

# Open Models for Generative Artificial Intelligence

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<https://floss.social/@jgbarah>

<https://jgbarah.github.io/presentations>

I Jornadas de Software Libre en Educacion  
IES Rafael Alberti, Cadiz, Spain, June 2 2025



# Plan

- 1 What is an “open” model?
- 2 Generative AI in your computer
- 3 Models, models, models
- 4 Infrastructure to play, to share
- 5 Many issues raised
- 6 Summarizing

## Open Generative AI

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# What is an “open” model?



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# Start by trying!

Dime cuánto es 123 menos 12



Reasoning  
Done in 37s.



$123 - 12 = 111.$

This result is consistent across various methods of calculation, including digit-by-digit subtraction, vertical subtraction, and real-world examples. Therefore, the answer is 111.

Ask anything



Model: deepseek-ai/DeepSeek-R1-Distill-Qwen-32B ▾ · Generated content may be inaccurate or false.

Share this conversation

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# Start by trying!

<https://huggingface.co/chat/>

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# Start by trying!

[https://api.aime.info/sd3\\_5/](https://api.aime.info/sd3_5/)

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# Start by trying!

`https:  
//api.aime.info/tts-tortoise/`

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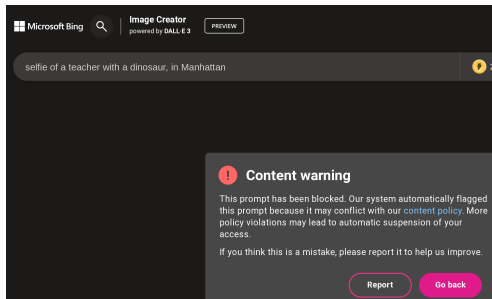
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# But beware!



“selfie of a teacher with a dinosaur, in Manhattan”

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# Can we control how we use generative models?



# What's a generative model

- Architecture
- Weights, just weights
- Software to make inferences

But also:

- Data to train, benchmark
- Software to train, benchmark
- Weights of intermediate models
- Documentation, explaining everything

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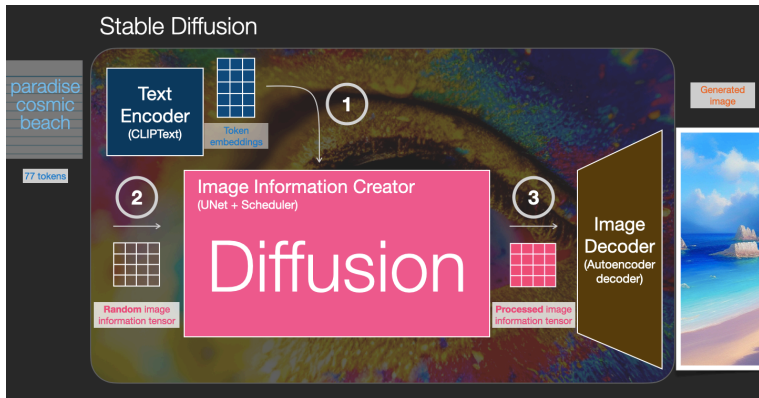
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# Example: Stable Diffusion 1.0



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# The Model Openness Framework: Promoting Completeness and Openness for Reproducibility, Transparency and Usability in AI

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Matt White<sup>1,2</sup>, Ibrahim Haddad<sup>2</sup>, Cailean Osborne<sup>2,3</sup>,  
Xiao-Yang (Yanglet) Liu<sup>1,4</sup>, Ahmed Abdelmonsef<sup>1</sup>, Sachin Varghese<sup>1</sup>

<sup>1</sup> LF AI & Data - Generative AI Commons, <sup>2</sup> Linux Foundation,

<sup>3</sup> University of Oxford, <sup>4</sup> Columbia University

<https://arxiv.org/abs/2403.13784>

# Classes of “openness”

- Open science: paper, datasets, log files, intermediate models parameters & metadata
- Open tooling: training, inference, and evaluation code, libraries, evaluation data
- Open model: architecture, model parameters & metadata, tech report, model card, data card

# “Open reproducible model”

All of the above, and

complete training set

(and any other detail needed to produce the same  
binary model)

# The four freedoms

- Freedom to use
- Freedom to study and modify
- Freedom to distribute
- Freedom to distribute modifications

