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AI Terminology

Key Terms

- **Algorithm:** A structured set of rules or instructions for a computer to follow in order to complete a task.
- **Artificial General Intelligence (AGI):** An AI that possesses human-level intelligence and can understand, learn, and apply knowledge across a wide range of tasks. AGI would emulate a human of moderate intelligence, able to learn, and excel in any field.
- **Artificial Intelligence (AI):** AI is the simulation of human intelligence by machines, enabling them to perform tasks that typically require human cognition—such as learning, problem-solving, and decision-making.
- **Artificial Narrow Intelligence (ANI):** An AI that can only solve specific problems. For example, a smartphone can use facial recognition to identify photos of an individual in the Photos app, but that same system cannot identify sounds.
- **Artificial Super Intelligence (ASI):** A hypothetical AI that surpasses human intelligence and capabilities in every aspect, including creativity, problem-solving, and decision-making.
- **Bias:** A systematic error in a model's predictions, often caused by biased training data or algorithms. This can lead to inaccurate, misleading, or even discriminatory outcomes.
- **Context Window:** The amount of text data (measured in tokens) the AI model can process and reference when generating text. A larger context window allows for more coherent and contextually relevant responses, while a smaller window can limit AI's ability to generate a relevant response.
- **Deep Learning:** A subset of ML that uses artificial neural networks to learn complex patterns in data. Deep learning applies a layering process, stacking data points to find patterns. Deep learning is used in fields like image recognition and language processing.
- **FLOPs (Floating-Point Operations Per Second):** FLOPs is a standard measure of a computer's performance, indicating how many floating-point calculations it can perform every second. In AI and high-performance computing contexts, higher FLOPs generally mean the system can handle more complex computations—such as training deep neural networks or running large-scale simulations—within a shorter time.

- **Generative AI:** A type of AI that makes content, such as text, images, or music. Unlike basic AI, which can simulate human capabilities by drawing on existing information, generative AI has the ability to create new material.
- **Hallucination:** A phenomenon where an AI model generates incorrect or nonsensical information. These errors are often caused by insufficient training data or a misunderstanding of the prompt.
- **Hyperparameters:** Parameters that control the learning process of a model, such as learning rate and batch size (number of samples processed before updating model parameters). They are chosen before training begins and play a critical role in how quickly and effectively the model learns.
- **Large Language Model (LLM):** An LLM is a type of AI trained on vast amounts of text data, capable of generating or analyzing text with human-like fluency. It can be likened to an immense digital library, drawing upon its extensive "reading" to produce coherent and contextually relevant responses.
- **Machine Learning (ML):** Machine Learning is a subset of AI in which computers learn from data and improve their performance over time without explicit programming. By examining large datasets, ML models detect patterns that help them make predictions or decisions.
- **Natural Language Processing (NLP):** A field of AI that focuses on the interaction between computers and human language, enabling machines to understand, interpret, and generate human language. By analyzing linguistic structure and context, NLP systems can process and respond to queries in a way that simulates human comprehension.
- **Neural Network:** A computational model inspired by the human brain, used to recognize patterns. A neural network can be pictured as a spiderweb, made up of interconnected nodes ("neurons") that process information and communicate with each other.
- **Overfitting:** A phenomenon where a model becomes too specialized in training data and performs poorly on new data. Overfitting is like a student memorizing instead of learning, so they know specific data but are unable to see underlying patterns and apply them to new information.
- **Parameters:** In the context of AI models, parameters are the values that the model learns during training. These parameters function like tuning knobs, adjusting a model's behavior to minimize the error between the model's predictions and reality.
- **Prompt Engineering:** The art of crafting effective prompts to guide AI models towards the generation of desired outputs. Prompt engineering is like commissioning a piece of artwork, giving specific instructions to influence the content created.
- **Test Data:** A separate and unseen set of data used to assess the final performance of the model. Test data is used to test a model's overall capabilities once training is complete.

- **Tokenization:** The process of breaking down text into smaller units – often words, subwords, or symbols– called tokens for processing. This simplifies data to make it understandable to AI models.
- **Training Data:** The data used to train an AI model.
- **Transformer:** A type of neural network architecture that processes sequential data, like text. This approach allows the model to process input data in parallel, making it more efficient and powerful for language-related tasks.
- **Underfitting:** A phenomenon where a model is too simple to capture the underlying patterns in the data. Underfitting is the equivalent of not studying enough and lacking the information needed to succeed.
- **Validation Data:** A separate subset of data used to evaluate the model's performance during training. Validation data is the practice test or mock exam, assessing a model's readiness while still in the development process.

Comparing Terms

In the realm of AI, certain terms can seem deceptively similar, making it challenging to grasp their unique roles. Metaphors can help disentangle these nuances by connecting unfamiliar concepts to everyday experiences, making them easier to compare and remember. Take parameters, context window, and FLOPs: each represents a different dimension of an AI model's capability, yet it's easy to mix them up because they all influence performance. Thinking of parameters as the number of books in a library, the context window as the size of the reading room, and FLOPs as the efficiency of the library staff helps highlight their individual contributions—what they store, how much they can process at once, and how fast they can work.

- **Context Window (Reading Room Size):**
    - **Metaphor:** The context window is like the size of the library's reading room. If the reading room is large, visitors can spread out and read multiple books or documents at once, gaining a broader understanding of a topic. If the reading room is small, visitors can only consult a limited number of materials at a time. A larger reading room (context window) allows for a richer, more comprehensive understanding of longer texts, while a smaller room limits the scope of information considered.
- **FLOPs (Library Staff Efficiency):**
    - **Metaphor:** FLOPs represent the efficiency and speed of the library staff who handle book retrieval and processing. If the staff is highly efficient (high FLOPs), they can quickly find and process large volumes of books and information, making the library more effective and responsive. If the staff is less efficient (low FLOPs), it takes longer to process and manage information, potentially slowing down the library's ability to provide timely responses.

- **Parameters (Library Collection):**
    - **Metaphor:** Imagine parameters as the number of books in a library. Each book represents a piece of knowledge or information that the library can use to answer questions or provide insights. A larger library with more books (parameters) can offer more diverse and detailed information, making it better equipped to handle a wide range of inquiries.

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