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Theory of Large Language Models

Foundations, Engineering, and the New AI Paradigm

Content

Basic Concepts of the AI&LLMs

Cornerstone of the LLMs: Data

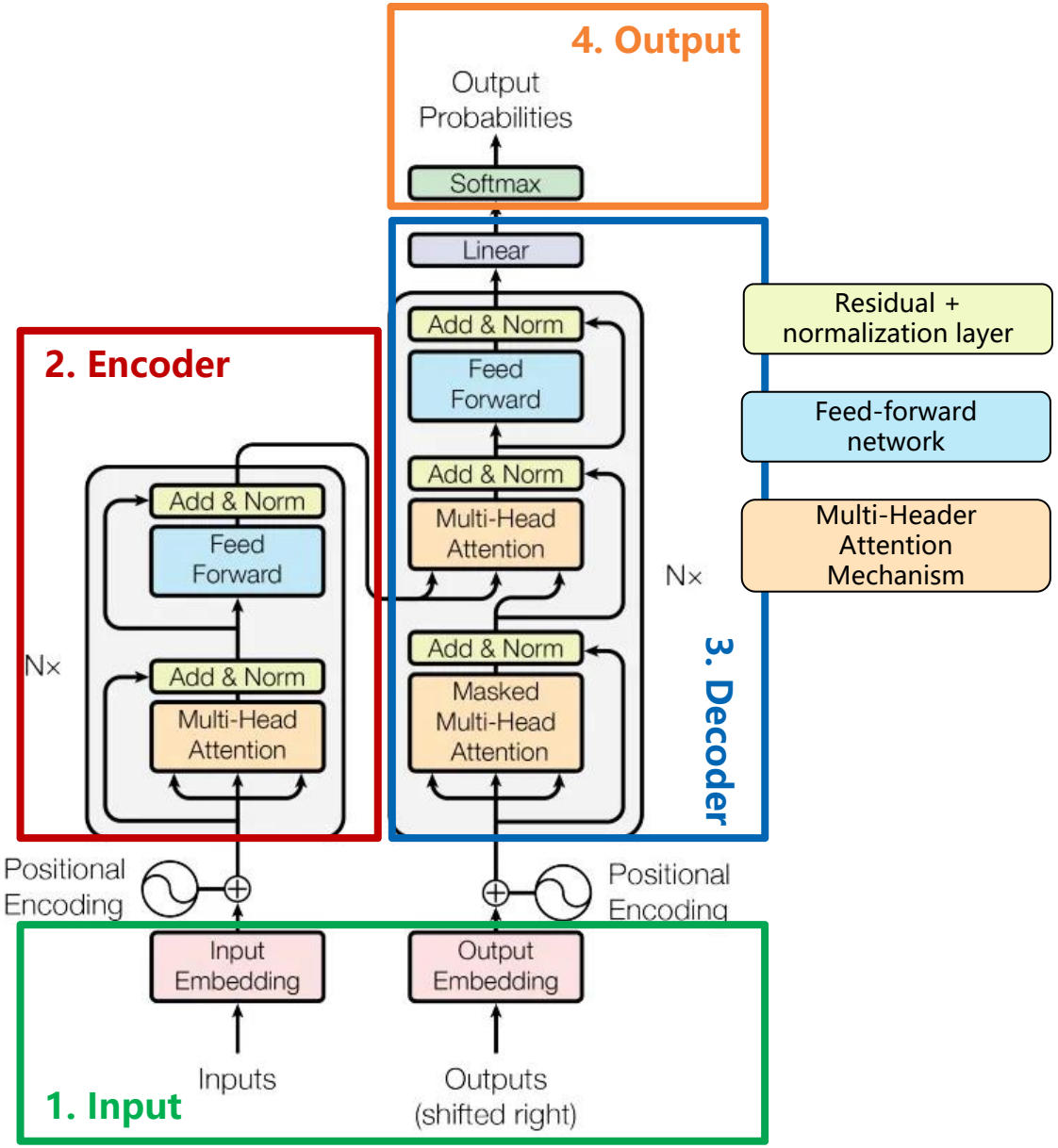
Cornerstone of the LLMs: Algorithm

Cornerstone of the LLMs: Computing Power

Current Progress of LLMs

LLMs Define the New Paradigm of AI

Transformer Architecture



Key Technology	Explanation
Multi-Header (Self-Attention) Mechanism	The weights are calculated adaptively based on each element in the input sequence to better capture the information in the input sequence. (Find key points from the global list.)
Feed-forward network	Through linear transformation, data is first mapped to high-latitude space and then mapped to low-latitude space, extracting deeper features. Its input is a word vector. After a series of linear transformation and activation functions are processed, another word vector is output.
Residual Connection & Layer normalization Normolization	Residual connection: The sum of network input and output solves the problem of gradient disappearance. Layer normalization: The average value and variance of Batch Size samples are approximate to those of the entire sample, and the input data of each dimension is independently standardized.
Zero-shot learning	The pre-training model can complete specific tasks without any (small) training samples for fine-tuning training.
Transfer learning	The knowledge learned from one task (object recognition in the image) is applied to another task (activity recognition in the video).

