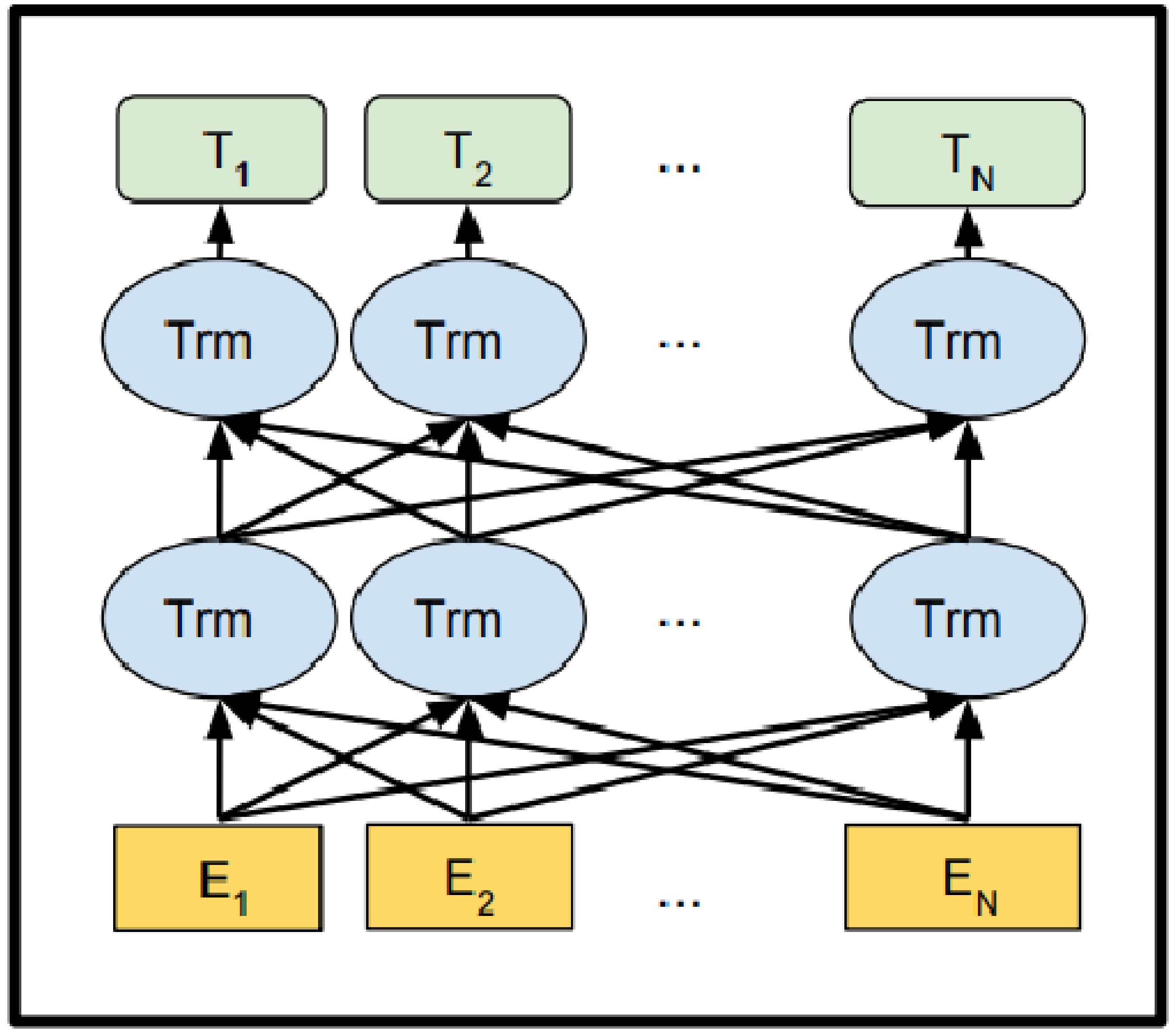


BERT

Bidirectional **E**ncoder

Representations from

