Phi-3

> **Demonstration environment**

Development board: rdk x5 motherboard

sd card: 64G

> **Tutorial application scope**: Whether the motherboard can run is related to the available memory of the system. The user's own environment and the program running in the background may cause the model to fail to run.

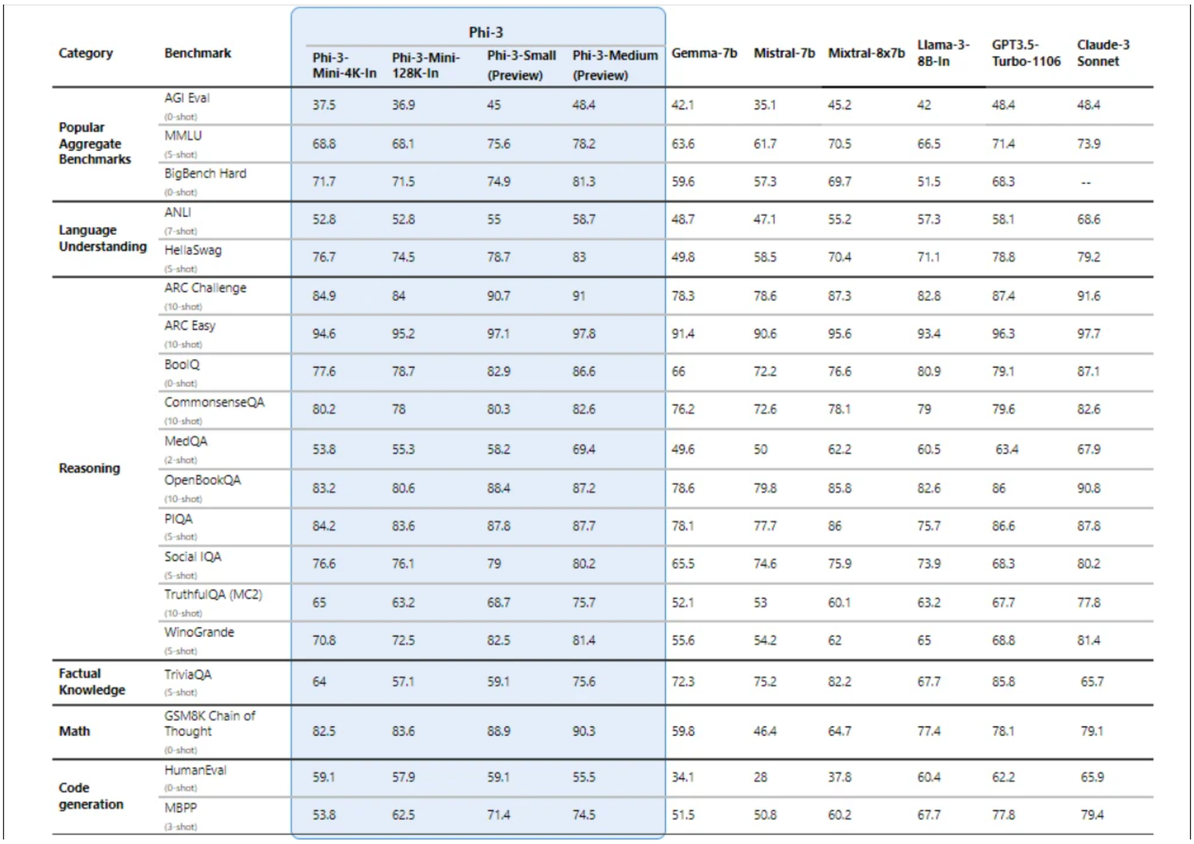
Board model	Ollama
rdk x5 8GB	√
rdk x5 4GB	√

Phi-3 is a powerful, cost-effective Small Language Model (SLM) from Microsoft that outperforms models of the same and larger size on a variety of language, reasoning, encoding, and math benchmarks.

