What does “learned weight matrix” mean?

In machine learning (including Transformers), a weight matrix is like a table of numbers that the model uses to transform input data.

“Learned” means:

- The model doesn’t start with fixed numbers.
- Instead, during training, it adjusts these numbers again and again to improve performance.

Example in the Transformer

When creating the Query, Key, and Value vectors, we multiply the word embeddings by weight matrices:

$Q = \text{Embedding} \times W^Q$, $K = \text{Embedding} \times W^K$, $V = \text{Embedding} \times W^V$

Here:

- W^Q, W^K, W^V are the learned weight matrices.
- They start with random numbers.
- As the model trains on data, it adjusts these numbers (using optimization algorithms like gradient descent) to reduce error and improve accuracy.

Simple analogy

Think of the weight matrix like a recipe:

- Initially, you guess ingredient amounts (random weights).
- You taste the dish (check loss/error).
- You adjust the recipe (update weights).
- Over time, you learn the best combination for great results.

Why is it important?

Without learning the weight matrix:

- The model would just apply fixed, useless transformations.
- With learning, the model adapts itself to the data, finding the best patterns to make good predictions.

Related posts:

1. November 2023 Current affairs
2. On November 3, 1957, the Soviet Union launched Sputnik 2
3. Neil Wagner Retirement: A Tribute to New Zealand’s Cricket Legend
4. Daily Current Affairs 18 October 2024
5. Current Affairs
6. Daily Current Affairs 19 October 2024
7. Daily Current Affairs 20 October 2024
8. Daily Current Affairs 21 October 2024
9. Daily Current Affairs 22 October 2024
10. Daily Current Affairs 22 October 2024
11. Daily Current Affairs 23 October 2024
12. Daily Current Affairs 24 October 2024
13. Daily Current Affairs 25 October 2024

14. Daily Current Affairs 26 October 2024
15. Fix ERR_TOO_MANY_REDIRECTS: Solve Redirect Loop in WordPress & Cloudflare