[https://www.gnu.org/philosophy/  
free-sw.en.html](https://www.gnu.org/philosophy/free-sw.en.html)

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# Use

- Model weights
- Minimum: Detailed description of the model architecture
- Practical: Inference software
- Permission

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# Study and modify

- Training set, software & parameters
- Permission

Special case: Finetuning  
(model weights & architecture)



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# Distribute

Both as such and modified:

- Permission

# Open Source AI

## Open Source AI Definition:

- Fundamentally, four freedoms
- ...but...
- ...only description of the training set

[https://opensource.org/ai/  
open-source-ai-definition](https://opensource.org/ai/open-source-ai-definition)

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# Minimum for running in your computer

- Inference code, with libraries
- Model architecture
- Model parameters & metadata (weights)
- Technical report (prompts, etc.)
- Model card (convenient)

# Equipment requirements

- Depends on architecture, and size of the model
- CPU can be enough, GPU can accelerate a lot
- RAM enough so that model fits
- Code is usually FOSS

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# Example: HuggingChat

The screenshot displays the HuggingChat web interface. At the top, the header reads 'HuggingChat v0.8.4' with a tagline 'Making the community's best AI chat models available to everyone.' Below this, a 'Current Model' section shows 'CohereForAI/c4ai-command-r-plus' with a 'Model page' link and a 'Website' icon. A 'Examples' section contains three input prompts: 'Write an email from bullet list', 'Code a snake game', and 'Assist in a task'. A 'Search web' toggle is visible. The main chat area has a placeholder 'Ask anything' and a disclaimer: 'Model: CohereForAI/c4ai-command-r-plus · Generated content may be inaccurate or false.' On the right, a 'Settings' sidebar is open, showing 'Application Settings' and a list of models. 'CohereForAI/c4ai-command-r-plus' is selected and marked as 'Active'. Other models listed include 'meta-llama/Meta-Llama-3-70B-Instruct', 'HuggingFaceH4/zephyr-orpo-141b-A35b-v0.1', 'mistralai/Mistral-8x7B-Instruct-v0.1', 'NousResearch/Nous-Hermes-2-Mistral-8x7B-DPO', and 'google/gemma-1.1-7b-it'. The 'System Prompt' section is also visible at the bottom of the settings.

<https://huggingface.co/chat/>

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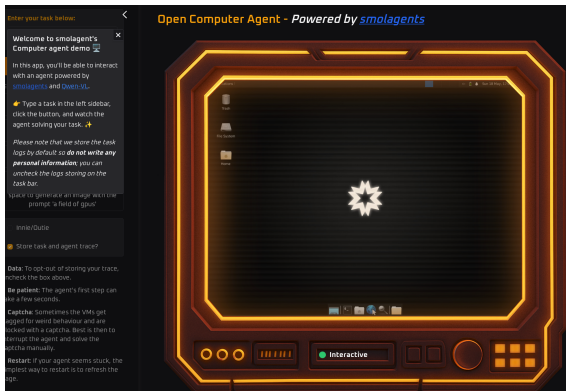
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# Example: computer-agent



<https://huggingface.co/spaces/smolagents/computer-agent>

# Example: computer-agent

## Key components:

- Agents framework: smolagents
- Model: Qwen2-VL-72B
- Desktop: E2B Desktop

<https://github.com/huggingface/smolagents>  
<https://huggingface.co/Qwen/Qwen2-VL-72B-Instruct>  
<https://github.com/e2b-dev/desktop>

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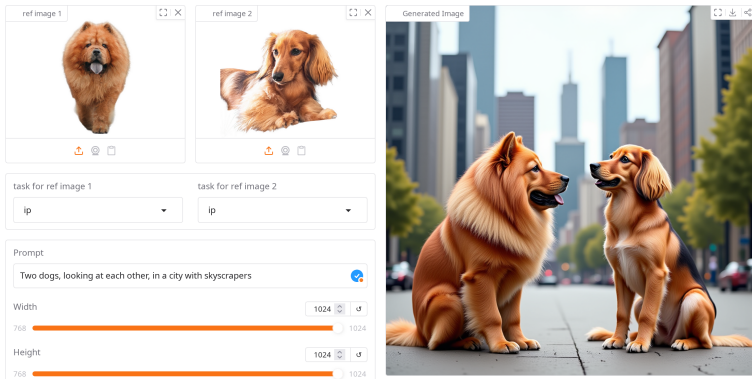
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# Example: DreamO



