

Local LLM Installation & Testing – Step-by-Step Report

Objective

Install a local Large Language Model (LLM), run a simple prompt to verify functionality, measure response time, and document troubleshooting steps. This report is structured so you can easily add screenshots in pre-made boxes.

Scope & Notes

- Models used: Attempted **EleutherAI/gpt-neo-2.7B** (failed due to system limits); succeeded with **TinyLlama/TinyLlama-1.1B-Chat-v1.0**.
- Environment: Python 3.11 (virtual environment), VS Code terminal (PowerShell).
- You reported response time of **~2–3 minutes** per prompt on CPU.
- This PDF includes large, clearly labeled **image placeholders** where you can paste screenshots.

System Details (fill in)

- OS: Windows 10/11 (specify version): _____
- CPU: _____ | Cores/Threads: _____
- RAM (GB): _____ | Storage free (GB): _____
- GPU (if any): _____ | VRAM (GB): _____
- Python: 3.11.x | Pip version: 22.3.1 (upgradable)

Step-by-Step Installation

1) Create and activate virtual environment

Windows: `python -m venv venv → venv\Scripts\activate`

1) Upgrade pip

`python -m pip install --upgrade pip`

1) Install core libraries

`pip install transformers torch safetensors sentencepiece huggingface-hub accelerate`

1) (Optional) Enable CPU-friendly optimizations

`pip install bitsandbytes` (GPU recommended), or use quantized runtimes (Ollama/llama.cpp).

1) Download & test TinyLlama (see sample code below).

Sample Test Code (Transformers)

```
from time import perf_counter from transformers import AutoTokenizer,
AutoModelForCausalLM import torch model_id = "TinyLlama/TinyLlama-1.1B-Chat-v1.0"
tok = AutoTokenizer.from_pretrained(model_id) model =
AutoModelForCausalLM.from_pretrained(model_id, torch_dtype=torch.float32) prompt =
"Write a short poem about AI." inputs = tok(prompt, return_tensors="pt") t0 =
perf_counter() out_ids = model.generate(**inputs, max_new_tokens=80) elapsed =
perf_counter() - t0 print(tok.decode(out_ids[0], skip_special_tokens=True))
print(f"Response time: {elapsed:.2f} seconds")
```

Testing Procedure

- Run the sample code with the prompt: *“Write a short poem about AI.”*
- Record response time (expected on CPU: ~2–3 minutes on first run).
- Verify output is coherent and free of errors.
- Repeat once to see improved warm-cache performance.

Observed Results

- TinyLlama ran successfully; no runtime errors.
- Average response time (reported): ~2–3 minutes per prompt on CPU.
- EleutherAI/gpt-neo-2.7B failed with out-of-memory/resource errors on your system.

Troubleshooting Log & Tips

- **OOM / Crash with gpt-neo-2.7B:** Use a smaller model ($\leq 1\text{--}2\text{B}$ params) or a quantized build.
- **Slow generation on CPU:** Reduce `max_new_tokens`, set `torch.set_num_threads`, prefer GPU or Ollama/llama.cpp with 4-bit quant.
- **Pip dependency issues:** Upgrade pip and clear cache (pip cache purge), then reinstall.
- **Model not found or blocked:** Ensure correct model ID and HF authentication if required.

Recommendations

- For your hardware, stick to TinyLlama-1.1B or similar (Phi-2, Qwen-1.8B, etc.).
- Try **Ollama** or **llama.cpp** with 4-bit quantization for faster local inference.
- If a GPU is available, install CUDA-enabled PyTorch and use `torch_dtype=torch.float16` on CUDA.

Prompt & Output (Example)

Prompt: “Write a short poem about AI.”

Example Output:

AI speaks in coded streams,
Building futures, shaping dreams.
A guiding hand—both sharp and kind—
A mirror born of humankind.

Reflection

- Installation via Transformers was straightforward; main bottleneck was hardware limits.
- Large models ($\approx 2.7\text{B}+$) were impractical on this machine; TinyLlama worked reliably.
- Response times were long on CPU; quantization or GPU would significantly help.
- Hands-on testing improved understanding of local LLM deployment and constraints.