1、Model scale

Model	Parameter
Phi-3（Mini)	3.8B

2、Performance

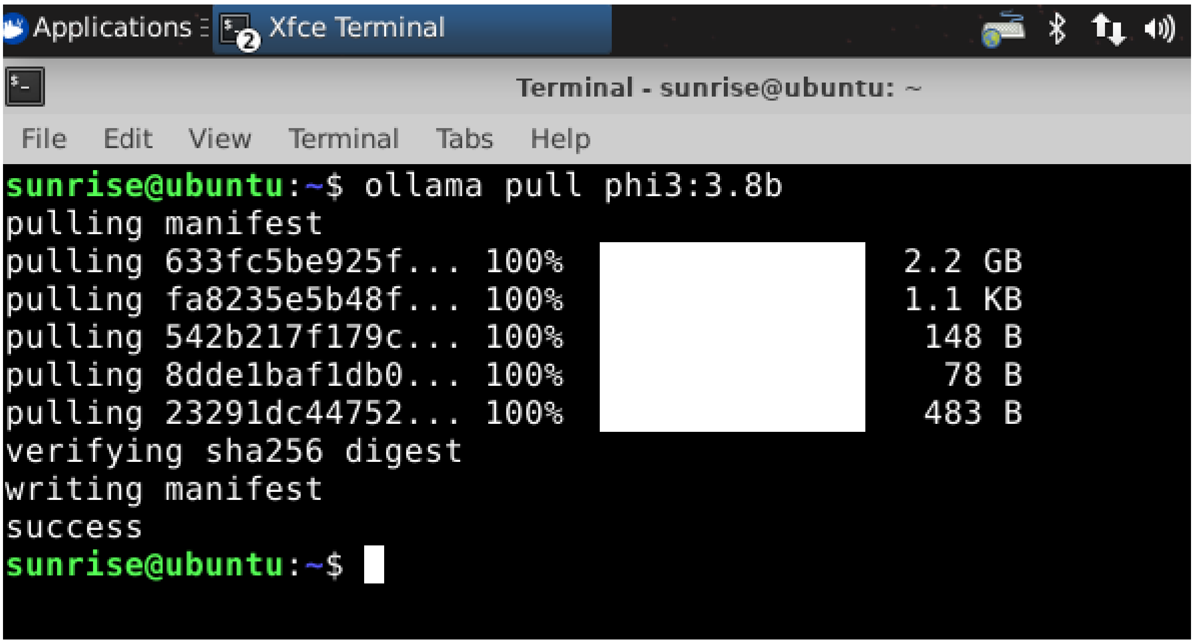


Category	Benchmark	Phi-3				Gemma-7b	Mistral-7b	Mixtral-8x7b	Llama-3-8B-In	GPT3.5-Turbo-1106	Claude-3 Sonnet
		Phi-3-Mini-4K-In	Phi-3-Mini-128K-In	Phi-3-Small (Preview)	Phi-3-Medium (Preview)						
Popular Aggregate Benchmarks	AGI Eval (0-shot)	37.5	36.9	45	48.4	42.1	35.1	45.2	42	48.4	48.4
	MMLU (5-shot)	68.8	68.1	75.6	78.2	63.6	61.7	70.5	66.5	71.4	73.9
	BigBench Hard (0-shot)	71.7	71.5	74.9	81.3	59.6	57.3	69.7	51.5	68.3	--
Language Understanding	ANLI (7-shot)	52.8	52.8	55	58.7	48.7	47.1	55.2	57.3	58.1	68.6
	HellaSwag (5-shot)	76.7	74.5	78.7	83	49.8	58.5	70.4	71.1	78.8	79.2
Reasoning	ARC Challenge (10-shot)	84.9	84	90.7	91	78.3	78.6	87.3	82.8	87.4	91.6
	ARC Easy (10-shot)	94.6	95.2	97.1	97.8	91.4	90.6	95.6	93.4	96.3	97.7
	BoolQ (0-shot)	77.6	78.7	82.9	86.6	66	72.2	76.6	80.9	79.1	87.1
	CommonsenseQA (10-shot)	80.2	78	80.3	82.6	76.2	72.6	78.1	79	79.6	82.6
	MedQA (2-shot)	53.8	55.3	58.2	69.4	49.6	50	62.2	60.5	63.4	67.9
	OpenBookQA (10-shot)	83.2	80.6	88.4	87.2	78.6	79.8	85.8	82.6	86	90.8
	PIQA (5-shot)	84.2	83.6	87.8	87.7	78.1	77.7	86	75.7	86.6	87.8
	Social IQA (5-shot)	76.6	76.1	79	80.2	65.5	74.6	75.9	73.9	68.3	80.2
	TruthfulQA (MC2) (10-shot)	65	63.2	68.7	75.7	52.1	53	60.1	63.2	67.7	77.8
	WinoGrande (5-shot)	70.8	72.5	82.5	81.4	55.6	54.2	62	65	68.8	81.4
Factual Knowledge	TriviaQA (5-shot)	64	57.1	59.1	75.6	72.3	75.2	82.2	67.7	85.8	65.7
Math	GSM8K Chain of Thought (0-shot)	82.5	83.6	88.9	90.3	59.8	46.4	64.7	77.4	78.1	79.1
Code generation	HumanEval (0-shot)	59.1	57.9	59.1	55.5	34.1	28	37.8	60.4	62.2	65.9
	MBPP (3-shot)	53.8	62.5	71.4	74.5	51.5	50.8	60.2	67.7	77.8	79.4

