPT is a language model developed by Microsoft.
   - True
   - **False (correct)**

   Explanation: ChatGPT is developed by OpenAI.

25) Adobe Express is primarily used for data analysis.
- True
- **False (correct)**

Explanation: Adobe Express is primarily used for graphic design.

26) Meta AI is only available for use on Facebook.
- True
- **False (correct)**

Explanation: Meta AI is available across multiple Meta platforms, including Instagram, Messenger, and WhatsApp.

27) Stable Diffusion is a tool for generating text.
- True
- **False (correct)**

Explanation: Stable Diffusion is a tool for generating images.

28) Microsoft Azure AI Studio is a platform for building and deploying AI models.
- **True (correct)**
- False

Explanation: Microsoft Azure AI Studio is a comprehensive platform that enables users to build, deploy, and manage AI models and applications.

29) Match the following terms to their correct definitions.
a) Hallucination
b) Accountability
c) Obsolescence
d) Transparency
e) Protocols
f) Misinformation

Hallucination (correct) The fabricated content, unrelated to reality
Accountability (correct) The responsibility of individuals and organizations to answer for their actions
Transparency (correct) The practice of being open and clear about processes, decisions, and data
Obsolescence (correct) The process of becoming outdated or no longer useful due to advancements
Misinformation (correct) The false or inaccurate information generated
Protocols (correct) The formal procedures or systems of rules followed

30) What is a significant limitation of generative AI models that can impact the accuracy and trustworthiness of their outputs?
   a) Computational limitations
   b) Training data bias (correct)
   c) Development expenses
   d) User knowledge

   Explanation: Biases in the training data can lead to prejudiced and inaccurate outputs from generative AI models.

31) What is a major challenge associated with the technological requirements of generative AI?
   a) Difficult algorithms
   b) Few skilled developers
   c) High energy consumption (correct)
   d) Limited data availability

   Explanation: The computational resources required for generative AI can be energy-intensive, leading to environmental concerns.

32) What is a key concern regarding privacy when using generative AI?
   a) Data collection and storage (correct)
   b) Lack of user control
   c) Limited access to information
   d) High cost of implementation

   Explanation: Generative AI models often collect and store user data, which can raise privacy concerns.

33) What is an important challenge arising from the absence of universal standards in generative AI?
   a) Difficulty in understanding how AI models work (correct)
   b) Inconsistency in AI model deployment
   c) Increased cost of AI development
   d) Lack of user interest in generative AI

   Explanation: The absence of universal standards can lead to variations in how AI models are developed and used, potentially causing issues like bias and lack of transparency.

34) What is a common issue with generative AI models that can lead to inconsistent outputs?
   a) Bias in training data
   b) Lack of computational resources
   c) Variability in input interpretation (correct)
   d) Limit of functionality

   Explanation: Generative AI models may interpret inputs slightly differently each time, leading to variations in the output.

Unit 1 Key Terms

Term	Definition
Accessibility	The ease with which individuals or organizations can use and benefit from technology, including AI tools.
Accountability	The responsibility of individuals or organizations to answer for their actions and ensure they are following set standards and ethics.
Actionable	Clear, specific, and able to be directly used to make decisions or take steps.
Adobe Express	A tool that uses AI to assist with graphic design and content creation.
Adobe Firefly	An AI-powered tool by Adobe designed to enhance creative workflows by generating images, effects, and other visual content from text-based inputs.
AGI (Artificial General Intelligence)	A type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI.
AI Hallucination	An instance where an artificial intelligence model generates content that is entirely fabricated and has no connection to reality.
AI System	A computer-based system that uses algorithms and data to perform tasks typically requiring human intelligence.
Algorithm	A set of rules or instructions given to an AI system to help it learn from data and make decisions.
Analytical AI	A type of artificial intelligence focused on processing and interpreting complex data to extract meaningful insights and support decision-making.
Anthropic	An AI research company focused on developing AI systems that are safe, ethical, and aligned with human values.
Anthropic Claude	An AI model developed by Anthropic, designed with a focus on safety, ethics, and alignment with human values.
API (Application Programming Interface)	A set of tools and protocols that allow different software applications to communicate with each other.
Artificial Intelligence	The simulation of human intelligence processes by computer systems.
Attention Layers	The components of a transformer that allow the model to focus on specific parts of the input data when making predictions.
Audio	Sound recordings, including speech or music, used as input for processing by AI models.
Automated Customer Support	Systems that handle consumer inquiries without the need for human intervention, often through chatbots or automated messaging.

Automation	The use of technology to perform tasks without human intervention, often powered by AI.
Bias	A tendency of AI models to reflect and perpetuate prejudices found in the training data, leading to unfair or unbalanced outputs.
Bias Mitigation	The strategies and actions taken to reduce or eliminate bias in processes, decisions, or outcomes.
Canva	An online design tool that incorporates AI to simplify graphic design tasks.
Class	A distinct group or category that data points are organized into based on shared characteristics or features.
Classification	The task of predicting the category of a given data point.
Competitive Edge	The advantage that an individual or organization has over its competitors, often due to superior technology, innovation, or strategy.
Computational Resources	The hardware and software tools required to train AI models, including processors, memory, and storage.
Consistency	The degree to which an AI model produces the same output when given the same input across multiple instances.
Content Moderation	The process of monitoring and managing user-generated content to ensure it complies with standards and policies.
Contextual Relevance	The ability of an AI model to generate or interpret text that is appropriate to the given context.
Conversational AI	Artificial intelligence models designed to interact with users in natural language, simulating human dialogue.
Convolutional Layer	A component in a neural network that applies filters to input data to capture important visual features like edges and textures.
CNN (Convolutional Neural Network)	A type of deep learning model designed to analyze visual data by automatically detecting and learning features through layers.
Cost	The financial expenditure required to acquire, maintain, and operate a tool or system.
Custom GPT	A tailored AI chatbot that customizes OpenAI's GPT models to perform specific functions for users.
Customizability	The ability of a tool or system to be tailored to specific user needs or preferences.
Customization	The process of tailoring AI models to perform specific, individualized tasks.
DALL-E	An AI model developed by OpenAI that generates images from textual descriptions, allowing users to create detailed and imaginative visuals based on prompts.

Data Analysis	The process of examining and interpreting information to extract useful facts and insights, often assisted by AI tools.
Data Collection	The process by which AI tools gather information from users, often for the purpose of improving model accuracy.
Data Privacy	The protection of personal and sensitive information from unauthorized access or disclosure.
Data Protection	The measures taken to ensure that user information is kept secure and is not exposed to unauthorized access.
Data Variability	The extent to which points in a set differ from each other or from a central value, indicating diversity or inconsistency within the set.
Dataset	A collection of information used to train AI models, often consisting of images, text, or other types of information.
Decision-Making	The ability to make choices or recommendations based on data.
Deployment	The process of making a software application or AI model operational and accessible to users.
Diffusion	A generative process where an image is gradually refined from random noise into a coherent and detailed visual by iteratively removing the noise, guided by a trained neural network.
Discriminative AI	A type of artificial intelligence that focuses on distinguishing between different classes or categories within a dataset.
Discriminator	The component of a GAN that evaluates the generated data and helps the generator improve by distinguishing between real and fake data.
Ease of Use	The degree to which a tool or system is user-friendly and intuitive to operate.
Efficiency	The ability to achieve desired outcomes with minimal waste of time, energy, or resources.
Energy Consumption	The amount of energy required to power the computational resources used during model training.
Environmental Impact	The effect that technological operations, including AI, have on the environment, particularly in terms of energy consumption and resource use.
Ethical Considerations	The principles that guide decision-making and behavior, especially in ensuring fairness, integrity, and respect for individuals.
Evolution	The gradual development or progression of something, particularly in terms of improvement or adaptation over time.
Filters	Tools or features that modify or enhance the appearance of images or videos, often by applying visual effects, color changes, or overlays.
Fine-Tuning	The process of making specific adjustments to a pre-trained AI model to improve its performance on a particular task.

Flexibility	The ability to adapt or change in response to new conditions or demands.
Functionality	The range of tasks and operations that a tool or system can perform.
GAN (Generative Adversarial Network)	A type of AI model that consists of two neural networks, a generator and a discriminator, which compete against each other to create highly realistic data, such as images or videos.
Generative AI	A subset of artificial intelligence focused on creating content, such as images, text, music, or videos.
Generative Audio	Sound or music produced by an AI model based on input data.
Generative Image	Visual content generated by an AI model from textual or visual input.
Generative Text	Written content produced by an AI model based on input data.
Generative Video	Video content created by an AI model from scripts, storyboards, or visual descriptions.
Generator	The part of a GAN that creates new data samples, attempting to mimic real data from the dataset.
Google	A widely used search engine that indexes and retrieves vast amounts of information from the web in response to user queries.
Google Gemini	A multilingual AI model developed by Google, known for its capability to handle diverse language tasks across different languages.
Google Gems	A tailored AI chatbot that customizes Google's Gemini AI for specific language-related tasks.
GPT (Generative Pre-trained Transformer)	A type of AI model developed by OpenAI, designed for generating human-like text based on large-scale pre-training.
GPTx	The evolving versions of OpenAI's GPT models, where "x" serves as a placeholder for the specific version number (e.g., GPT-3, GPT-3.5, GPT-4).
GPUs (Graphics Processing Units)	Specialized hardware used to accelerate the training of AI models, especially in tasks involving large datasets and complex computations.
Human Values	The moral principles and beliefs that guide the behavior and decisions of individuals and organizations.
Hyperparameters	The settings that define the architecture and behavior of a neural network, such as learning rate and number of layers.
Image	Static visual representations used as input for AI models focused on tasks like recognition or generation.
Image Classification	The task of categorizing images into predefined classes based on their visual content using models like CNNs.
Image Model	An AI representation designed to generate or interpret visual content, such as images and graphics.

