Data Science Collective

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How to Run Large Language Models (LLMs) Locally: A Beginner's Guide to Offline AI

How to Set Up LLMs on Your Machine in Just a Few Minutes

Claudia Ng · Follow

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If you've been following artificial intelligence (AI) advancements, you've likely noticed a thriving open-source community developing powerful large language models (LLMs). These models can **rival offerings from major players like OpenAI and Anthropic.**

The best part? You can run them **entirely offline**, keeping your data private while enjoying **unlimited AI access.**

In this guide, we'll explore:

- Why you should run LLMs locally
- The best tools for running LLMs offline
- How to choose the right AI model for your hardware

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Why Run AI Locally?

Running LLMs locally offer advantages over cloud-based solutions. Here's why I prefer it:

- 🛫 **No Internet Required** — Use AI **without WiFi**, whether you're on a long-haul flight, in a remote area, or during an OpenAI service outage.
- 🔒 **Enhanced Privacy & Data Control** — Local AI **keeps your data on your device**, preventing your interactions from being logged or used for future

model training.

- 💬 **Unlimited Usage** — Avoid **API rate limits, token restrictions, and paywalls**. Local models let you chat as much as you want — free, forever.

Every time you interact with a cloud-based AI, your prompts and responses may be stored as data for model training in the future. Running LLMs locally **puts you in control**.

How to Run LLMs Locally: Best Tools for Beginners & Advanced Users

Setting up local AI is easier than you might think — **some tools require zero coding!** Here are the best options based on your experience level:

1️⃣ LM Studio (Easiest, No Coding Required!)

LM Studio is the **fastest way to get started** with local LLMs. It provides a **user-friendly interface** to download models, chat with AI, and even upload documents for context.

💡 **Pro Tip:** LM Studio supports **context injection** — upload PDFs, CSVs, or DOCX files (up to 30MB each) to provide **background knowledge** to your AI assistant. This makes it **a local version of RAG (Retrieval-Augmented Generation)** — perfect for summarizing documents or extracting insights from reports!

2️⃣ Ollama (For Developers & Power Users)

Ollama is a **command-line tool** that makes downloading and running AI models seamless. It's slightly more technical but offers **flexibility and**

customization for those comfortable with the terminal.

3️⃣ vLLM (For Speed & Performance)

Developed by **UC Berkeley's Sky Computing Lab**, vLLM is optimized for **blazing-fast inference** and can handle **multiple concurrent requests** — ideal for those prioritizing speed.

4️⃣ Manual Installation (For AI Enthusiasts & Researchers)

If you prefer full control, you can manually download **GGUF models from Hugging Face** and use Python libraries like transformers to run them. **This option is best if you want to fine-tune models** for specific applications.

Choosing the Right AI Model for Your Needs

With many open-source LLMs available, picking the right one depends on your **hardware and use case**. Here are some well-regarded open-source AI models:

- DeepSeek R1
- Gemma 3 (My favorite!)
- DeepSeek V3
- QwQ 32B
- Llama 3.1

To find the best model for your needs, check out the Chatbot Arena LLM leaderboard — a ranking of AI models based on real-world user feedback.

How to Match Model Size to Your Computer

Once you've selected a model, the next step is to select a model size that aligns with your computer's capabilities. Researchers use "quantization", a method that reduces the precision of model parameters, to make larger models fit on less powerful devices.

If you're working on a high-precision reasoning task, prioritize accuracy with larger models. However, if you have limited compute power and want faster inference speeds, opt for a smaller, quantized version.

💡 **Key Factor: RAM (Memory) Matters!** LLMs require enough **RAM to load the model**. Here's a rough guide:

🖥️ **8GB RAM** → Small models (3B-7B) with aggressive quantization

🖥️ **16GB RAM** → Medium models (7B-13B) with moderate quantization

🖥️ **32GB+ RAM** → Large models (up to 30B) with higher precision

A **GPU (Graphics Processing Unit)** significantly improves performance. If you have a **CUDA-compatible NVIDIA GPU**, look for models **optimized for GPU inference**.

Tip: Start with a **smaller model** and gradually scale up based on performance!

Limitations of Running LLMs Locally

While local AI offers **privacy and unlimited use**, there are trade-offs:

❌ **No Internet Access** — Unlike ChatGPT, local models can't browse the web or perform live fact-checking.

PC.

To compensate for these limitations, I like to regularly check for **newer, optimized models** trained on recent data!

Final Thoughts: Reclaiming Your AI Experience

Running AI **offline** puts you in control — no paywalls, no data collection, no internet needed. Here's my set-up:

📌 **My Go-To Tool:** LM Studio (**best balance of ease and functionality!**)

📌 **Best Model Right Now:** Gemma 3

📌**Key Benefit:** Work distraction-free by turning off WiFi while using AI

Open-source LLMs are so powerful. There are options for different tasks, and you no longer have to rely on big tech — you can run powerful AI models **on your own terms.**

Want to build your AI skills?

👉 Join the **AI Weekender** for ideas on more AI projects you can build in a weekend!

Llm AI Python Genai Data Science

Responses (2)

Alex Mylnikov

What are your thoughts?

Raphael Schols
2 days ago (edited)

Ohh nice, I'll give this a try! Thanks for the article. Have you built anything with local models that you use frequently? I'd also be interested in the limitations you've seen, especially compared to online LLMs.