<https://huggingface.co/spaces/ByteDance/DreamO>



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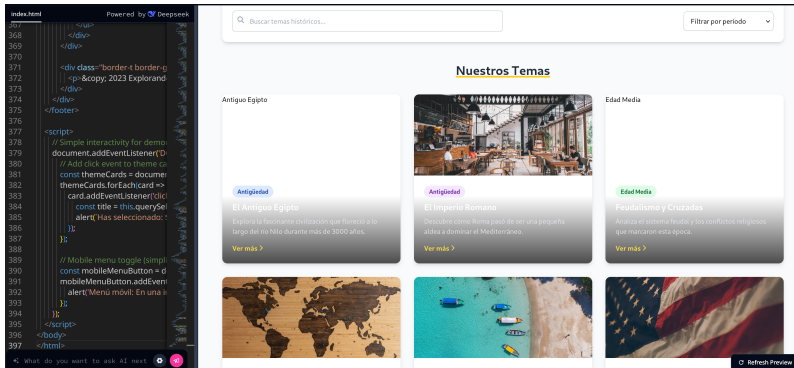
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# Example: DeepSite



<https://huggingface.co/spaces/enzostvs/deepsite>

<https://huggingface.co/spaces/enzostvs/deepsite/discussions/74>

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# More examples

<https://huggingface.co/spaces/>

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# Generative AI in your computer

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# Models to download

- HuggingFace: all kinds  
<https://huggingface.co/>
- CivitAI: images  
<https://civitai.com/>

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# Models via cloud APIs

- OpenRouter: text  
<https://openrouter.ai/>
- Groq: text  
<https://groq.com/>
- Replicate: images  
<https://replicate.com>
- Together.ai: multimodal  
<https://together.ai/>

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# Models, models, models

# Speech to text: Whisper

```
#!/usr/bin/python3  
import whisper
```

```
model = whisper.load_model('tiny')  
transcription = model.transcribe('recording.wav')  
print(transcription['text'])
```

```
$ whisper speech.wav --language Spanish
```

<https://openai.com/blog/whisper/>  
<https://github.com/openai/whisper>  
License: MIT (open source)

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# Text to speech: Coqui TTS

```
$ tts --text "Texto" \  
  --model_name tts_models/es/mai/tacotron2-DDC \  
  --out_path speech.wav
```

<https://github.com/idiap/coqui-ai-TTS>

License: MPL-2.0 (open source)



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# Text to speech: Tortoise TTS

```
$ python tortoise/do_tts.py \  
  --text "Hello everybody!" \  
  --voice random --preset fast
```

<https://github.com/neonbjb/tortoise-tts>

License: Apache-2.0 (open source)

# Stable Diffusion

EasyDiffusion:

<https://easydiffusion.github.io>

Fooocus:

<https://github.com/l1llyasviel/Fooocus>

AUTOMATIC1111:

[https://github.com/AUTOMATIC1111/  
stable-diffusion-webui](https://github.com/AUTOMATIC1111/stable-diffusion-webui)

# Stable Diffusion (2)

SD.next:

[https:](https://github.com/vladmandic/automatic)

[//github.com/vladmandic/automatic](https://github.com/vladmandic/automatic)

ComfyUI:

[https:](https://github.com/comfyanonymous/ComfyUI)

[//github.com/comfyanonymous/ComfyUI](https://github.com/comfyanonymous/ComfyUI)