3. Pull Phi-3

Using the pull command will automatically pull the model from the Ollama model library:

```
ollama pull phi3:3.8b
```



```
sunrise@ubuntu:~$ ollama pull phi3:3.8b
pulling manifest
pulling 633fc5be925f... 100%                2.2 GB
pulling fa8235e5b48f... 100%                1.1 KB
pulling 542b217f179c... 100%                 148 B
pulling 8dde1baf1db0... 100%                  78 B
pulling 23291dc44752... 100%                 483 B
verifying sha256 digest
writing manifest
success
sunrise@ubuntu:~$
```

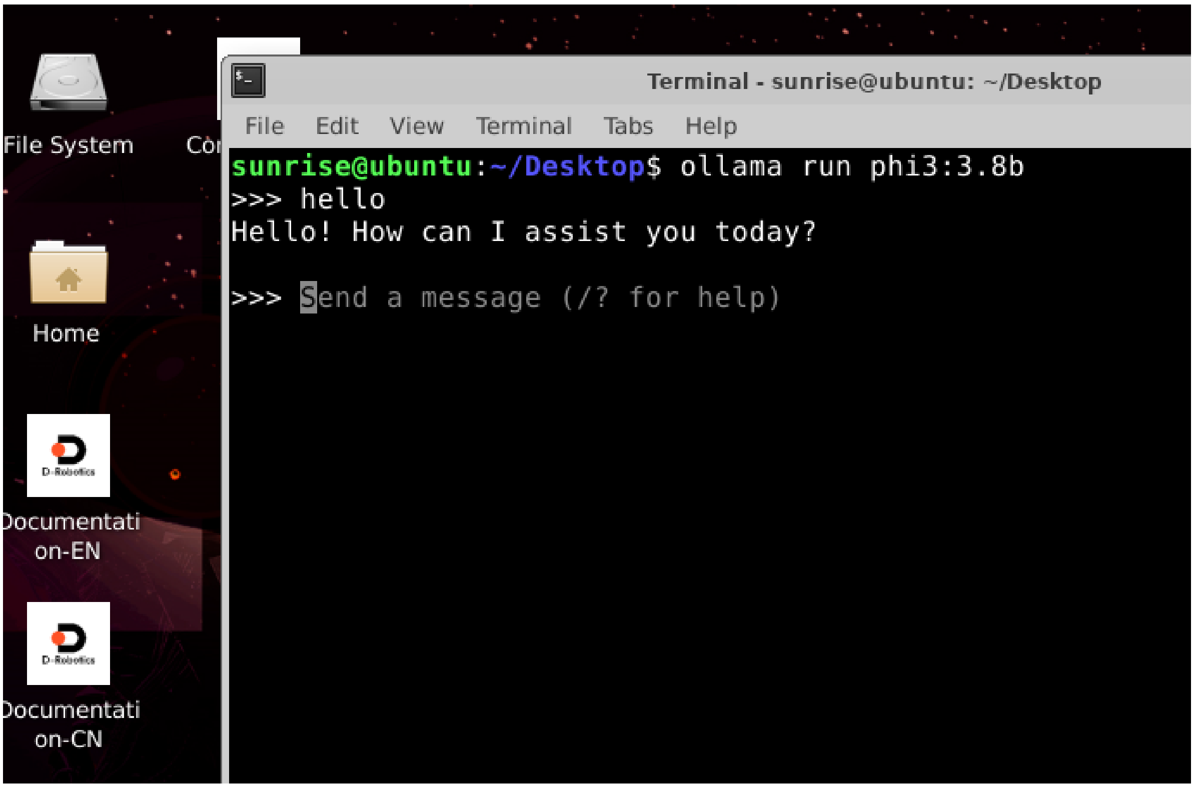
4. Use Phi-3

4.1. Run Phi-3

If the system does not have a running model, the system will automatically pull the Phi-3 3.8B model and run it:

```
ollama run phi3:3.8b
```