Image Recognition	The process of identifying and classifying objects, people, or other elements within an image using AI.
In Parallel	Refers to performing multiple tasks or processes simultaneously rather than one after the other.
Information Retrieval	The process of obtaining relevant data or documents from a database in response to a user query.
Input	The data or information provided to an AI model for processing, such as text, images, or audio.
Integration	The process of combining different systems, tools, or data sources to work together.
Iteratively	Repeatedly applying a process or set of steps multiple times, often with the goal of refining or improving the outcome with each repetition.
Labeled Data	Images that have been tagged with descriptions or classifications, used to train AI models.
Latent Space	A compressed representation of data learned by a model, from which new variations can be generated.
Learning Rate	A hyperparameter that controls how much the model's guesses are adjusted with each step during training.
LLaMA (Large Language Model Meta AI)	A research-focused AI model developed by Meta, optimized for studying language processing and AI model behavior.
LLM (Large Language Model)	An AI system trained on extensive text data to perform advanced language tasks.
Machine Learning	A subset of AI that enables systems to learn from data and improve their performance over time without being explicitly programmed.
Meta	A technology company that develops social media platforms and AI research projects, including advanced AI models like LLaMA.
Microsoft Azure AI Studio	A platform for building, deploying, and managing AI models.
Misinformation	The false or inaccurate information that may be generated by AI, often due to flawed or incomplete input data.
Model Training	The process of teaching an AI system to perform specific tasks by learning from data.
Multilingual	The ability of an AI model to understand and generate text in multiple languages.
Narrow AI	A type of artificial intelligence designed to perform a specific task or a narrow range of tasks.
Neural Network	Computational models inspired by the human brain, used in AI to recognize patterns and make decisions.

NLP (Natural Language Processing)	A field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language.
Noise Generation	The process of adding random data (noise) to an image, which is later refined by the diffusion model to create a coherent image.
Obsolescence	The process of becoming outdated or no longer useful due to advancements in technology.
Obsolete	No longer in use or replaced by a newer, more effective alternative.
OpenAI	An artificial Intelligence research organization known for developing advanced AI models, including the GPT series.
Output	The result generated by an AI model after processing the input, such as generated text, video, images, or audio.
Output Control	The settings and parameters that allow users to influence the nature and quality of the outputs generated by a tool or system.
Parameters	The adjustable elements within an AI model that influence how it processes and interprets data.
Personal Information	The data that can be used to identify an individual, such as name, address, or contact details.
Personalization	The process of tailoring services or content to individual preferences, sometimes using AI.
Predictive AI	A type of artificial intelligence that analyzes existing data to forecast future events or trends.
Predictive Modeling	The process of creating, testing, and validating a model to best predict the probability of an outcome.
Privacy	The right of individuals to control the collection, use, and sharing of their personal information.
Privacy Settings	The options within a software or platform that allow users to manage how their personal information is collected, used, and shared.
Privacy Violation	A breach or unauthorized use of personal information that infringes on an individual's privacy rights.
Probability	A measure of the likelihood that a specific event will occur.
Probability Theory	A branch of mathematics that deals with the analysis and interpretation of random events and the likelihood of different outcomes.
Productivity Tool	Software designed to help users complete tasks more efficiently.
Protocols	The formal procedures or systems of rules that are followed in specific situations to ensure consistency and reliability.
Prototyping	The process of creating a preliminary model or concept to test ideas before full-scale development.

Purpose	The specific objective or intended use of a tool or system.
Quality	The degree to which a tool or system produces reliable and accurate results.
Query	A request for information or data submitted to a search engine or database.
Query Understanding	The ability of a search engine to interpret the intent and context of a user's question to deliver the most relevant results.
Refinement Algorithm	Processes used in diffusion models to iteratively reduce noise and produce a clear, high-quality image.
Regression Analysis	A statistical process for estimating the relationships among variables, often used in predictive modeling.
Relevance Ranking	The process by which a search engine orders search results based on their relevance to the user's query.
Reliability	The degree to which an AI model consistently produces accurate and trustworthy outputs.
Scalability	The capacity of a system or technology to expand and manage increased demand or workload effectively.
Search Algorithm	A set of rules and processes used by a search engine to determine and rank the most relevant results for a given query.
Search Engine	A software system that searches a database or the internet for information based on user queries and returns relevant results.
Security	The measures taken to safeguard a tool or system from threats such as cyberattacks or data breaches.
Sensitive Information	The data that requires extra protection due to its potential impact on privacy, such as financial details or health records.
Sentiment Analysis	The process of using AI to determine the emotional tone or opinion expressed in a piece of text.
Sequential Data	A type of information that is ordered or arranged in a specific sequence, such as time-series information or text, where the order of elements is important for understanding the context.
Smart Replies	Response suggestions that help users quickly reply to messages or emails.
Spam Detection	The use of AI to identify and filter out unwanted or malicious emails from legitimate messages.
Speech Recognition	The process of converting spoken language into text by recognizing and interpreting human language.
Stable Diffusion	An AI tool used for generating high-quality images from textual descriptions.

Standards	A set of established guidelines or rules that dictate the acceptable practices and quality in a particular field.
Statistical AI	A type of artificial intelligence that uses statistical models and methods to make predictions, decisions, or classifications based on data.
Style Transfer	A technique that applies the visual style of one image to another, often used in creative applications.
Summarization	The process of condensing a large amount of information into a shorter, more digestible form.
Supervised Learning	A training method where the AI model learns from labeled data with known outcomes.
Support	The assistance provided by the tool or system's provider to help users resolve issues or optimize usage.
Technological Advancements	The progress and improvement in technology that can lead to the development of newer, more effective tools and models.
Technological Resources	The hardware, software, and data necessary to develop, operate, and maintain AI models and systems.
Template	A pre-designed layout that can be customized to create various types of documents or visuals.
Text	Written words or commands provided as input to an AI model.
Text Model	An AI model designed to process, understand, and generate human language.
Text-Image Pairs	Data sets where images are matched with corresponding textual descriptions, used in training image models.
Textual Description	A written input provided to an AI model to generate corresponding images or other outputs.
Tokenization	The process of breaking down text into smaller units, like words or subwords, that can be processed by a transformer model.
Training Data	Data used to teach AI models, enabling them to learn patterns, structures, and relationships to perform tasks effectively.
Transformer	A type of neural network architecture that processes sequential data, like text, by considering entire sequences in parallel and using attention mechanisms to understand context and relationships within the data.
Transparency	The practice of being open and clear about processes, decisions, and data, allowing for accountability and trust.
Uncertainty	The degree of unpredictability in outcomes or events, often modeled and quantified in AI using probability.
Uniformity	The quality of being consistent and the same across different instances.

Unstructured Data	Information that is not organized in a pre-defined manner, making it difficult to analyze using traditional data processing methods.
Unsupervised Learning	A training method where the AI model identifies patterns in data without explicit labels.
Updates	The regular improvements or patches provided to a tool or system to enhance performance or security.
Variability	The differences in output that can occur when an AI model processes similar inputs.
Variational Autoencoder	A type of generative model that learns to encode input data into a compressed representation and then decodes it to generate new, similar data by introducing variability in the encoding process.
Video	Moving visual content, often accompanied by sound, used as input for AI models designed to handle dynamic media.
Virtual Assistant	A software agent that can perform tasks or services for an individual based on user input.
Visual Appeal	The attractiveness of a design, which can be enhanced through the use of colors, layouts, and imagery.
Visual Content	Any matter that is viewed, such as images, graphics, or videos.
Visual Perception	The ability to interpret and understand graphical information from the surrounding environment, such as images or video.
Workflow	The sequence of processes through which a piece of work passes from initiation to completion, especially in creative industries.

Unit 1: Unplugged Activities Instructor Guide

Instructions

Below are a variety of offline activities to choose from to support learning in Unit 1. Choose activities to enhance learning in the classroom.

Activity 1: Word Search

With Words - Use this word search to reinforce the key terms in Unit 1. An answer key is provided.

With Clues - Use this word search to challenge learners to find key terms in Unit 1 using clues. An answer key is provided.

Activity 2: Crossword Puzzle

Solve the crossword puzzle by reading clues and filling in the answer with key terms from Unit 1. A solution key is provided.

Activity 3: Tool Selection Game

The objective of this activity is to educate learners about how to select the appropriate tool for specific AI tasks based on the tool's strengths and limitations.

Activity 4: Key Term Relay

The objective of this activity is to help learners understand and remember key terms such as Diffusion, Transformer, Variational Autoencoders (VAEs), Generative Adversarial Networks (GANs), Neural Networks, Convolutional Neural Networks (CNNs), Tokenization, Noise Generation, Refinement Algorithms, Hyperparameters, and Dataset.

Unit 1: Unplugged Activity

Activity 1: Word Search

With Words - Use this word search to reinforce the key terms in Unit 1. An answer key is provided.

With Clues – Use this word search to challenge learners to find key terms in Unit 1 using clues. An answer key is provided.