New Paradigms in Model Production: The Large Model Revolution

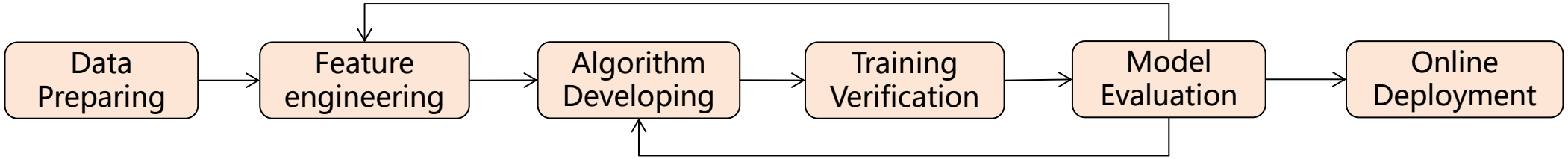
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Traditional model training

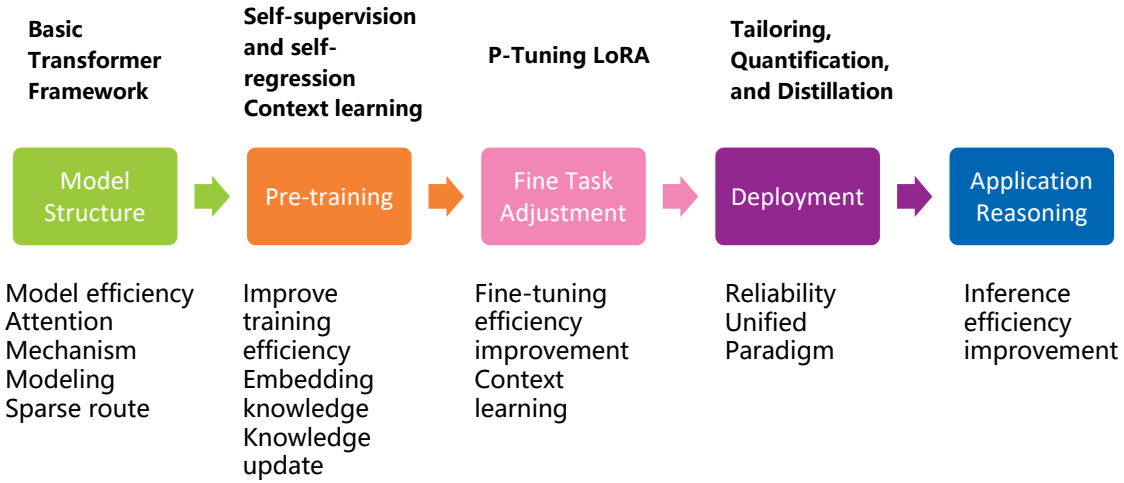
Data
1. What kind of data is there?
2. What is the data volume?
3. Is it related to objectives?

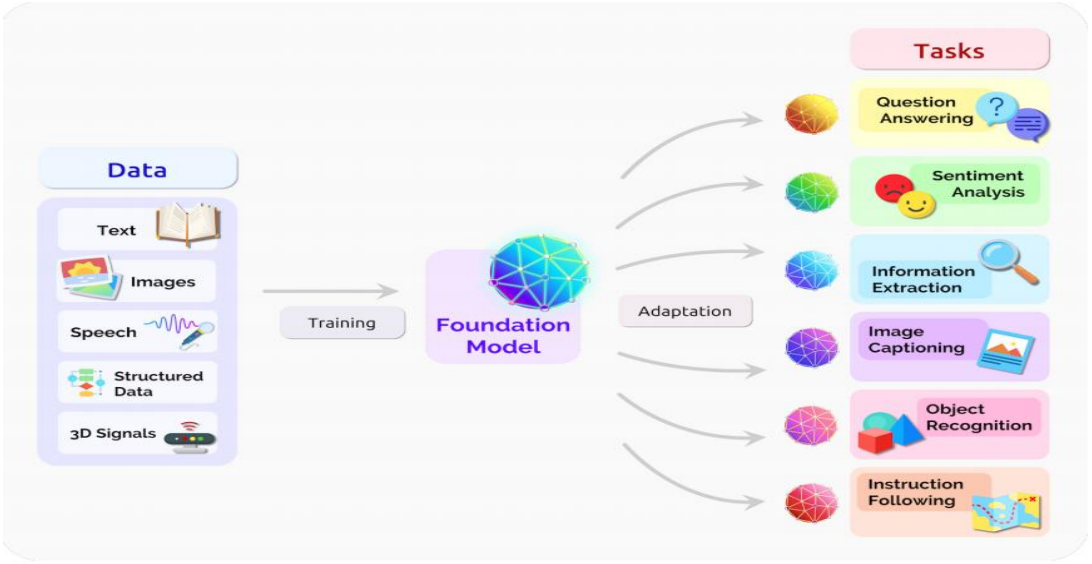
Algorithm
1. Which algorithm is applicable to the problem?
2. Which algorithm is applicable to the current conditions?

Feasibility
1. Is the objective reasonable? Does the rule exist?
2. Can the performance of the algorithm be effectively verified?



Large model training





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