Transformers

Architecture

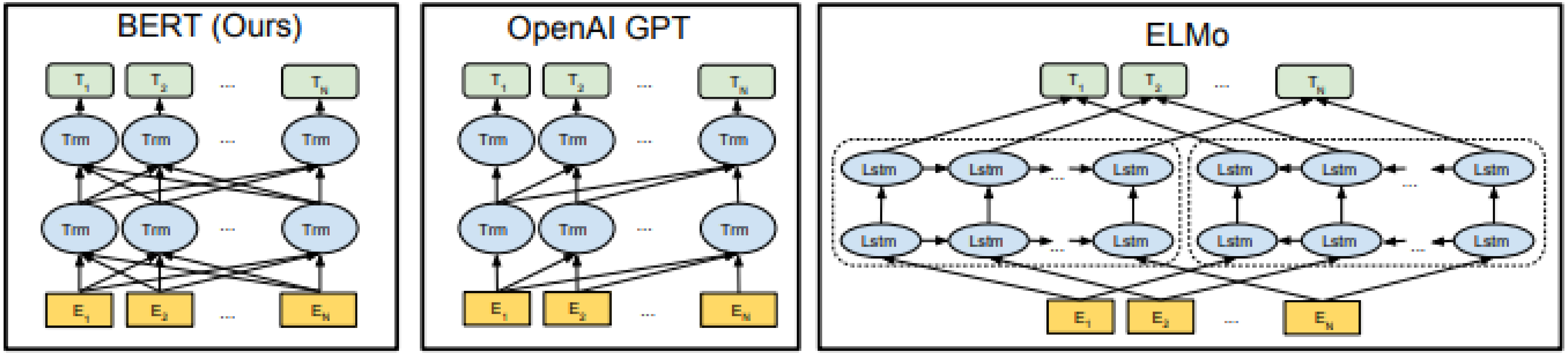
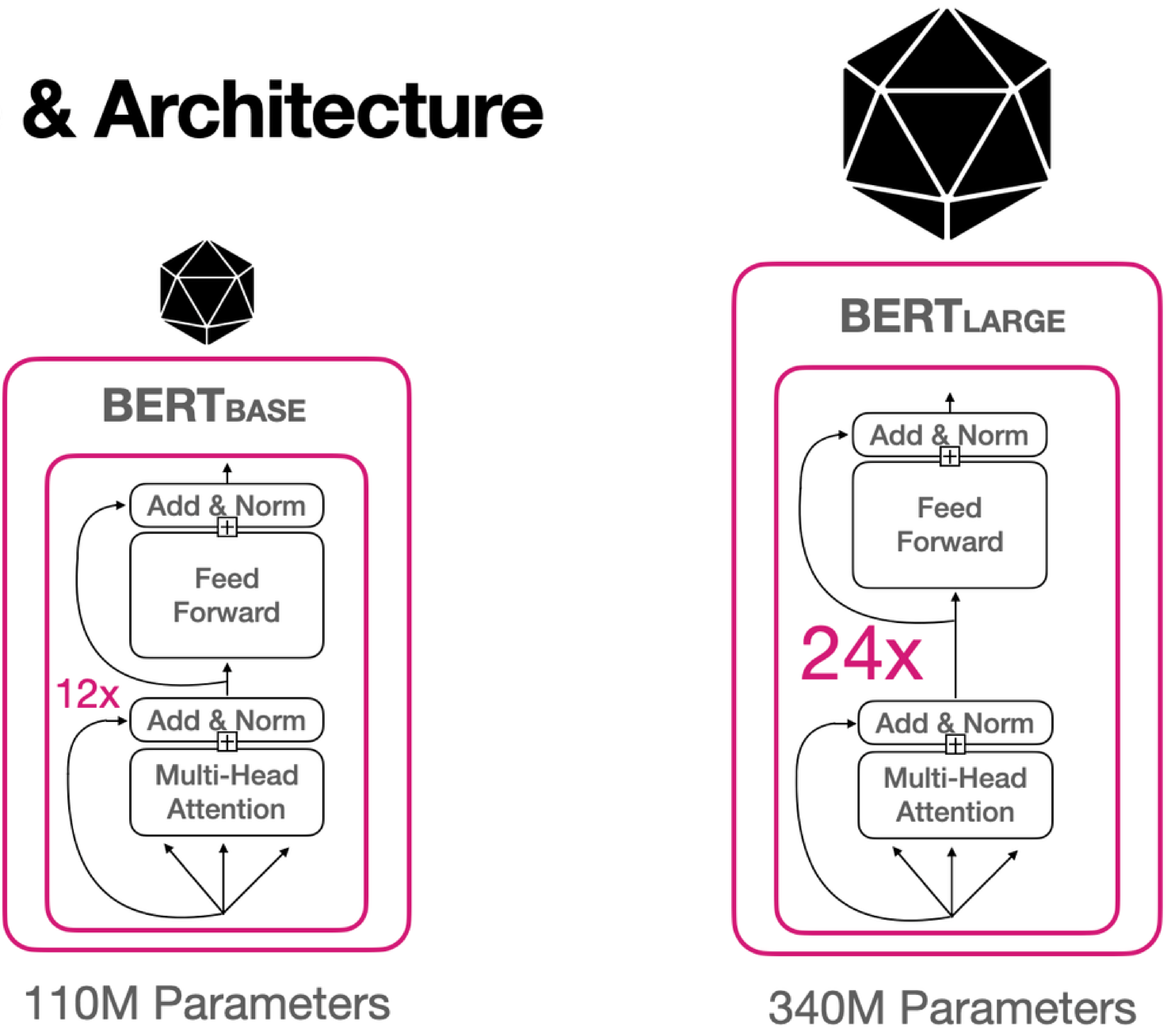