Unit 1 Word Search with Words

Complete the following word search by finding and circling all the words in the box below the puzzle. Words can be in any direction.

```
Q Q W W M S T S J K B E S N F A R F Q H U
W A M A F N Z W W G D R I G Q O B O D T W
F Z N W N N C D W U E D W V W A S Z G F R
P H Z P E Y Q J A T Y A I U C J K K A N N
T A L Z J C G L E L S T G X Q G G V O O L
O L Q Z P J C M E J M A E A D P T I I I H
K L X I Y J A V P S O S M G E T T T Z N V
E U P V J R I Q T G Y E I I P U A I P T A
N C Q R A T R Z V T A T N G L M Z A O E L
I I T P A W T A I O G O I O O G R P B G G
Z N F R Z D R L B W I P V T Y E R B S R O
A A E L I F I N H S Q E U A M N O I O A R
T T L B Z B B P U M C A K S E E E A L T I
I I E S A Y K F S N D N L P N R E S E I T
O O E I V O F N H T A J N C T A Y K S O H
N N R N B I P R O B A B I L I T Y L C N M
H A T P D C L E B R R I P K W O D X E I H
V G B U J T R A N S F O R M E R Y P N P L
B G V T Y F A T X A K K L A P I L I C L D
H A A D I S C R I M I N A T O R D D E L W
R F X N H Y P E R P A R A M E T E R S M B
```

AGI	DISCRIMINATOR	HALLUCINATION	OBSOLESCENCE
ALGORITHM	EVOLUTION	HYPERPARAMETERS	OPENAI
API	GAN	INPUT	PARAMETERS
AUTOMATION	GEMINI	INTEGRATION	PROBABILITY
BIAS	GENERATOR	ITERATIVELY	TOKENIZATION
CLAUDE	GPT	LLM	TRANSFORMER
CNN	GPUS	NLP	VARIABILITY
DATASET	DEPLOYMENT	DIFFUSION	

Unit 1 Word Search Solution Key

```
Q Q W W M S T S J K B E S N F A R F Q H U
W A M A F N Z W W G D R I G Q O B O D T W
F Z N W N N C D W U E D W V W A S Z G F R
P H Z P E Y Q J A T Y A I U C J K K A N N
T A L Z J C G L E L S T G X Q G G V O O L
O L Q Z P J C M E J M A E A D P T I I I H
K L X I Y J A V P S O S M G E T T T Z N V
E U P V J R I Q T G Y E I J P U A I P T A
N C Q R A T R Z V T A T N G L M Z A O E L
I I T P A W T A I O G O J O O G R P B G G
Z N F R Z D R L B W I P V T Y E R B S R O
A A E L I F I N H S Q E U A M N O I O A R
T T L B Z B B P U M C A K S E E E A L T I
L I E S A Y K F S N D N L P N R E S E I T
O O E I V O F N H T A J N C T A Y K S O H
N N R N B I P R O B A B I L I T Y L C N M
H A T P D C L E B R R I P K W O D X E I H
V G B U J T R A N S F O R M E R Y P N P L
B G V T Y F A T X A K K L A P I L I C L D
H A A D I S C R I M I N A T O R D D E L W
R F X N H Y P E R P A R A M E T E R S M B
```

Unit 1 Word Search with Clues

Complete the following word search by finding and circling the words that fit the clues below. Words can be in any direction.

```
Q Q W W M S T S J K B E S N F A R F Q H U
W A M A F N Z W W G D R I G Q O B O D T W
F Z N W N C D W U E D W V W A S Z G F R
P H Z P E Y Q J A T Y A I U C J K K A N N
T A L Z J C G L E L S T G X Q G G V O O L
O L Q Z P J C M E J M A E A D P T I I I H
K L X I Y J A V P S O S M G E T T T Z N V
E U P V J R I Q T G Y E I I P U A I P T A
N C Q R A T R Z V T A T N G L M Z A O E L
I I T P A W T A I O G O I O O G R P B G G
Z N F R Z D R L B W I P V T Y E R B S R O
A A E L I F I N H S Q E U A M N O I O A R
T T L B Z B B P U M C A K S E E E A L T I
I I E S A Y K F S N D N L P N R E S E I T
O O E I V O F N H T A J N C T A Y K S O H
N N R N B I P R O B A B I L I T Y L C N M
H A T P D C L E B R R I P K W O D X E I H
V G B U J T R A N S F O R M E R Y P N P L
B G V T Y F A T X A K K L A P I L I C L D
H A A D I S C R I M I N A T O R D D E L W
R F X N H Y P E R P A R A M E T E R S M B
```

Unit 1 Word Search Clues

ANSWER KEY	CLUE
	A type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI.
	An instance where an artificial intelligence model generates content that is entirely fabricated and has no connection to reality.
	A set of rules or instructions given to an AI system to help it learn from data and make decisions.
	An AI model developed by Anthropic, designed with a focus on safety, ethics, and alignment with human values.
	A set of tools and protocols that allow different software applications to communicate with each other.
	The use of technology to perform tasks without human intervention, often powered by AI.
	A tendency of AI models to reflect and perpetuate prejudices found in the training data, leading to unfair or unbalanced outputs.
	A type of deep learning model designed to analyze visual data by automatically detecting and learning features through layers.
	A collection of information used to train AI models, often consisting of images, text, or other types of information.
	The process of making a software application or AI model operational and accessible to users.
	A generative process where an image is gradually refined from random noise into a coherent and detailed visual by iteratively removing the noise, guided by a trained neural network.
	The component of a GAN that evaluates the generated data and helps the generator improve by distinguishing between real and fake data.
	The gradual development or progression of something, particularly in terms of improvement or adaptation over time.
	A type of AI model that consists of two neural networks, a generator and a discriminator, which compete against each other to create highly realistic data, such as images or videos.
	The part of a GAN that creates new data samples, attempting to mimic real data from the dataset.
	A multilingual AI model developed by Google, known for its capability to handle diverse language tasks across different languages.
	A type of AI model developed by OpenAI, designed for generating human-like text based on large-scale pre-training.
	Specialized hardware used to accelerate the training of AI models, especially in tasks involving large datasets and complex computations.
	The settings that define the architecture and behavior of a neural network, such as learning rate and number of layers.
	The data or information provided to an AI model for processing, such as text, images, or audio.
	The process of combining different systems, tools, or data sources to work together.
	Repeatedly applying a process or set of steps multiple times, often with the goal of refining or improving the outcome with each repetition.
	An AI system trained on extensive text data to perform advanced language tasks.

	A field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language.
	The process of becoming outdated or no longer useful due to advancements in technology.
	An artificial Intelligence research organization known for developing advanced AI models, including the GPT series.
	The adjustable elements within an AI model that influence how it processes and interprets data.
	A measure of the likelihood that a specific event will occur.
	The process of breaking down text into smaller units, like words or subwords, that can be processed by a transformer model.
	A type of neural network architecture that processes sequential data, like text, by considering entire sequences in parallel and using attention mechanisms to understand context and relationships within the data.
	The differences in output that can occur when an AI model processes similar inputs.

Unit 1 Word Search with Clues Answer Key

ANSWER KEY	CLUE
AGI	A type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI.
HALLUCINATION	An instance where an artificial intelligence model generates content that is entirely fabricated and has no connection to reality.
ALGORITHM	A set of rules or instructions given to an AI system to help it learn from data and make decisions.
CLAUDE	An AI model developed by Anthropic, designed with a focus on safety, ethics, and alignment with human values.
API	A set of tools and protocols that allow different software applications to communicate with each other.
AUTOMATION	The use of technology to perform tasks without human intervention, often powered by AI.
BIAS	A tendency of AI models to reflect and perpetuate prejudices found in the training data, leading to unfair or unbalanced outputs.
CNN	A type of deep learning model designed to analyze visual data by automatically detecting and learning features through layers.
DATASET	A collection of information used to train AI models, often consisting of images, text, or other types of information.
DEPLOYMENT	The process of making a software application or AI model operational and accessible to users.
DIFFUSION	A generative process where an image is gradually refined from random noise into a coherent and detailed visual by iteratively removing the noise, guided by a trained neural network.
DISCRIMINATOR	The component of a GAN that evaluates the generated data and helps the generator improve by distinguishing between real and fake data.
EVOLUTION	The gradual development or progression of something, particularly in terms of improvement or adaptation over time.
GAN	A type of AI model that consists of two neural networks, a generator and a discriminator, which compete against each other to create highly realistic data, such as images or videos.
GENERATOR	The part of a GAN that creates new data samples, attempting to mimic real data from the dataset.
GEMINI	A multilingual AI model developed by Google, known for its capability to handle diverse language tasks across different languages.
GPT	A type of AI model developed by OpenAI, designed for generating human-like text based on large-scale pre-training.
GPUS	Specialized hardware used to accelerate the training of AI models, especially in tasks involving large datasets and complex computations.
HYPERPARAMETERS	The settings that define the architecture and behavior of a neural network, such as learning rate and number of layers.
INPUT	The data or information provided to an AI model for processing, such as text, images, or audio.
INTEGRATION	The process of combining different systems, tools, or data sources to work together.
ITERATIVELY	Repeatedly applying a process or set of steps multiple times, often with the goal of refining or improving the outcome with each repetition.
LLM	An AI system trained on extensive text data to perform advanced language tasks.

| NLP	A field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language.
OBSOLESCENCE	The process of becoming outdated or no longer useful due to advancements in technology.
OPENAI	An artificial Intelligence research organization known for developing advanced AI models, including the GPT series.
PARAMETERS	The adjustable elements within an AI model that influence how it processes and interprets data.
PROBABILITY	A measure of the likelihood that a specific event will occur.
TOKENIZATION	The process of breaking down text into smaller units, like words or subwords, that can be processed by a transformer model.
TRANSFORMER	A type of neural network architecture that processes sequential data, like text, by considering entire sequences in parallel and using attention mechanisms to understand context and relationships within the data.
VARIABILITY	The differences in output that can occur when an AI model processes similar inputs.

Unit 1: Unplugged Activity

Activity 2: Crossword Puzzle

Solve the crossword puzzle by reading clues and filling in the answer with key terms from Unit 1. An answer key is provided.