1 1 reply Reply

Biyesse
3 days ago

Nice article 👍

1 1 reply Reply

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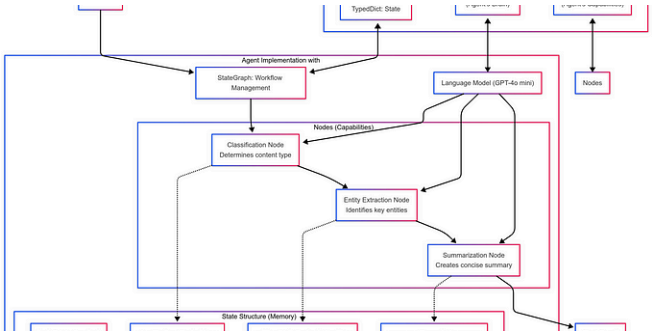

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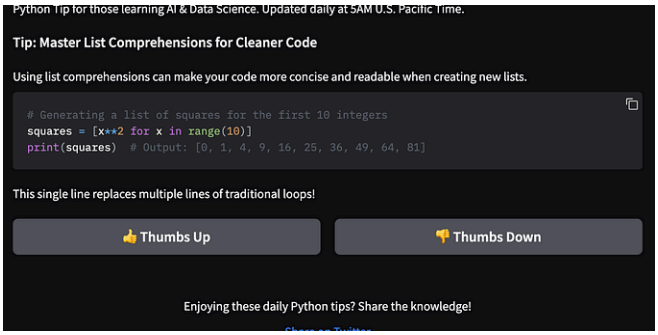

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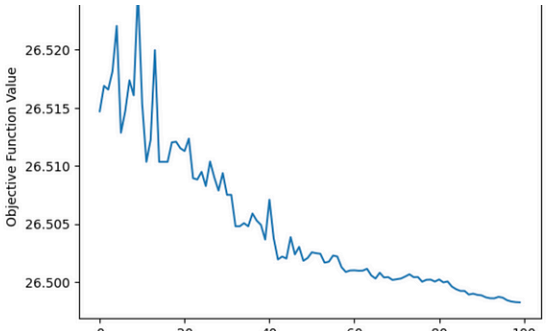
Dataset	Sampling prop.	Epochs	Disk size
CommonCrawl	67.0%	1.10	3.3 TB
C4	15.0%	1.06	783 GB
Github	4.5%	0.64	328 GB
Wikipedia	4.5%	2.45	83 GB
Books	4.5%	2.23	85 GB
ArXiv	2.5%	1.06	92 GB
StackExchange	2.0%	1.03	78 GB



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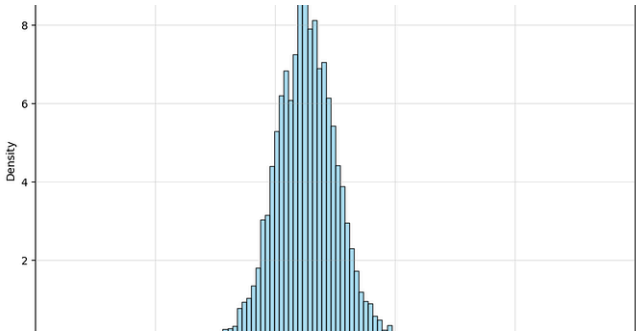

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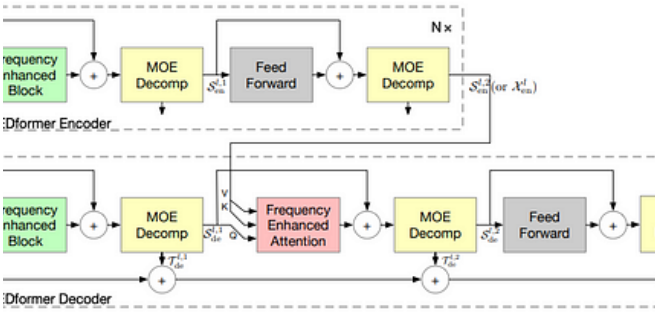

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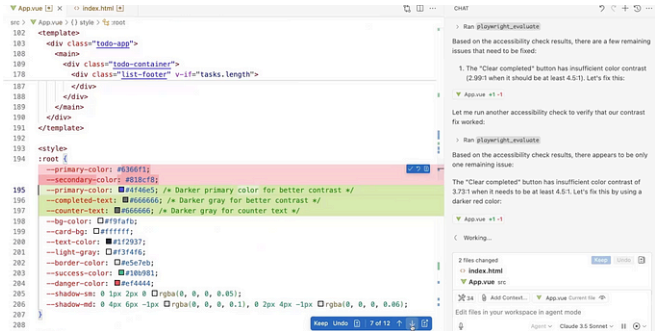

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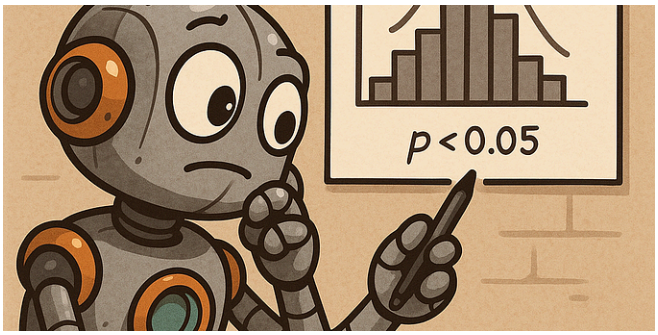
Wow this is insane.



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