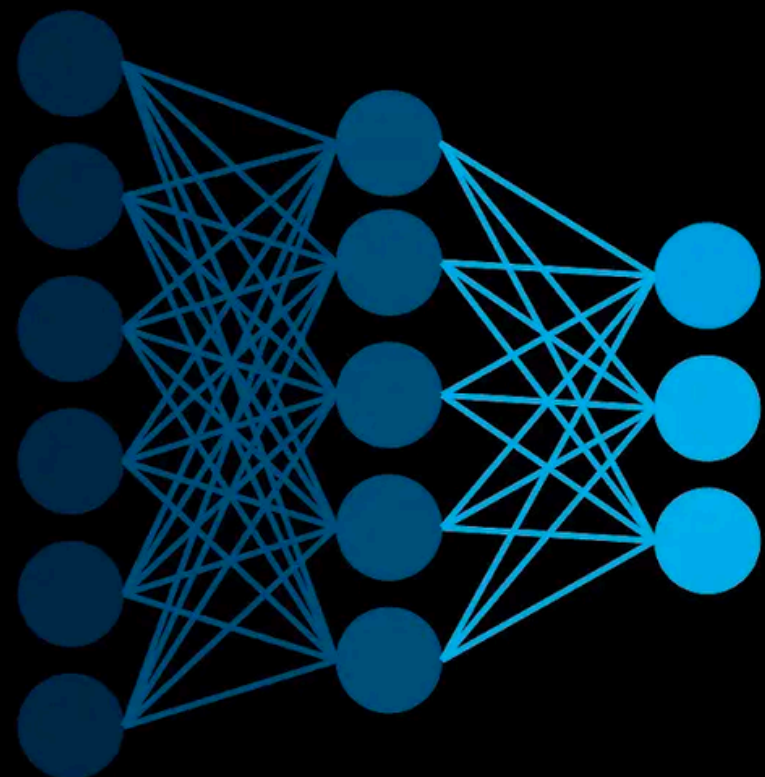


Open Source and Open Weight Models

Weight Initialization

$$W^{[l]} = \begin{bmatrix} w_{11}^{[l]} & w_{12}^{[l]} & \dots & w_{1n^{[l-1]}}^{[l]} \\ w_{21}^{[l]} & w_{22}^{[l]} & \dots & w_{2n^{[l-1]}}^{[l]} \\ \vdots & \vdots & \dots & \vdots \\ w_{n^{[l]}1}^{[l]} & w_{n^{[l]}2}^{[l]} & \dots & w_{n^{[l]}n^{[l-1]}}^{[l]} \end{bmatrix}$$



What are weights in LLMs?

In machine learning, weights are numbers the model learns during training. These numbers control how the model turns input data into predictions. In LLMs, weights store the knowledge learned from the training data. Models with more weights can often learn more complex language patterns.

During training, the model adjusts its weights using the data it sees. It tries to make its predictions more accurate. After training, developers can save these weights. Others can then use the trained model without needing to train it again, which saves time and resources.

Here are the types of LLM in terms of their parameters:
An open-weights model refers to a type of Large Language Model (LLM) where the model's parameters aka its "weights"—are publicly available. That means anyone can download, inspect, use, or fine-tune the model without hitting any licensing walls or proprietary restrictions.

Unlike closed or proprietary models, which are tightly guarded by the companies that built them, open-weights models are typically released to encourage research, experimentation, and community-driven innovation. They're often used in academic settings, by startups, or by independent developers who want to push the boundaries of what these models can do—or just get under the hood and tinker.

Now, here's an important nuance: open-weights ≠ open-source. While open-source models give you access to everything—the architecture, training code, datasets (sometimes), and the weights—open-weights models only release the final trained parameters. You don't get the full recipe, just the final dish.



What are Open Weight Models?

“Open weights” means the trained weights of a model are available to the public. Anyone can download these weights. They can use the weights in their own applications if they have the right computer systems. Open weights let developers use powerful pre-trained models for tasks like writing text or understanding sentiment. This avoids the high cost and time of training a model from the beginning.

The main benefit of open weights is access. Developers can quickly use advanced models in their projects. This helps drive new ideas. However, open weights don't always mean the model's design or training data are also public. Users might get the model's abilities but not know exactly how it was built or trained.

Lets see some examples

- Llama 3 (from Meta): Meta released the weights for various Llama 3 model sizes. While the weights are available, they come with a specific license that includes usage restrictions, particularly for very large companies commercializing services based on it.
- Mistral 7B (from Mistral AI): This model gained popularity for its strong performance relative to its size. The weights were released under the Apache 2.0 license, making them widely usable.



What are Open Source Models?

“Open source models” is a broader idea. An open source model usually includes the weights, the complete source code, guides, and often the training data. This openness lets developers see how the model works. They can change it or even retrain it with new data.

The open source approach supports teamwork and community development. Developers can help improve the model, find bugs, and share changes. This group effort can lead to stronger, more useful models. Using and changing open source models might need more technical knowledge, which can be a challenge for some people.

Lets see some examples

- **BLOOM (BigScience Large Open-science Open-access Multilingual Language Model):** This was a large collaborative effort involving many researchers. The model’s weights, code, and details about its extensive multilingual training data were released with an open RAIL license aimed at responsible use.
- **GPT-2 (from OpenAI):** Although older now, GPT-2 was a landmark release where OpenAI made both the model code and the weights publicly available, fostering much research and development in the community.



Key Differences

- **Transparency:** Open source models show everything, including design and often training data. Open weights models might only share the trained numbers.
- **Modification:** You can change and retrain open source models for specific needs. You usually cannot change open weights models unless the base model is also open source.
- **Community:** Open source models involve the community in development. Open weights models usually do not have this level of group work.
- **Ease of Use:** Open weights can be easier for developers who just want to use a model quickly without studying its design.

For more information, you can visit this [article](#)

Intermediate

LLMs

What are Open Source and Open Weight Models?

Explore open weight models, why they matter, and what OpenAI's upcoming re