Unit 1 Crossword Puzzle

Use the clues to solve the crossword puzzle.
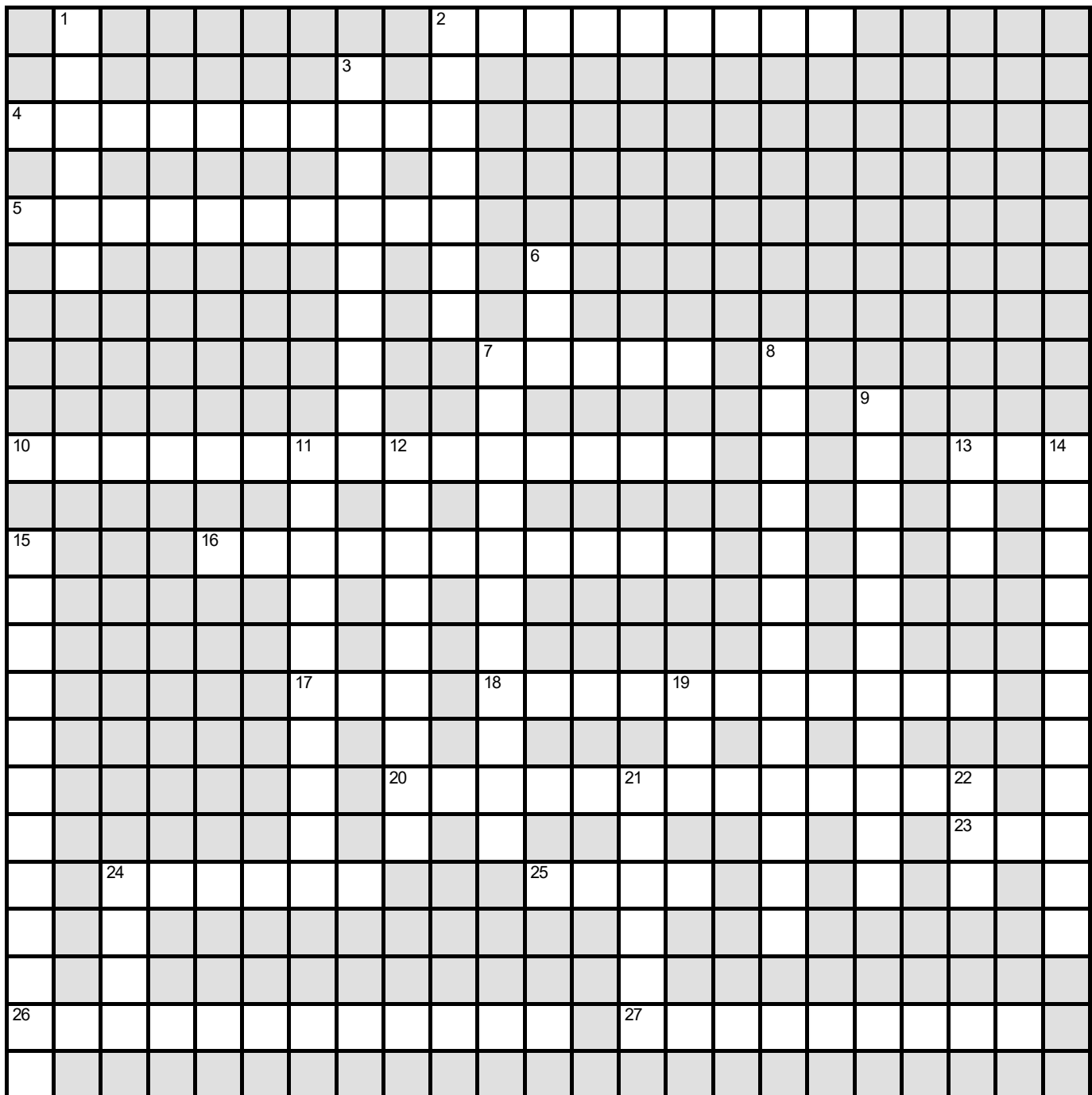
Unit 1 Crossword Clues

Across

2 A generative process where an image is gradually refined from random noise into a coherent and detailed visual by iteratively removing the noise, guided by a trained neural network. (9)

4 The process of making a software application or AI model operational and accessible to users. (10)

5 The adjustable elements within an AI model that influence how it processes and interprets data. (10)

7 The data or information provided to an AI model for processing, such as text, images, or audio. (5)

10 The settings that define the architecture and behavior of a neural network, such as learning rate and number of layers. (15)

13 A type of AI model developed by OpenAI, designed for generating human-like text based on large-scale pre-training. (3)

16 The process of combining different systems, tools, or data sources to work together. (11)

17 A type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI. (3)

18 The differences in output that can occur when an AI model processes similar inputs. (11)

20 An instance where an artificial intelligence model generates content that is entirely fabricated and has no connection to reality. (13)

23 An AI system trained on extensive text data to perform advanced language tasks. (3)

24 A multilingual AI model developed by Google, known for its capability to handle diverse language tasks across different languages. (6)

25 A tendency of AI models to reflect and perpetuate prejudices found in the training data, leading to unfair or unbalanced outputs. (4)

26 The process of becoming outdated or no longer useful due to advancements in technology. (12)

27 The gradual development or progression of something, particularly in terms of improvement or adaptation over time. (9)

Down

1 An artificial Intelligence research organization known for developing advanced AI models, including the GPT series. (6)

2 A collection of information used to train AI models, often consisting of images, text, or other types of information. (7)

3 The part of a GAN that creates new data samples, attempting to mimic real data from the dataset. (9)

6 A type of deep learning model designed to analyze visual data by automatically detecting and learning features through layers. (3)

7 Repeatedly applying a process or set of steps multiple times, often with the goal of refining or improving the outcome with each repetition. (11)

8 The component of a GAN that evaluates the generated data and helps the generator improve by distinguishing between real and fake data. (13)

9 A measure of the likelihood that a specific event will occur. (11)

11 The use of technology to perform tasks without human intervention, often powered by AI. (10)

12 A set of rules or instructions given to an AI system to help it learn from data and make decisions. (9)

13 A type of AI model that consists of two neural networks, a generator and a discriminator, which compete against each other to create highly realistic data, such as images or videos. (3)

14 A type of neural network architecture that processes sequential data, like text, by considering entire sequences in parallel and using attention mechanisms to understand context and relationships within the data. (11)

15 The process of breaking down text into smaller units, like words or subwords, that can be processed by a transformer model. (12)

19 A set of tools and protocols that allow different software applications to communicate with each other. (3)

21 An AI model developed by Anthropic, designed with a focus on safety, ethics, and alignment with human values. (6)

22 A field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language. (3)

24 Specialized hardware used to accelerate the training of AI models, especially in tasks involving large datasets and complex computations. (4)

Unit 1 Crossword Puzzle Answer Key

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	O(1)								D(2)	I	F	F	U	S	I	O	N					
	P						G(3)		A													
D(4)	E	P	L	O	Y	M	E	N	T													
	N						N		A													
P(5)	A	R	A	M	E	T	E	R	S													
	I						R		E		C(6)											
							A		T		N											
							T			I(7)	N	P	U	T		D(8)						
							O			T						I		P(9)				
H(10)	Y	P	E	R	P	A(11)	R	A(12)	M	E	T	E	R	S		S		R		G(13)	P	T(14)
						U		L		R						C		O		A		R
T(15)				I(16)	N	T	E	G	R	A	T	I	O	N		R		B		N		A
O						O		O		T						I		A				N
K						M		R		I						M		B				S
E						A(17)	G	I		V(18)	A	R	I	A(19)	B	I	L	I	T	Y		F
N						T		T		E				P		N		L				O
I						I		H(20)	A	L	L	U	C(21)	I	N	A	T	I	O	N(22)		R
Z						O		M		Y			L			T		T		L(23)	L	M
A		G(24)	E	M	I	N	I				B(25)	I	A	S		O		Y		P		E
T		P											U			R						R
I		U											D									
O(26)	B	S	O	L	E	S	C	E	N	C	E		E(27)	V	O	L	U	T	I	O	N	
N																						

Across: 2 DIFFUSION, **4** DEPLOYMENT, **5** PARAMETERS, **7** INPUT, **10** HYPERPARAMETERS, **13** GPT, **16** INTEGRATION, **17** AGI, **18** VARIABILITY, **20** HALLUCINATION, **23** LLM, **24** GEMINI, **25** BIAS, **26** OBSOLESCENCE, **27** EVOLUTION.
Down: 1 OPENAI, **2** DATASET, **3** GENERATOR, **6** CNN, **7** ITERATIVELY, **8** DISCRIMINATOR, **9** PROBABILITY, **11** AUTOMATION, **12** ALGORITHM, **13** GAN, **14** TRANSFORMER, **15** TOKENIZATION, **19** API, **21** CLAUDE, **22** NLP, **24** GPUS.

Unit 1: Methods

Activity 3: Tool Selection Game

Objective: To educate learners about how to select the appropriate tool for specific AI tasks based on the tool's strengths and limitations.

Materials Needed:
- Large poster or whiteboard
- Task descriptions (provided)
- Cards
- AI Tool Card list (provided)
- Markers

Instructions:
- Present the group with a list of AI-related tasks on a poster or whiteboard.
- Give each group a set of cards with different AI tools.
- Explain that the task for each group is to choose the most appropriate tool for each task, describing why that tool is best suited for the job.
- Ask each group to present their choices and reasoning to the class.
- Wrap up by facilitating a discussion about any limitations or challenges learners faced in selecting the right tool and how these reflect the real-world challenges of generative AI.

AI Tool Cards

ChatGPT

Microsoft Copilot

Google Gemini

Meta AI

Adobe Express

Claude

Microsoft Azure AI Studio

Stable Diffusion

DALL-E

Adobe Firefly

Task Descriptions

Generate an image based on a text description.

Summarize a lengthy research paper into key points.

Create a chatbot that answers frequently asked questions for a customer service team.

Design a custom marketing flyer using AI-generated graphics.

Translate a conversation in real-time between English and Spanish.

Generate an original piece of background music for a short video for use on Meta social media platforms.

Write a creative short story based on a set of user-provided keywords.

Analyze customer reviews to identify common themes and sentiments.

Create a 3D model of a product concept based on a rough sketch.

Generate a personalized workout plan using AI based on user input (age, fitness level, goals).

Activity 3: The Tool Selection Game Answer Key

Generate an image based on a text description.

Tool: DALL-E or Adobe Firefly

Explanation: Both DALL-E and Adobe Firefly are excellent for generating high-quality images from text prompts. DALL-E focuses on a wide variety of image styles, while Adobe Firefly can add extra creative flair.