# Text generation models

Llama4, Llama Community License

<https://llama.com/models/llama-4/>  
<https://github.com/meta-llama/>

DeepSeek, DeepSeek License

<https://deepseek.com/>  
<https://huggingface.co/deepseek-ai>

# Text generation models (2)

Mistral, Apache 2.0

<https://mistral.ai/>

<https://huggingface.co/mistralai>

Qwen, Apache 2.0

<https://huggingface.co/Qwen>

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## Leaderboard

Rank (UB)	Model	Arena Elo	95% CI	Votes	Organization	License	Knowledge Cutoff
1	<a href="#">GPT-4-Turbo-2024-04-09</a>	1258	+3/-3	44592	OpenAI	Proprietary	2023/12
2	<a href="#">GPT-4-1106-preview</a>	1252	+2/-3	76173	OpenAI	Proprietary	2023/4
2	<a href="#">Gemini 1.5 Pro API-0409-Preview</a>	1249	+3/-3	61011	Google	Proprietary	2023/11
2	<a href="#">Claude 3 Opus</a>	1248	+2/-2	101863	Anthropic	Proprietary	2023/8
3	<a href="#">GPT-4-0125-preview</a>	1246	+3/-2	70239	OpenAI	Proprietary	2023/12
6	<a href="#">Bard (Gemini Pro)</a>	1208	+5/-6	12387	Google	Proprietary	Online
6	<a href="#">Llama-3-70B-Instruct</a>	1208	+3/-3	75844	Meta	Llama 3 Community	2023/12
7	<a href="#">Reka-Core-20240501</a>	1199	+4/-4	18735	Reka AI	Proprietary	Unknown
8	<a href="#">Claude 3 Sonnet</a>	1200	+2/-3	84252	Anthropic	Proprietary	2023/8
10	<a href="#">GPT-4-0314</a>	1189	+3/-3	53446	OpenAI	Proprietary	2021/9
10	<a href="#">Qwen-Max-0420</a>	1186	+5/-7	10500	Alibaba	Proprietary	Unknown
10	<a href="#">Command R+</a>	1189	+3/-3	50490	Cohere	CC-BY-NC-4.0	2024/3
12	<a href="#">Claude 3 Haiku</a>	1180	+2/-3	74097	Anthropic	Proprietary	2023/8
13	<a href="#">Qwen1.5-110B-Chat</a>	1172	+7/-8	6019	Alibaba	Qianwen LICENSE	2024/4

<https://lmarena.ai/?leaderboard>

# Inference engines

llama.cpp

<https://github.com/ggerganov/llama.cpp>

Ollama

<https://ollama.com/>

vLLM

<https://github.com/vllm-project/vllm>

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## Chat frontends

Oobabooga:

[https://github.com/oobabooga/  
text-generation-webui](https://github.com/oobabooga/text-generation-webui)

openplayground:

<https://github.com/nat/openplayground>

catAI

<https://github.com/withcatai/catai>



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# Collections of consented, open data

LAION Open Empathic

<https://laion.ai/blog/open-empathic/>

LAION Datasets

<https://laion.ai/projects/>

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# Agent frameworks

## Camel–AI Owl

<https://github.com/camel-ai/owl><https://github.com/camel-ai>

## LangChain

<https://langchain.com/>

## Smolagents

<https://github.com/huggingface/smolagents>

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# Infrastructure to play, to share

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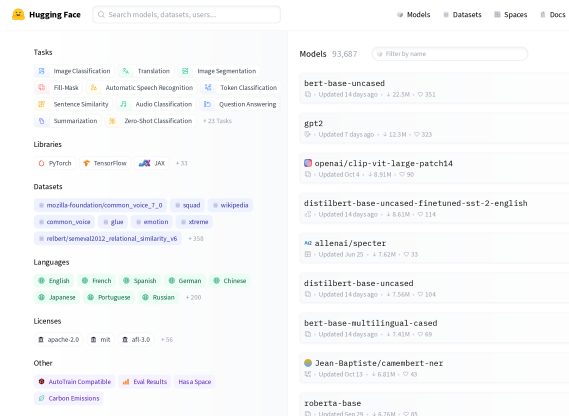
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## Hugging Face

“GitHub for ML”

<https://huggingface.co>

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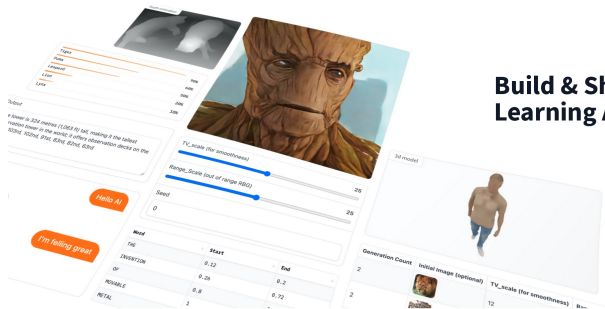
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## Gradio



## Build &amp; Share Delightful Machine Learning Apps

Gradio is the fastest way to demo your machine learning model with a friendly web interface so that anyone can use it, anywhere!