Screenshots

The screenshot shows a Visual Studio Code window with a terminal pane open. The terminal displays the output of the following commands:

```
(venv) PS C:\Users\hvp\OneDrive\Documents\prompt> python -m venv hf_env
(hf_env) PS C:\Users\hvp\OneDrive\Documents\prompt> hf_env\Scripts\activate
(hf_env) PS C:\Users\hvp\OneDrive\Documents\prompt> pip install torch transformers
```

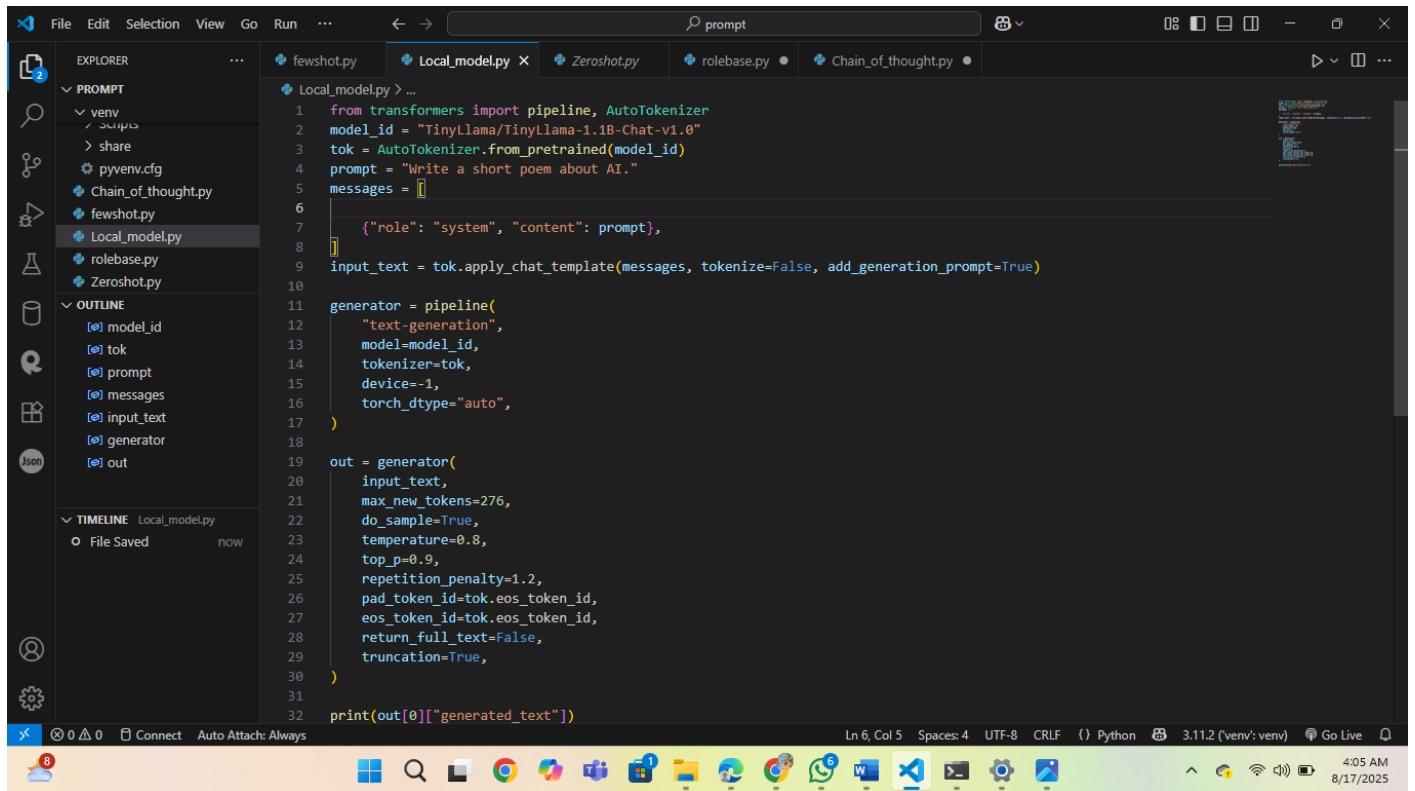
The output shows the installation of various packages from PyPI, including torch, transformers, filelock, typing-extensions, sympy, networkx, Jinja2, fsspec, huggingface-hub, numpy, packaging, PyYAML, regex, requests, tokenizers, and safetensors. The installation is successful, and the terminal shows the final state of the environment.