Summarize a lengthy research paper into key points.

Tool: ChatGPT or Claude

Explanation: Both ChatGPT and Claude are advanced large language models. ChatGPT is known for generating coherent summaries, while Claude specializes in producing clear and concise summaries from complex text.

Create a chatbot that answers frequently asked questions for a customer service team.

Tool: Microsoft Azure AI Studio

Explanation: Azure AI Studio is designed to build custom, domain-specific chatbots, making it perfect for setting up a chatbot that can handle FAQs effectively.

Design a custom marketing flyer using AI-generated graphics.

Tool: Adobe Express or Adobe Firefly

Explanation: Adobe Express is designed for creating marketing materials, while Adobe Firefly enhances design with AI-generated graphics. Together, they offer a seamless solution for flyer design.

Translate a conversation in real-time between English and Spanish.

Tool: Google Gemini

Explanation: Google Gemini, as part of Google's AI ecosystem, has strong multilingual translation capabilities, which makes it ideal for real-time translations.

Generate an original piece of background music for a short video for use on Meta social media platforms.

Tool: Meta AI

Explanation: Meta AI focuses on creative multimedia applications, including audio generation, making it a great choice for generating music for videos.

Write a creative short story based on a set of user-provided keywords.

Tool: ChatGPT or Claude

Explanation: Both ChatGPT and Claude excel at creative writing. They are well-suited to generating coherent, imaginative short stories from keywords provided by the user.

Analyze customer reviews to identify common themes and sentiments.

Tool: Microsoft Copilot

Explanation: Microsoft Copilot integrates with business tools like Excel and Word, allowing it to quickly analyze large datasets (e.g., customer reviews) and extract themes and sentiments.

Create a 3D model of a product concept based on a rough sketch.

Tool: Adobe Firefly

Explanation: Adobe Firefly can transform rough sketches into refined, 3D-like images, making it ideal for visualizing product concepts from simple designs.

Generate a personalized workout plan using AI based on user input (age, fitness level, goals).

Tool: ChatGPT

Explanation: ChatGPT, with its ability to process detailed inputs and provide text-based outputs, is well-suited to generating personalized workout plans based on various user parameters like age and fitness level.

Unit 1: Methods

Activity 4: Key Term Relay

Objective: To help learners understand and remember key terms such as Diffusion, Transformer, Variational Autoencoders (VAEs), Generative Adversarial Networks (GANs), Neural Networks, Convolutional Neural Networks (CNNs), Tokenization, Noise Generation, Refinement Algorithms, Hyperparameters, and Dataset.

Materials Needed:
- Index cards with the vocabulary words on one side and definitions or key facts on the other side (Pages 2-4).
- A list of Connection Questions for each team (Page 5).
- A list of Example AI Tasks for each team (Page 6).
- Chart paper and markers.
- Tape or sticky notes to attach the cards to a wall or board.

Instructions:
- Place the vocabulary word cards around the room at different stations.
- Divide learners into small teams.
- Each team will start at a different station.
- At each station, teams will examine the vocabulary word and try to write their own explanation or guess what the word means based on what they know.
- After writing their guess, they check the definition/explanation to determine if they were correct. They can then rewrite their explanation or make notes if needed.
- After four minutes at the station, teams will rotate to a new station.
- After visiting every station, teams will sit down and work on making connections between the words by answering the provided list of Connection Questions.
- Next, teams will identify which vocabulary words relate to the provided list of Example AI Tasks.
- After completing the relay, gather the class to discuss the meanings of each word and how they connect to real-world AI processes.

Vocabulary Cards

Front: Diffusion

Back:

- **Fact 1:** Diffusion is a generative process that starts with random noise and gradually refines it into a coherent output, often used in image generation.

- **Fact 2:** It is iterative, meaning the model makes multiple passes over the data to reduce noise and improve clarity.

- **Fact 3:** Popular in models like Stable Diffusion, which use this method to create high-quality images from prompts.

Front: Neural Networks

Back:

- **Fact 1:** Neural networks are like brain-inspired systems made of layers of connected "neurons" that help computers learn from data.

- **Fact 2:** They are used in AI to make decisions, like recognizing pictures or creating text, by learning patterns from lots of examples.

- **Fact 3:** The more layers a neural network has, the more complex tasks it can handle, which is why deeper networks are used for harder problems.

Front: Transformer

Back:

- **Fact 1:** A transformer is a neural network architecture that processes input data in parallel. Multiple tasks or operations are performed simultaneously rather than sequentially, allowing for faster processing.

- **Fact 2:** Transformers are key to models like GPT, which generate and understand complex text-based sequences.

- **Fact 3:** Transformers focus on relevant parts of the input, improving contextual understanding.

Front: Variational Autoencoders (VAEs)

Back:

- **Fact 1:** VAEs learn to compress information into a simpler version (called encoding) and then recreate the original data from that compressed version.

- **Fact 2:** They are used to generate new data that appears similar to what they were trained on, like new images or text that resemble the original.

- **Fact 3:** VAEs work well for generating realistic outputs, but they are less competitive compared to Generative Adversarial Networks for certain tasks, like very detailed images.

Front: Generative Adversarial Networks (GANS)

- **Fact 1:** Consist of two neural networks, a generator and a discriminator, where the generator creates data, and the discriminator evaluates it.

- **Fact 2:** The generator improves by trying to "fool" the discriminator, leading to increasingly realistic outputs over time.

- **Fact 3:** GANs are widely used in generating images, videos, and even music but can struggle with instability during training.

Front: Convolutional Neural Networks (CNNs)

- **Fact 1:** CNNs are specialized for analyzing visual data, making them ideal for image classification, recognition, and generation.

- **Fact 2:** They automatically detect patterns such as edges, textures, and shapes in images.

- **Fact 3:** CNNs are hierarchical, meaning they first learn low-level features (like edges) and gradually learn more complex features (like objects).

Front: Tokenization

Back:

- **Fact 1:** Tokenization is the process of splitting text into smaller units (tokens) such as words or subwords, which are straightforward for AI models to process.

- **Fact 2:** Large language models like GPT use tokenization to understand and generate text, as each token is mapped to a numerical representation.

- **Fact 3:** Effective tokenization can improve a model's performance by capturing more nuanced meanings of text, especially in languages with complex morphology.

Front: Noise Generation

Back:

- **Fact 1:** Noise generation means adding random changes to data and then refining it, like starting with a blurry image before improving it.

- **Fact 2:** This process is key to creative tasks, as it allows models to start with abstract forms before honing in on specific outputs.

- **Fact 3:** I Adding noise helps AI learn better by making sure it doesn't just memorize the data but understands data and its patterns more generally.

Front: Refinement Algorithms

Back:

- **Fact 1:** Refinement algorithms are used to improve the quality of generated outputs by making iterative adjustments to reduce noise or correct errors.

- **Fact 2:** In image generation, refinement algorithms help enhance the clarity and detail of an image over multiple steps.

- **Fact 3:** These algorithms are critical in models like GANs and Diffusion models, as they help ensure outputs are high quality and realistic.

Front: Hyperparameters

Back:

- **Fact 1:** Hyperparameters are settings that control the behavior of a model during training, such as learning rate, batch size, and number of layers.

- **Fact 2:** They are not learned by the model itself but must be manually tuned to optimize performance and prevent issues like overfitting.

- **Fact 3:** Adjusting hyperparameters can significantly affect the model's efficiency, accuracy, and convergence speed during training.

Front: Dataset

Back:

- **Fact 1:** A dataset is a collection of data (text, images, audio, etc.) used to train and evaluate AI models, and its quality is crucial for model performance.

- **Fact 2:** Large and diverse datasets help generative models like GPT and DALL-E learn from a wide range of examples, improving the output.

- **Fact 3:** In image models, datasets often consist of text-image pairs for better image generation.

Connection Questions

How does diffusion use noise to turn a messy image into something clear?

How do neural networks help models like GANs and VAEs create new things like images or text?

How does tokenization help transformers like GPT understand and make sentences?

How do datasets help both CNNs and transformers learn to create or recognize things like pictures or text?

Why is adjusting hyperparameters important to make models like GANs and diffusion work better?

How do refinement algorithms help models like VAEs and GANs make better and clearer outputs?

How is noise generation used differently in GANs and diffusion models to create images?

How do CNNs and refinement algorithms work together to improve image quality?

How do transformers and tokenization work together to generate meaningful sentences?

How do good datasets help models like diffusion and VAEs create better results?

Example AI Tasks

Remove background noise from an audio clip to enhance sound quality.

Create a realistic photo of a futuristic city from a text description.

Generate a summary of a research paper for quick reading.

Generate a fake celebrity face that appears highly realistic for a game.

Improve the resolution of a low-quality photo for print use.

Analyze a set of customer reviews to detect common themes like "service quality" or "delivery speed".

Train a chatbot to respond to common customer questions based on historical data.

Automatically generate variations of an image, like different color schemes for a product design

Translate a document from English to Spanish using AI.

Create a new version of a logo by blending two existing designs.

Activity 4: The Key Term Relay Answer Key

Connection Questions

How does diffusion use noise to turn a messy image into something clear?

Sample Answer: Diffusion starts by adding random noise to an image and then uses an AI model to gradually remove that noise step by step. As the noise is removed, the model refines the image until it becomes clear and detailed.

How do neural networks help models like GANs and VAEs create new things like images or text?

Sample Answer: Neural networks learn patterns from data by adjusting their connections, helping models like GANs and VAEs generate new images or text by understanding how different elements fit together.

How does tokenization help transformers like GPT understand and make sentences?

Sample Answer: Tokenization breaks a sentence into smaller units (like words or parts of words). This allows transformer models like GPT to process the text in chunks, making it straightforward for them to understand meaning and generate new sentences.

How do datasets help both CNNs and transformers learn to create or recognize things like pictures or text?

