LLM Capabilities & Current Limitation

Understanding What LLMs Can and Cannot Do

What LLMs Excel At

🏆 Text Generation & Writing

- Creative writing, technical documentation, email composition, content creation
- Style adaptation and rewriting, multiple language support

📊 Data Analysis & Summarization

- Document summarization and analysis, information extraction from text
- Pattern recognition in content, research assistance and synthesis

💻 Code Generation & Programming

- Code writing and completion, bug detection and debugging
- Code explanation and documentation, multiple programming language support

🧠 Reasoning & Problem Solving

- Step-by-step problem breakdown, logical reasoning and analysis
- Decision support and recommendations

🌍 Translation & Language Tasks

- High-quality translation between languages, grammar correction
- Language learning assistance, cultural context understanding

Current Limitations

⚠️ Knowledge & Information

- Training data cutoff (knowledge gaps), cannot access real-time information
- May generate outdated facts, no internet browsing capability

🌀 Hallucinations & Accuracy

- May generate convincing but false information, inconsistent factual accuracy
- Cannot verify information independently, overconfident in incorrect responses

📏 Context Window Constraints

- Limited memory of long conversations, cannot process extremely long documents
- Forgets earlier context when limit exceeded, token counting affects performance

🔢 Mathematical & Computational

- Complex arithmetic calculation errors, inconsistent with multi-step math
- Cannot execute code or verify results, struggles with precise numerical tasks

👁️ Sensory & Multimodal

- Cannot see images or process visual data, no audio processing capabilities
- Limited to text-based interactions, cannot access files or external systems

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Context Window Impact on Tasks

Small Context (4K tokens)

✅ **Good for:** Quick Q&A, short summaries, simple code

❌ **Limited:** Long document analysis, extended conversations

Medium Context (32K tokens)

✅ **Good for:** Document analysis, code review, research papers

❌ **Limited:** Book-length analysis, multi-document tasks

Large Context (200K+)

✅ **Good for:** Comprehensive analysis, entire codebases

❌ **Limited:** Still cannot access external data or real-time info

🛡️ Mitigation Strategies

Fact-checking: Verify important information independently.

Prompt engineering: Use clear, specific instructions.

Context management: Break large tasks into smaller chunks.

Human oversight: Always review critical outputs.