Get Started

Star

10,955

<https://gradio.app/>  
License: Apache 2.0

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## Diffusers



Pretrained diffusion models (vision, audio, etc.)  
Modular toolbox for inference & training of  
diffusion models

<https://github.com/huggingface/diffusers>

License: Apache 2.0

# Model frameworks, etc

PyTorch

<https://pytorch.org/>

TensorFlow

<https://tensorflow.org/>

Keras

<https://keras.io/>

Cuda

[https://developer.nvidia.com/  
cuda-toolkit](https://developer.nvidia.com/cuda-toolkit)

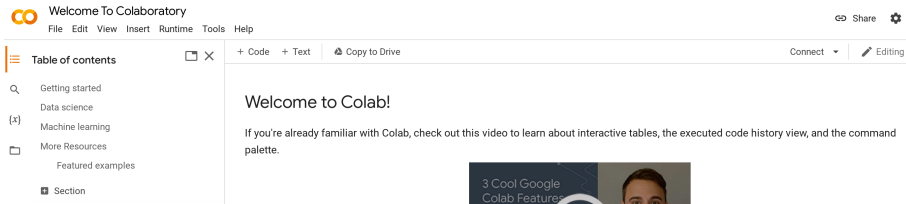
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## Collab



Python in the browser, zero configuration  
Access to GPUs & easy sharing

<https://colab.research.google.com/>



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# Jupyter



## Python in the browser, easy

<https://jupyter.org/>

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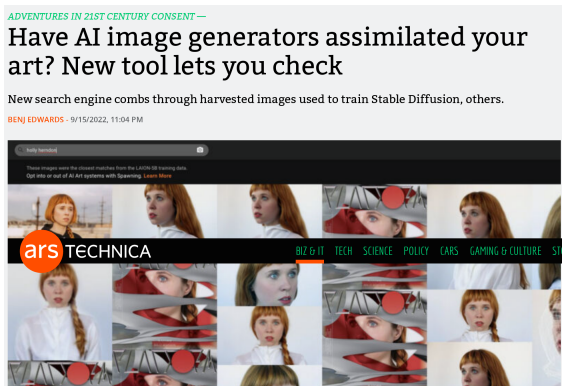
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# Intellectual property (training set)



<https://haveibeentrained.com/>

<https://arstechnica.com/information-technology/2022/09/have-ai-image-generators-as>

# Intellectual property (results)

Impact of Technology Deep Dive Report I

## STUDY ON THE IMPACT OF ARTIFICIAL INTELLIGENCE ON THE INFRINGEMENT AND ENFORCEMENT OF COPYRIGHT AND DESIGNS

[https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document\\_library/observatory/documents/reports/2022\\_Impact\\_AI\\_on\\_the\\_Infringement\\_and\\_Enforcement\\_CR\\_Designs/2022\\_Impact\\_AI\\_on\\_the\\_Infringement\\_and\\_Enforcement\\_CR\\_Designs\\_FullR\\_en.pdf](https://euipo.europa.eu/tunnel-web/secure/webdav/guest/document_library/observatory/documents/reports/2022_Impact_AI_on_the_Infringement_and_Enforcement_CR_Designs/2022_Impact_AI_on_the_Infringement_and_Enforcement_CR_Designs_FullR_en.pdf)

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# Intellectual property

- Can models be trained on anything public?
- Are models subject to copyright law?
- Who is the author of the production of a model?
- Can anybody besides the author claim rights on the production of a model