Sample Answer: Datasets provide examples that CNNs and transformers use to learn. For CNNs, image datasets teach them to recognize patterns in pictures. For transformers, text datasets help them understand language and how sentences are structured.

Why is adjusting hyperparameters important to make models like GANs and diffusion work better?

Sample Answer: Hyperparameters control how the model learns, such as how fast it adjusts or how much data it processes at once. Adjusting them can help GANs and diffusion models perform better by finding the right balance between learning too quickly or too slowly.

How do refinement algorithms help models like VAEs and GANs make better and clearer outputs?

Sample Answer: Refinement algorithms improve the quality of the output by making small adjustments. In VAEs and GANs, these algorithms help clean up blurry or imperfect images, making them sharper and more realistic.

How is noise generation used differently in GANs and diffusion models to create images?

Sample Answer: In diffusion models, noise is added at the beginning and then slowly removed to create a clear image. In GANs, the noise is used by the generator to create a completely new image from random input, and the discriminator helps make the result appear realistic.

How do CNNs and refinement algorithms work together to improve image quality?

Sample Answer: CNNs analyze images by detecting patterns, like edges and textures. Refinement algorithms then take the CNN's output and make it even clearer by correcting mistakes and enhancing details, leading to a better-quality image.

How do transformers and tokenization work together to generate meaningful sentences?

Sample Answer: Transformers rely on tokenization to break down sentences into smaller parts. They then use these tokens to understand the relationships between words and generate new sentences that make sense based on the input.

How do good datasets help models like diffusion and VAEs create better results?

Sample Answer: Good datasets provide diverse and high-quality examples for models like diffusion and VAEs to learn from. The more variety and quality in the dataset, the better the model can generate realistic and accurate results, whether it's creating images or other outputs.

Example AI Tasks

Remove background noise from an audio clip to enhance sound quality

Linked to: Noise Generation, Refinement Algorithms

Sample Explanation: Noise generation is key because the AI must identify and separate the "noise" from the desired sound. Refinement algorithms help the AI continuously improve the audio quality, removing unnecessary distortions.

Create a realistic photo of a futuristic city from a text description

Linked to: Diffusion, GANs, Dataset

Sample Explanation: The **diffusion** process starts with noise and refines the image gradually to match the text description. **GANs** help by having two models, one generating the image and the other judging its realism, leading to better-quality outputs. The AI relies on a **dataset** of existing images to learn what a "futuristic city" might appear like.

Generate a summary of a research paper for quick reading

Linked to: Transformer, Tokenization, Dataset

Sample Explanation: Transformer models like GPT handle the complexity of summarizing long texts. **Tokenization** breaks the text into smaller units that the model can process. The AI draws from a **dataset** of similar texts to understand key ideas.

Generate a fake celebrity face that appears highly realistic for a game

Linked to: GANs, Neural Networks, Refinement Algorithms

Sample Explanation: GANs generate realistic faces by having one model create and another judge the results. **Neural networks** process complex features like facial structures. **Refinement algorithms** enhance the realism by fine-tuning the generated face until it appears authentic.

Improve the resolution of a low-quality photo for print use

Linked to: Refinement Algorithms, CNNs, Hyperparameters

Sample Explanation: Refinement algorithms gradually sharpen and enhance the photo, improving clarity. **Convolutional neural networks (CNNs)** specialize in analyzing and improving visual data. **Hyperparameters** are adjusted to control the level of improvement and how the model learns during training.

Analyze a set of customer reviews to detect common themes like "service quality" or "delivery speed"

Linked to: Neural Networks, Dataset

Sample Explanation: Neural networks process the text data to identify patterns and themes across reviews. The AI relies on a **dataset** of past reviews and similar texts to recognize important topics and make predictions.

Train a chatbot to respond to common customer questions based on historical data

Linked to: Transformer, Tokenization, Dataset

Sample Explanation: Transformer models handle natural language understanding and generation to make the chatbot respond intelligently. **Tokenization** breaks down the customer's input into manageable parts, and the AI uses a **dataset** of previous interactions to provide accurate answers.

Automatically generate variations of an image, like different color schemes for a product design

Linked to: VAEs, Noise Generation, Dataset

Sample Explanation: Variational autoencoders (VAEs) create variations by altering small details in the original image, such as colors. **Noise generation** adds randomness, allowing the model to explore new possibilities. A **dataset** of images guides the model in generating realistic variations.

Translate a document from English to Spanish using AI

Linked to: Transformer, Tokenization, Dataset

Sample Explanation: Transformer models are excellent for translation tasks as they handle the sequential relationships between words in different languages. **Tokenization** splits the text into smaller units for straightforward processing. A large **dataset** of multilingual texts helps the AI learn the correct translations.

Create a new version of a logo by blending two existing designs

Linked to: GANs, Refinement Algorithms, Neural Networks

Sample Explanation: GANs combine features from two existing designs to generate a new one, with the generator creating and the discriminator judging. **Refinement algorithms** ensure that the final logo appears polished and professional. **Neural networks** learn the characteristics of logos from the dataset and apply them to the new design.

Generative AI Foundations
Course Key Terms

Term	Definition
Accessibility	The ease with which individuals or organizations can use and benefit from technology, including AI tools.
Accountability	The responsibility of individuals or organizations to answer for their actions and ensure they are following set standards and ethics.
Actionable	Clear, specific, and able to be directly used to make decisions or take steps.
Adapt	To modify content to make it more suitable for a different purpose, audience, or situation.
Add Objects	The process of inserting new elements into a video scene, ensuring they integrate smoothly with the existing footage.
Adobe Express	A tool that uses AI to assist with graphic design and content creation.
Adobe Firefly	An AI-powered tool by Adobe designed to enhance creative workflows by generating images, effects, and other visual content from text-based inputs.
Aesthetic	The visual appearance or style of a graphic, affecting its appeal and effectiveness.
AGI (Artificial General Intelligence)	A type of artificial intelligence that aims to perform any intellectual task that a human can do, still largely theoretical compared to current narrow AI.
AI Hallucination	An instance where an artificial intelligence model generates content that is entirely fabricated and has no connection to reality.
AI System	A computer-based system that uses algorithms and data to perform tasks typically requiring human intelligence.
Algorithm	A set of rules or instructions given to an AI system to help it learn from data and make decisions.
Ambiguous	Unclear or vague, often in a way that can lead to misunderstandings.
Analytical AI	A type of artificial intelligence focused on processing and interpreting complex data to extract meaningful insights and support decision-making.
Anonymization	The process of removing or altering personal information so that individuals cannot be identified.
Anthropic	An AI research company focused on developing AI systems that are safe, ethical, and aligned with human values.
Anthropic Claude	An AI model developed by Anthropic, designed with a focus on safety, ethics, and alignment with human values.

API (Application Programming Interface)	A set of tools and protocols that allow different software applications to communicate with each other.
Artificial Intelligence	The simulation of human intelligence processes by computer systems.
Artistic Style	The distinctive techniques and visual characteristics used in creating art, often associated with specific movements or artists.
Assumptions	Unstated expectations that the AI may not interpret correctly, leading to incorrect or incomplete outputs.
Attention Layers	The components of a transformer that allow the model to focus on specific parts of the input data when making predictions.
Audience	The group of people for whom the content is intended, which can affect both the style and tone of the output.
Audio	Sound recordings, including speech or music, used as input for processing by AI models.
Automated Customer Support	Systems that handle consumer inquiries without the need for human intervention, often through chatbots or automated messaging.
Automation	The use of technology to perform tasks without human intervention, often powered by AI.
Avatar	A digital representation of a character, often used in videos or virtual environments to deliver content or interact with users.
Background Information	The relevant details about a task or project that provide the AI with a better understanding of what is required.
Bar Chart	A graphical representation of data using bars of different lengths or heights.
Bias	A tendency of AI models to reflect and perpetuate prejudices found in the training data, leading to unfair or unbalanced outputs.
Bias in Data	The presence of unfair representation or favoritism within a dataset.
Bias Mitigation	The strategies and actions taken to reduce or eliminate bias in processes, decisions, or outcomes.
Canva	An online design tool that incorporates AI to simplify graphic design tasks.
Chain-of-Thought Prompting	Encouraging the AI to provide a step-by-step breakdown of its reasoning to reach a conclusion.
Chronology	The arrangement of events or dates in the order of their occurrence.
Civil Liability	A legal responsibility arising from a violation of private rights, typically resulting in the requirement to compensate for damages.

Class	A distinct group or category that data points are organized into based on shared characteristics or features.
Classification	The task of predicting the category of a given data point.
CNN (Convolutional Neural Network)	A type of deep learning model designed to analyze visual data by automatically detecting and learning features through layers.
Color Scheme	A specific combination of colors used in an image or design to create a particular mood or aesthetic.
Colorize	The process of adding color to a black-and-white film or image, often for restoration or artistic purposes.
Company Policy	A set of rules or guidelines established by a company to govern employee actions and ensure legal compliance.
Competitive Edge	The advantage that an individual or organization has over its competitors, often due to superior technology, innovation, or strategy.
Computational Resources	The hardware and software tools required to train AI models, including processors, memory, and storage.
Condense	To reduce the length of a text while maintaining its essential elements.
Consistency	The degree to which an AI model produces the same output when given the same input across multiple instances.
Constraints	The parameters or limits set in the prompt to guide the AI's response in terms of length, format, or focus.
Content Gathering	The process of collecting and compiling information on a specific topic.
Content Moderation	The process of monitoring and managing user-generated content to ensure it complies with standards and policies.
Contextual Relevance	The ability of an AI model to generate or interpret text that is appropriate to the given context.
Continuity	The consistency and logical flow of content across multiple AI interactions or responses.
Contrast	The difference in luminance or color that makes an object or element in an image distinguishable from others, often used to create emphasis or visual interest.
Conversational AI	Artificial intelligence models designed to interact with users in natural language, simulating human dialogue.
Convolutional Layer	A component in a neural network that applies filters to input data to capture important visual features like edges and textures.
Core Message	The essential idea or argument that a text conveys.