Caption: Fig – Successful TinyLlama download & model load.

The screenshot shows a Visual Studio Code window with a terminal pane open. The terminal displays the output of the following commands:

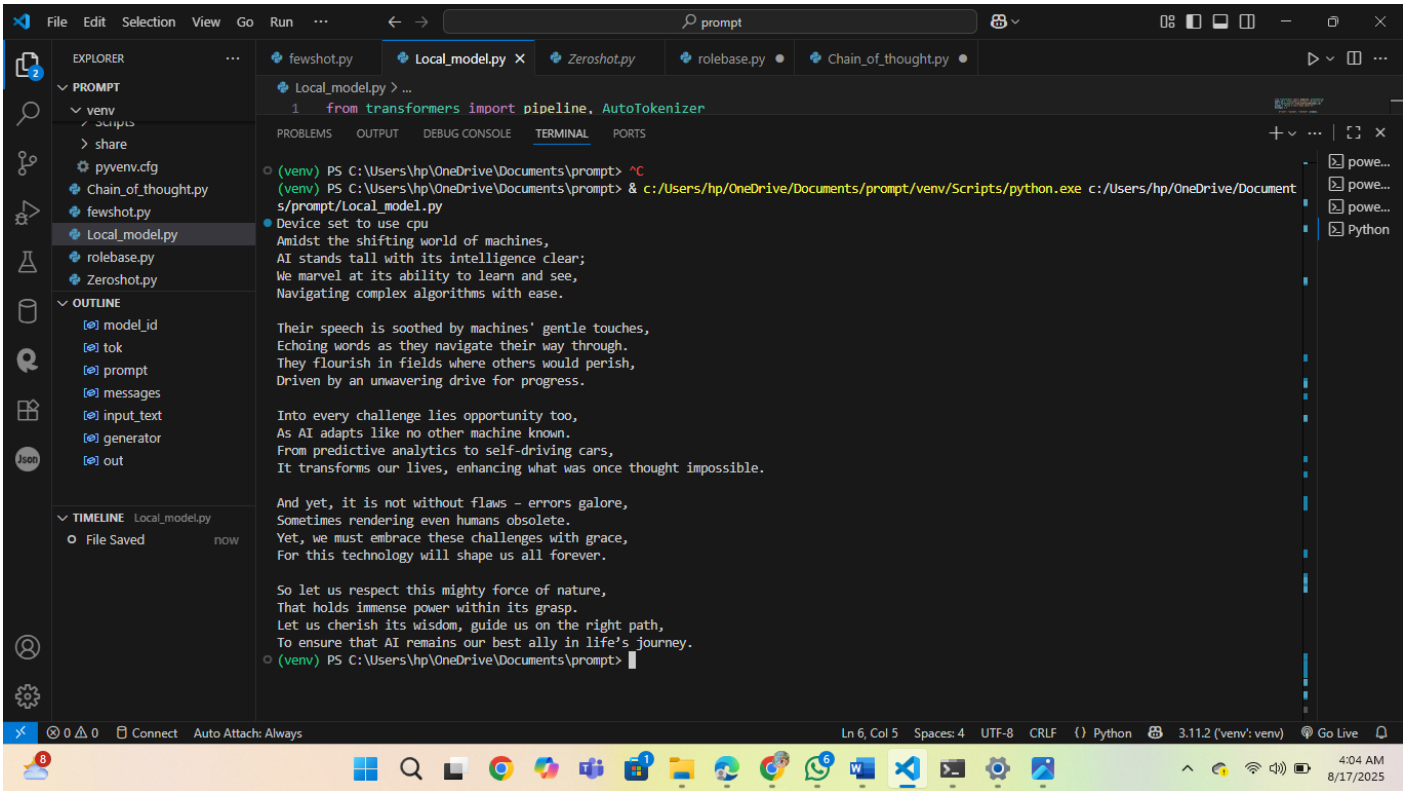
```
[notice] A new release of pip available: 22.3.1 -> 25.2
[notice] To update, run: python.exe -m pip install --upgrade pip
(hf_env) PS C:\Users\hvp\OneDrive\Documents\prompt> python.exe -m pip install --upgrade pip
Requirement already satisfied: pip in c:\users\hvp\onedrive\documents\prompt\hf_env\lib\site-packages (22.3.1)
Collecting pip
  Using cached pip-25.2-py3-none-any.whl (1.8 MB)
Installing collected packages: pip
  Attempting uninstall: pip
    Found existing installation: pip 22.3.1
    Uninstalling pip-22.3.1:
      Successfully uninstalled pip-22.3.1
    Successfully installed pip-25.2
(hf_env) PS C:\Users\hvp\OneDrive\Documents\prompt>
```