rdk x5 8gb motherboard test image:



```
sunrise@ubuntu:~/Desktop$ ollama run phi3:3.8b
>>> hello
Hello! How can I assist you today?

>>> Send a message (/? for help)
```

rdk x5 4gb board test image:

Note: the rdk x5 4gb board needs to shut down docer and desktop services to run this model

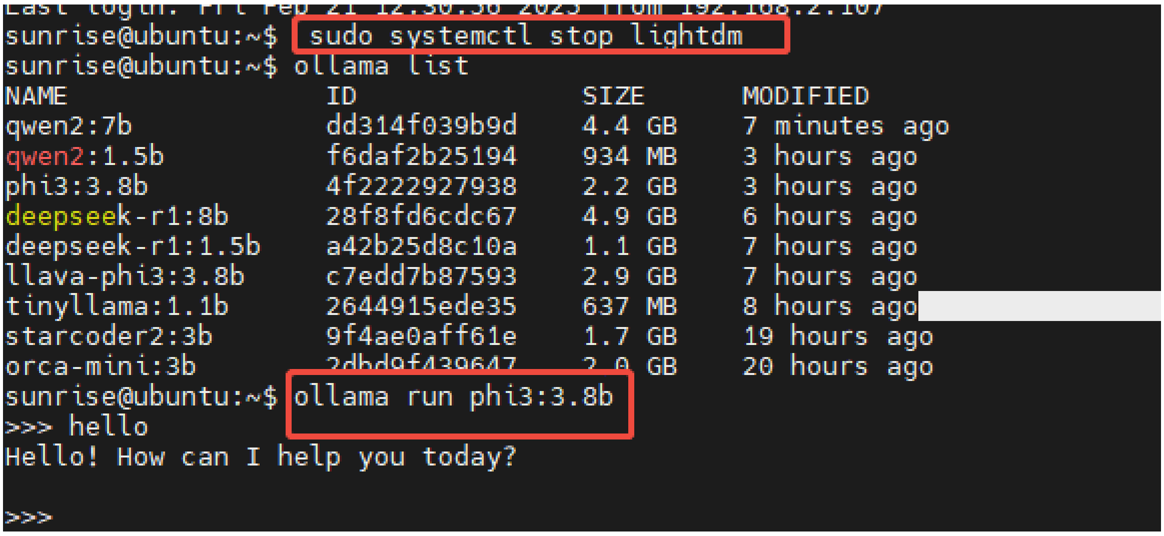
Shutdown instructions:

```
sudo systemctl stop docker
sudo systemctl stop lightdm
```

Instructions to restart the service:

```
sudo systemctl start docker
sudo systemctl start lightdm
```

Run in SSH terminal:

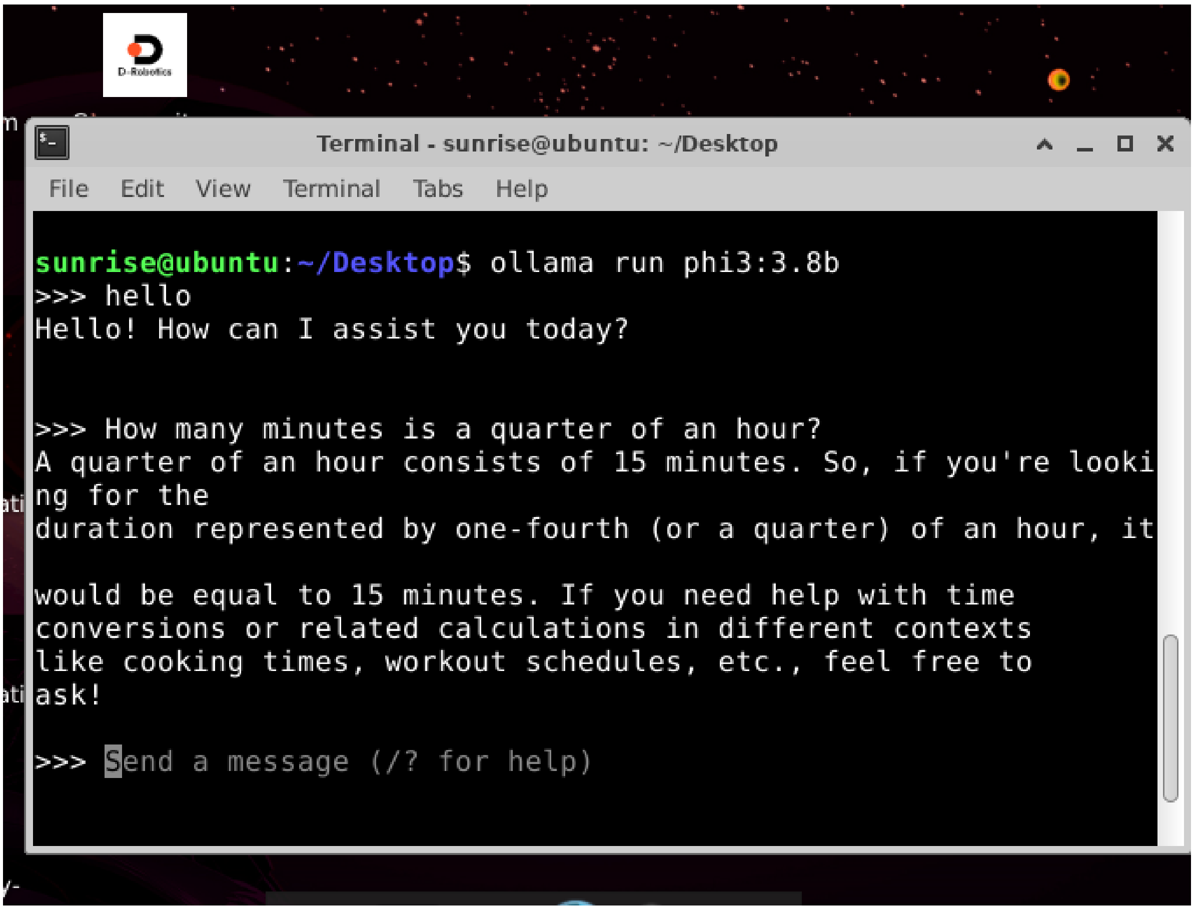


```
Last login: Fri Feb 21 12:30:38 2025 from 192.168.2.107
sunrise@ubuntu:~$ sudo systemctl stop lightdm
sunrise@ubuntu:~$ ollama list
NAME                    ID              SIZE      MODIFIED
qwen2:7b                dd314f039b9d    4.4 GB    7 minutes ago
qwen2:1.5b              f6daf2b25194    934 MB    3 hours ago
phi3:3.8b               4f2222927938    2.2 GB    3 hours ago
deepseek-r1:8b          28f8fd6cdc67    4.9 GB    6 hours ago
deepseek-r1:1.5b        a42b25d8c10a    1.1 GB    7 hours ago
llava-phi3:3.8b         c7edd7b87593    2.9 GB    7 hours ago
tinyllama:1.1b          2644915ede35    637 MB    8 hours ago
starcoder2:3b           9f4ae0aff61e    1.7 GB    19 hours ago
orca-mini:3b            2dbd9f439647    2.0 GB    20 hours ago
sunrise@ubuntu:~$ ollama run phi3:3.8b
>>> hello
Hello! How can I help you today?

>>>
```