Cost	The financial expenditure required to acquire, maintain, and operate a tool or system.
Credibility	The quality of being trusted and believed in.
Credit Score	A number that represents a person's creditworthiness, often used by lenders.
Criminal Liability	A legal responsibility for committing a crime, which may result in penalties such as fines, imprisonment, or other sanctions.
Cross-Checking	The process of verifying multiple responses to ensure consistency and accuracy.
Custom GPT	A tailored AI chatbot that customizes OpenAI's GPT models to perform specific functions for users.
Customizability	The ability of a tool or system to be tailored to specific user needs or preferences.
Customization	The process of tailoring AI models to perform specific, individualized tasks.
Cyberstalking	The use of the internet, social media, or other digital means to harass, intimidate, or stalk an individual repeatedly, often causing fear or distress.
DALL-E	An AI model developed by OpenAI that generates images from textual descriptions, allowing users to create detailed and imaginative visuals based on prompts.
Data Analysis	The process of examining and interpreting information to extract useful facts and insights, often assisted by AI tools.
Data Collection	The process by which AI tools gather information from users, often for the purpose of improving model accuracy.
Data Compliance	The process of following laws and regulations related to data privacy and security.
Data Discrepancy	A difference or inconsistency between datasets or reports.
Data Leak	The unauthorized release or exposure of private data.
Data Privacy	The protection of personal and sensitive information from unauthorized access or disclosure.
Data Protection	The measures taken to ensure that user information is kept secure and is not exposed to unauthorized access.
Data Variability	The extent to which points in a set differ from each other or from a central value, indicating diversity or inconsistency within the set.
Dataset	A collection of information used to train AI models, often consisting of images, text, or other types of information.
Decision-Making	The ability to make choices or recommendations based on data.

Deepfake	A form of artificially generated media (videos, images, or audio) that mimic real people or events in misleading ways.
Defamation	The act of making false statements about someone that damage their reputation.
Democratic Processes	The systems and procedures, such as voting and public debate, through which a population participates in decision-making and governance.
Deployment	The process of making a software application or AI model operational and accessible to users.
Description	A detailed account of the elements and characteristics of an image, capturing its visual and contextual information.
Diffusion	A generative process where an image is gradually refined from random noise into a coherent and detailed visual by iteratively removing the noise, guided by a trained neural network.
Disclosure	The act of making something known or revealing information that was previously hidden.
Discrimination	The unjust or prejudicial treatment of different categories of people.
Discriminative AI	A type of artificial intelligence that focuses on distinguishing between different classes or categories within a dataset.
Discriminator	The component of a GAN that evaluates the generated data and helps the generator improve by distinguishing between real and fake data.
Documentation	The process of recording the steps and methods used to create a work or complete a task.
Duration	The length of time over which the interpolation or transition occurs.
Ease of Use	The degree to which a tool or system is user-friendly and intuitive to operate.
Editing	The process of revising content to improve clarity, flow, structure, and overall quality.
Efficiency	The ability to achieve desired outcomes with minimal waste of time, energy, or resources.
Encryption Protocols	A set of standardized procedures for encrypting data to ensure secure communication and protect information from unauthorized access.
Energy Consumption	The amount of energy required to power the computational resources used during model training.
Environmental Impact	The effect that technological operations, including AI, have on the environment, particularly in terms of energy consumption and resource use.
Ethical Considerations	The principles that guide decision-making and behavior, especially in ensuring fairness, integrity, and respect for individuals.

Ethics	The branch of knowledge that deals with moral principles and what behaviors are right and desirable.
Evolution	The gradual development or progression of something, particularly in terms of improvement or adaptation over time.
Example	A sample or model used to guide the AI's output by displaying what the final result should appear like.
Expertise	The level of knowledge or proficiency that the AI displays when responding in a particular role.
Explicit Instructions	Clear and detailed instructions that leave no room for misinterpretation.
Fact-Checking	The process of verifying the accuracy of statements or reports.
Fairness	Impartial and just treatment without favoritism or discrimination.
False Advertising	The practice of using misleading, fabricated, or unsubstantiated claims to promote products or services.
Few-Shot Prompting	Providing a few examples to help the AI understand the task before generating an output.
Filters	Tools or features that modify or enhance the appearance of images or videos, often by applying visual effects, color changes, or overlays.
Fine-Tuning	The process of making specific adjustments to a pre-trained AI model to improve its performance on a particular task.
Flexibility	The ability to adapt or change in response to new conditions or demands.
Formatting	The arrangement of text, including headings, paragraphs, bullet points, and punctuation, to meet specific guidelines.
Fraud	A deliberate deception intended to result in financial or personal gain.
Functionality	The range of tasks and operations that a tool or system can perform.
GAN (Generative Adversarial Network)	A type of AI model that consists of two neural networks, a generator and a discriminator, which compete against each other to create highly realistic data, such as images or videos.
Generative AI	A subset of artificial intelligence focused on creating content, such as images, text, music, or videos.
Generative Audio	Sound or music produced by an AI model based on input data.
Generative Image	Visual content generated by an AI model from textual or visual input.
Generative Text	Written content produced by an AI model based on input data.
Generative Video	Video content created by an AI model from scripts, storyboards, or visual descriptions.

Generator	The part of a GAN that creates new data samples, attempting to mimic real data from the dataset.
Global Collaboration	Working together across countries and cultures, often facilitated by technology.
Glossary	A list of specialized or technical terms along with their definitions or translations, used to ensure accuracy and consistency.
Google	A widely used search engine that indexes and retrieves vast amounts of information from the web in response to user queries.
Google Gemini	A multilingual AI model developed by Google, known for its capability to handle diverse language tasks across different languages.
Google Gems	A tailored AI chatbot that customizes Google's Gemini AI for specific language-related tasks.
GPT (Generative Pre-trained Transformer)	A type of AI model developed by OpenAI, designed for generating human-like text based on large-scale pre-training.
GPTx	The evolving versions of OpenAI's GPT models, where "x" serves as a placeholder for the specific version number (e.g., GPT-3, GPT-3.5, GPT-4).
GPUs (Graphics Processing Units)	Specialized hardware used to accelerate the training of AI models, especially in tasks involving large datasets and complex computations.
Guardrails	Limitations or constraints placed on AI outputs to prevent harmful content.
Harassment	Unwanted, repeated behavior or actions intended to intimidate, disturb, or harm another person physically, emotionally, or mentally.
Historical Bias	A skewed interpretation of historical events based on the perspective of the narrator.
Human Motivation	The internal drive or desire that prompts individuals to act in a certain way to achieve goals or fulfill needs.
Human Values	The moral principles and beliefs that guide the behavior and decisions of individuals and organizations.
Human-Generated Content	A type of content created by individuals, such as text, images, or videos, which can be used to train AI models.
Hyperparameters	The settings that define the architecture and behavior of a neural network, such as learning rate and number of layers.
Ideation	The generation of ideas, often in a brainstorming context, to create new content or solve problems.
Identity Theft	The act of stealing someone's personal information to commit fraud.
Image	Static visual representations used as input for AI models focused on tasks like recognition or generation.

Image Classification	The task of categorizing images into predefined classes based on their visual content using models like CNNs.
Image Model	An AI representation designed to generate or interpret visual content, such as images and graphics.
Image Recognition	The process of identifying and classifying objects, people, or other elements within an image using AI.
In Parallel	Refers to performing multiple tasks or processes simultaneously rather than one after the other.
Information Retrieval	The process of obtaining relevant data or documents from a database in response to a user query.
Infringement	The act of violating someone's intellectual property rights.
Input	The data or information provided to an AI model for processing, such as text, images, or audio.
Input-Output Dynamic	The relationship between the user's instructions and the AI's resulting response.
Integration	The process of combining different systems, tools, or data sources to work together.
Interpolate	To create a smooth transition between two or more images, blending visual elements seamlessly.
Intervention	The act of taking action to modify or stop a process that is causing harm.
IP (Intellectual Property)	The legal rights that protect creations of the mind, such as inventions, literary works, and designs.
Iteratively	Repeatedly applying a process or set of steps multiple times, often with the goal of refining or improving the outcome with each repetition.
Job Displacement	The loss of employment due to technological advances or other economic changes.
Knowledge Generation	Using AI to produce new insights, ideas, or explanations based on its vast dataset.
Labeled Data	Images that have been tagged with descriptions or classifications, used to train AI models.
Latent Space	A compressed representation of data learned by a model, from which new variations can be generated.
Layered Task	A complex process that requires multiple steps or stages to complete, often achieved through prompt chaining.
Leading Question	A query that suggests a particular answer or contains bias.
Learning Rate	A hyperparameter that controls how much the model's guesses are adjusted with each step during training.

Liability	A legal responsibility for one's actions or failure to act, which may result in being subject to a lawsuit or penalties.
Licensing	The act of granting permission to use someone else's intellectual property under certain conditions.
LLaMA (Large Language Model Meta AI)	A research-focused AI model developed by Meta, optimized for studying language processing and AI model behavior.
LLM (Large Language Model)	An AI system trained on extensive text data to perform advanced language tasks.
Logical Reasoning	A process of thinking through a problem in an organized, step-by-step manner.
Loop	A continuous motion effect that repeats seamlessly without noticeable transitions.
Loophole	A gap or ambiguity in laws or regulations that allow individuals or organizations to exploit them without technically breaking the rules.
Machine Learning	A subset of AI that enables systems to learn from data and improve their performance over time without being explicitly programmed.
Mannerisms	The gestures, expressions, and movements of the avatar, which contribute to its personality and delivery.
Manual Labor	The physical work performed by humans, typically involving the use of hands and physical effort rather than machinery or automation.
Marginalization	The act of treating a person or group as insignificant or peripheral.
Media Type	The form in which content is presented, such as text, audio, video, or images.
Medium	The material or form through which artistic or creative content is expressed, such as painting, photography, or digital art.
Meta	A technology company that develops social media platforms and AI research projects, including advanced AI models like LLaMA.
Microsoft Azure AI Studio	A platform for building, deploying, and managing AI models.
Misinformation	The false or inaccurate information that may be generated by AI, often due to flawed or incomplete input data.
Model Training	The process of teaching an AI system to perform specific tasks by learning from data.
Mood	The emotional tone or atmosphere conveyed by the image, often influenced by colors, lighting, and composition.
Morph	The transformation of one shape or image into another, often used in interpolation.