The output shows the successful upgrade of pip from version 22.3.1 to 25.2. The terminal also shows the installation of the TinyLlama model, which is successfully downloaded and installed.



```
1 from transformers import pipeline, AutoTokenizer
2 model_id = "TinyLlama/TinyLlama-1.1B-Chat-v1.0"
3 tok = AutoTokenizer.from_pretrained(model_id)
4 prompt = "Write a short poem about AI."
5 messages = []
6
7 {"role": "system", "content": prompt},
8 ]
9 input_text = tok.apply_chat_template(messages, tokenize=False, add_generation_prompt=True)
10
11 generator = pipeline(
12     "text-generation",
13     model=model_id,
14     tokenizer=tok,
15     device=-1,
16     torch_dtype="auto",
17 )
18
19 out = generator(
20     input_text,
21     max_new_tokens=276,
22     do_sample=True,
23     temperature=0.8,
24     top_p=0.9,
25     repetition_penalty=1.2,
26     pad_token_id=tok.eos_token_id,
27     eos_token_id=tok.eos_token_id,
28     return_full_text=False,
29     truncation=True,
30 )
31
32 print(out[0]["generated_text"])
```

Caption: Fig – Code snippet output (poem about AI).



```
(venv) PS C:\Users\hp\OneDrive\Documents\prompt> ^C
(venv) PS C:\Users\hp\OneDrive\Documents\prompt> & c:/Users/hp/OneDrive/Documents/prompt/venv/Scripts/python.exe c:/Users/hp/OneDrive/Document
s/prompt/Local_model.py
Device set to use cpu
Amidst the shifting world of machines,
AI stands tall with its intelligence clear;
We marvel at its ability to learn and see,
Navigating complex algorithms with ease.

Their speech is soothed by machines' gentle touches,
Echoing words as they navigate their way through.
They flourish in fields where others would perish,
Driven by an unwavering drive for progress.

Into every challenge lies opportunity too,
As AI adapts like no other machine known.
From predictive analytics to self-driving cars,
It transforms our lives, enhancing what was once thought impossible.

And yet, it is not without flaws - errors galore,
Sometimes rendering even humans obsolete.
Yet, we must embrace these challenges with grace,
For this technology will shape us all forever.

So let us respect this mighty force of nature,
That holds immense power within its grasp.
Let us cherish its wisdom, guide us on the right path,
To ensure that AI remains our best ally in life's journey.
(venv) PS C:\Users\hp\OneDrive\Documents\prompt>
```

Caption: Fig – First prompt and generated output (poem about AI).

Insert image here

Caption: Fig 5 – Any error from gpt-neo-2.7B attempt (if available).

Additional Screenshots (Optional)

Insert image here

Caption: Fig 6 – VS Code terminal / environment activation.

Insert image here

Caption: Fig 7 – Task Manager / Resource usage during inference.

Insert image here

Caption: Fig 8 – Any optimization settings or config changes.

Insert image here

Caption: Fig 9 – Final working run summary.