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## Licenses

Model	Model License	Description	Link to License
GPT-2	MIT License + generated output disclaimer	Permissive open source license	<a href="https://github.com/openai/gpt-2/blob/master/LICENSE">https://github.com/openai/gpt-2/blob/master/LICENSE</a>
GPT-3	Exclusive	Licensed to	Microsoft
YOLO	YOLO License	Public domain license	<a href="https://github.com/pjreddie/darknet/blob/master/LICENSE">https://github.com/pjreddie/darknet/blob/master/LICENSE</a>
DALLE-pytorch	MIT License	Pytorch implementation of DALLE created by individual researcher	<a href="https://github.com/lucidrains/DALLE-pytorch/blob/main/LICENSE">https://github.com/lucidrains/DALLE-pytorch/blob/main/LICENSE</a>
Stable Diffusion	CreativeML Open RAIL-M	Open & Responsible AI License (RAIL) created by Stability.ai and adapted from the BLOOM RAIL license, including use-based restrictions (see attachment A)	<a href="https://huggingface.co/spaces/CompVis/stable-diffusion-license">https://huggingface.co/spaces/CompVis/stable-diffusion-license</a>
OPT	OPT-1.75B License	Meta restrictive license enabling use of the model weights for research purposes while establishing a set of use-based restrictions, which could be considered a RAIL.	<a href="https://github.com/facebookresearch/metaseq/blob/main/projects/OPT/MODEL_LICENSE.md">https://github.com/facebookresearch/metaseq/blob/main/projects/OPT/MODEL_LICENSE.md</a>
BigScience	BigScience OpenRAIL-M	Open & Responsible AI License (RAIL) created by BigScience and adapted from the BLOOM RAIL license, including use-based restrictions (see attachment A)	<a href="https://huggingface.co/spaces/bigscience/license">https://huggingface.co/spaces/bigscience/license</a>
Tsinghua University	GLM-130B license	Restrictive license enabling use of the model weights for research purposes	<a href="https://github.com/THUDM/GLM-130B/blob/main/MODEL_LICENSE">https://github.com/THUDM/GLM-130B/blob/main/MODEL_LICENSE</a>

<https://hackmd.io/@jending12/HyvMU8sJo><https://thegradient.pub/>[machine-learning-ethics-and-open-source-li](https://machine-learning-ethics-and-open-source-li)

## Open Generative AI

Jesus M.  
Gonzalez-Barahona

What is an “open”  
model?

Generative AI in  
your computer

Models, models,  
models

Infrastructure to  
play, to share

Many issues raised

Summarizing

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# Bias



Mugshot of a technical speaker, machine learning expert,  
smiling, long hair, big eyes [t-shirt, curly hair]

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# Security



[Privacy](#) [Careers](#) [Disclosure Policy](#) [Technical Advisories](#) [Public Reports](#) [2021 Research Report](#)

[Contact Us](#)

## Whitepaper – Practical Attacks on Machine Learning Systems

 Jennifer Fernick

 Machine Learning, Offensive Security & Artificial Intelligence, Research, Research Paper, Whitepaper

 July 6, 2022  1 Minute

*Written by Chris Anley, Chief Scientist, NCC Group*

[https://research.nccgroup.com/2022/07/06/  
whitepaper-practical-attacks-on-machine-learning-systems/](https://research.nccgroup.com/2022/07/06/whitepaper-practical-attacks-on-machine-learning-systems/)  
<https://simonwillison.net/2022/Sep/12/prompt-injection/>



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# Impact on professionals

- No more draw for hire as a profession?
- New opportunities for artists?
- Access to models as a fundamental need?

Is this different from the invention of photography?

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# Prompt engineers

A new profession

Artists, engineers, craftsmen?

Is it here to stay?

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# What is true?

## Make-A-Video

Make-A-Video research builds on the recent progress made in text-to-image generation technology built to enable text-to-video generation. The system uses images with descriptions to learn what the world looks like and how it is often described. It also uses unlabeled videos to learn how the world moves. With this data, Make-A-Video lets you bring your imagination to life by generating whimsical, one-of-a-kind videos with just a few words or lines of text.



<https://makeavideo.studio/>

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# The future just started

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# References, credits, license

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- Transformers-Tutorials

<https://github.com/NielsRogge/Transformers-Tutorials>

- Vision Transformers

<https://cameronrwolfe.substack.com/p/vision-transformers>

- A walk through latent space with Stable Diffusion

[https://keras.io/examples/generative/random\\_walks\\_with\\_stable\\_diffusion/](https://keras.io/examples/generative/random_walks_with_stable_diffusion/)

- How Open Source is eating AI

<https://lspace.swyx.io/p/open-source-ai>



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- Awesome Diffusion Models

<https://github.com/heejkoo/Awesome-Diffusion-Models>

- /r/StableDiffusion at Reddit

<https://www.reddit.com/r/StableDiffusion>

- Open LLMs

<https://github.com/eugeneyan/open-llms>

- The Generative Landscape (WiP course)

<https://johnowhitaker.github.io/tgllcourse/>

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<https://jgbarah.github.io/presentations>