Motion	The movement of elements within an image, adding dynamic effects to an otherwise static visual.
Multilingual	The ability of an AI model to understand and generate text in multiple languages.
Multi-Step Reasoning	Tasks that require several steps to arrive at the correct solution or conclusion.
Narrative	A storyline or sequence of events.
Narrow AI	A type of artificial intelligence designed to perform a specific task or a narrow range of tasks.
Neural Network	Computational models inspired by the human brain, used in AI to recognize patterns and make decisions.
Neutrality	The state of being impartial or unbiased.
NLP (Natural Language Processing)	A field of artificial intelligence focused on enabling computers to understand, interpret, and generate human language.
Noise Generation	The process of adding random data (noise) to an image, which is later refined by the diffusion model to create a coherent image.
Obsolescence	The process of becoming outdated or no longer useful due to advancements in technology.
Obsolete	No longer in use or replaced by a newer, more effective alternative.
OpenAI	An artificial Intelligence research organization known for developing advanced AI models, including the GPT series.
Open-Ended Question	A query designed to elicit a broad range of responses, encouraging creativity and exploration.
Opt Out	The action of choosing not to participate in a particular service or process.
Output	The result generated by an AI model after processing the input, such as generated text, video, images, or audio.
Output Control	The settings and parameters that allow users to influence the nature and quality of the outputs generated by a tool or system.
Over-Reliance	An excessive dependence on something (in this case, AI).
Oversight	The act of supervising or reviewing processes to ensure accuracy and prevent mistakes.
Pacing	The speed and rhythm at which something unfolds.
Palette	The range of colors used in a visual work.
Pan	A horizontal movement of the camera across an image.
Parameters	The adjustable elements within an AI model that influence how it processes and interprets data.

Persona	A role or identity assigned to the AI to guide how it communicates, such as a teacher, advisor, or expert.
Personal Information	The data that can be used to identify an individual, such as name, address, or contact details.
Personalization	The process of tailoring services or content to individual preferences, sometimes using AI.
Personalize	To tailor content to suit the preferences, needs, or context of a specific individual or group.
Plagiarism	The act of copying someone else's work and presenting it as your own.
Preconceived Notion	An idea formed beforehand without full knowledge or experience.
Predictive AI	A type of artificial intelligence that analyzes existing data to forecast future events or trends.
Predictive Modeling	The process of creating, testing, and validating a model to best predict the probability of an outcome.
Prejudice	Preconceived opinion that is not based on reason or actual experience.
Primary Source	An original document or firsthand account of a historical event.
Privacy	The right of individuals to control the collection, use, and sharing of their personal information.
Privacy Settings	The options within a software or platform that allow users to manage how their personal information is collected, used, and shared.
Privacy Violation	A breach or unauthorized use of personal information that infringes on an individual's privacy rights.
Probability	A measure of the likelihood that a specific event will occur.
Probability Theory	A branch of mathematics that deals with the analysis and interpretation of random events and the likelihood of different outcomes.
Productivity Tool	Software designed to help users complete tasks more efficiently.
Prompt Chaining	A technique where multiple prompts are used in sequence, each building on the previous one.
Proofreading	The process of checking a document for spelling, grammar, and punctuation errors.
Propagation	The act of spreading something widely.
Protocols	The formal procedures or systems of rules that are followed in specific situations to ensure consistency and reliability.
Prototyping	The process of creating a preliminary model or concept to test ideas before full-scale development.
Purpose	The specific objective or intended use of a tool or system.

Quality	The degree to which a tool or system produces reliable and accurate results.
Query	A request for information or data submitted to a search engine or database.
Query Understanding	The ability of a search engine to interpret the intent and context of a user's question to deliver the most relevant results.
Real-Time Data	A term for information that is delivered immediately after collection without delay.
Refinement Algorithm	Processes used in diffusion models to iteratively reduce noise and produce a clear, high-quality image.
Reformatting	Changing the structure or layout of content to meet specific guidelines or preferences.
Regression Analysis	A statistical process for estimating the relationships among variables, often used in predictive modeling.
Relevance	The language and content that is specifically tailored to the needs and understanding of a defined audience.
Relevance Ranking	The process by which a search engine orders search results based on their relevance to the user's query.
Reliability	The degree to which an AI model consistently produces accurate and trustworthy outputs.
Remove Objects	The process of erasing elements from a video scene while maintaining visual continuity.
Representation	The inclusion of diverse individuals or groups within a dataset.
Research Document	A detailed source of information, such as studies, reports, or articles, that provides in-depth knowledge for generating informed content.
Restrictions	Limitations that control or regulate the use of certain features.
Retraining	Updating an AI model's knowledge by using new, potentially more diverse data.
Reverse Prompting	Asking the AI to deduce the input that would generate a given output.
Scalability	The capacity of a system or technology to expand and manage increased demand or workload effectively.
Search Algorithm	A set of rules and processes used by a search engine to determine and rank the most relevant results for a given query.
Search Engine	A software system that searches a database or the internet for information based on user queries and returns relevant results.
Secondary Source	An interpretation or analysis based on primary sources.

Security	The measures taken to safeguard a tool or system from threats such as cyberattacks or data breaches.
Self-Consistency Prompting	Generating multiple responses and comparing them to find the most reliable or accurate result.
Sensitive Information	The data that requires extra protection due to its potential impact on privacy, such as financial details or health records.
Sentence Structure	The way words and phrases are arranged to create sentences, affecting readability and style.
Sentiment Analysis	The process of using AI to determine the emotional tone or opinion expressed in a piece of text.
Sequential Data	A type of information that is ordered or arranged in a specific sequence, such as time-series information or text, where the order of elements is important for understanding the context.
Smart Replies	Response suggestions that help users quickly reply to messages or emails.
Social Cohesion	The strength of relationships and sense of solidarity among members of a community or society, fostering unity and cooperation.
Socioeconomic Divide	The gap between groups in society due to differences in income, access to technology, education, and other resources.
Source Language	The original language in which a text is written before being translated.
Spam Detection	The use of AI to identify and filter out unwanted or malicious emails from legitimate messages.
Specificity	The level of detail provided in a prompt to narrow the scope of the AI's response.
Speech Recognition	The process of converting spoken language into text by recognizing and interpreting human language.
Stable Diffusion	An AI tool used for generating high-quality images from textual descriptions.
Standardized Content	Information that follows a consistent and established format, often used in professional or academic settings.
Standards	A set of established guidelines or rules that dictate the acceptable practices and quality in a particular field.
Statistical AI	A type of artificial intelligence that uses statistical models and methods to make predictions, decisions, or classifications based on data.
Stereotype	A widely held but oversimplified idea about a particular group of people.
Stereotype Amplification	The process where AI magnifies existing societal biases.
Structure	The organization and arrangement of content, including headings, lists, and paragraphs.

Style	The way in which content is written, including language choices and sentence structure, that affects how it is perceived.
Style Guide	A set of standards for writing and formatting documents, ensuring consistency and clarity.
Style Transfer	A technique that applies the visual style of one image to another, often used in creative applications.
Subtitle	The text displayed at the bottom of a video screen that translates or transcribes the spoken dialogue for viewers.
Summarization	The process of condensing a large amount of information into a shorter, more digestible form.
Summary	A condensed version of a larger text that includes the main points and key information.
Supervised Learning	A training method where the AI model learns from labeled data with known outcomes.
Support	The assistance provided by the tool or system's provider to help users resolve issues or optimize usage.
Synchronization	The alignment of visuals with the corresponding audio, ensuring that they appear at the correct time.
Target Audience	The specific group of people for whom content is intended, often influencing how it is presented and adapted.
Target Language	The language into which a text is translated.
Targeted Communication	The language and content that is specifically tailored to the needs and understanding of a defined audience.
Targeted Output	A precise response that directly addresses the needs or requirements stated in the prompt.
Technological Advancements	The progress and improvement in technology that can lead to the development of newer, more effective tools and models.
Technological Resources	The hardware, software, and data necessary to develop, operate, and maintain AI models and systems.
Template	A predefined structure or format that serves as a guide for creating content.
Text	Written words or commands provided as input to an AI model.
Text Model	An AI model designed to process, understand, and generate human language.
Text-Image Pairs	Data sets where images are matched with corresponding textual descriptions, used in training image models.
Textual Description	A written input provided to an AI model to generate corresponding images or other outputs.

Tokenization	The process of breaking down text into smaller units, like words or subwords, that can be processed by a transformer model.
Tone	The attitude or emotional quality of the text, such as formal, casual, or persuasive, which influences how the message is received.
Training Data	Data used to teach AI models, enabling them to learn patterns, structures, and relationships to perform tasks effectively.
Transform	To change content from one format or media type to another, such as text to audio or video.
Transformer	A type of neural network architecture that processes sequential data, like text, by considering entire sequences in parallel and using attention mechanisms to understand context and relationships within the data.
Transparency	The practice of being open and clear about processes, decisions, and data, allowing for accountability and trust.
Uncertainty	The degree of unpredictability in outcomes or events, often modeled and quantified in AI using probability.
Uniformity	The quality of being consistent and the same across different instances.
Variations	An assortment of different versions or interpretations of a theme or concept, allowing for creative exploration.
Visualization	The process of creating a graphical representation of data or information, such as graphs, charts, or diagrams.
Zero-Shot Prompting	Asking the AI to perform a task without providing any examples or prior context.