4.2. Have a conversation

```
How many minutes is a quarter of an hour?
```

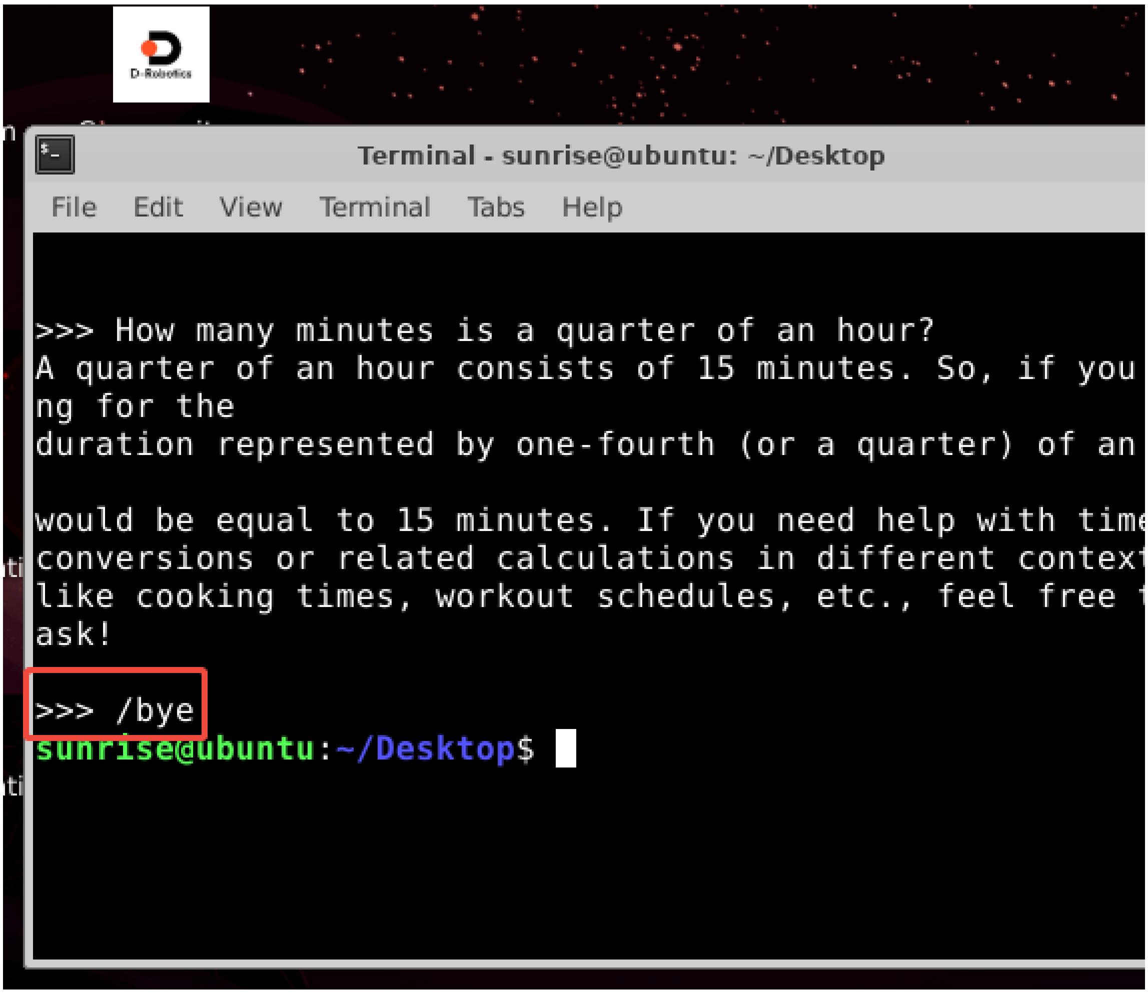
The response time is related to the hardware configuration, please be patient!


Terminal - sunrise@ubuntu: ~/Desktop
File Edit View Terminal Tabs Help

```
sunrise@ubuntu:~/Desktop$ ollama run phi3:3.8b
>>> hello
Hello! How can I assist you today?


>>> How many minutes is a quarter of an hour?
A quarter of an hour consists of 15 minutes. So, if you're looki
ng for the
duration represented by one-fourth (or a quarter) of an hour, it

would be equal to 15 minutes. If you need help with time
conversions or related calculations in different contexts
like cooking times, workout schedules, etc., feel free to
ask!

>>> Send a message (/? for help)
```

4.3. End the conversation

Use the `Ctrl+d` shortcut key or `/bye` to end the conversation!



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Terminal - sunrise@ubuntu: ~/Desktop
File Edit View Terminal Tabs Help

```
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conversions or related calculations in different context
like cooking times, workout schedules, etc., feel free t
ask!

>>> /bye
sunrise@ubuntu:~/Desktop$
```

References

> **Ollama**

Website： https://ollama.com/

GitHub： https://github.com/ollama/ollama

> **Phi-3**

Ollama model： https://ollama.com/library/phi3