Figure 1: Differences in pre-training model architectures. BERT uses a bidirectional Transformer. OpenAI GPT uses a left-to-right Transformer. ELMo uses the concatenation of independently trained left-to-right and right-to-left LSTM to generate features for downstream tasks. Among three, only BERT representations are jointly conditioned on both left and right context in all layers.

Architecture

BERT Size & Architecture



Input Representation

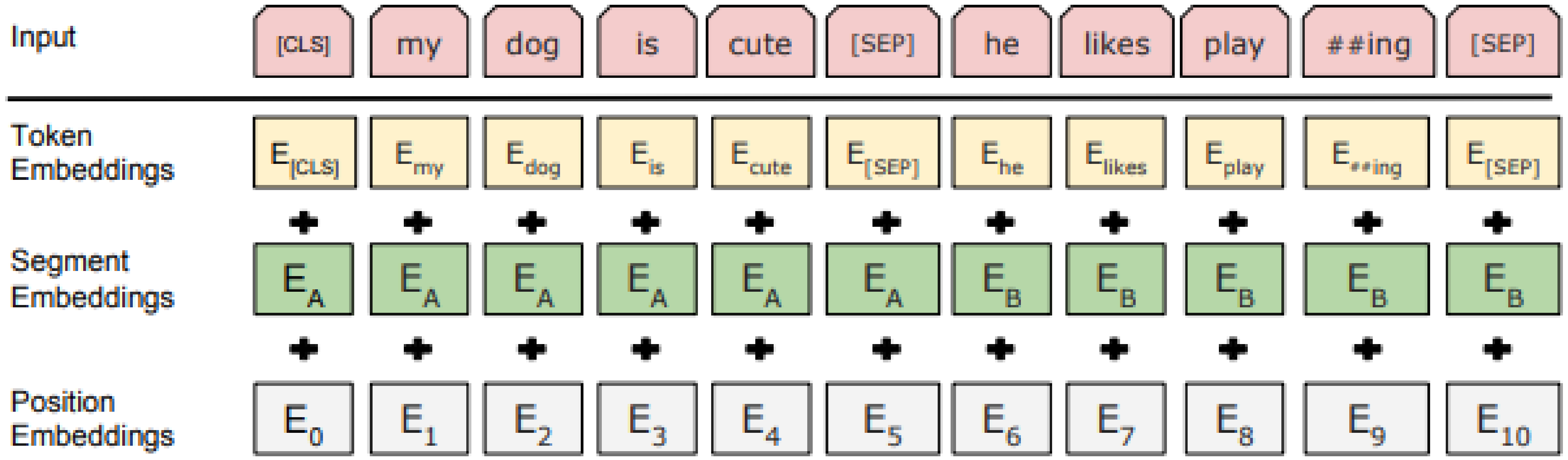
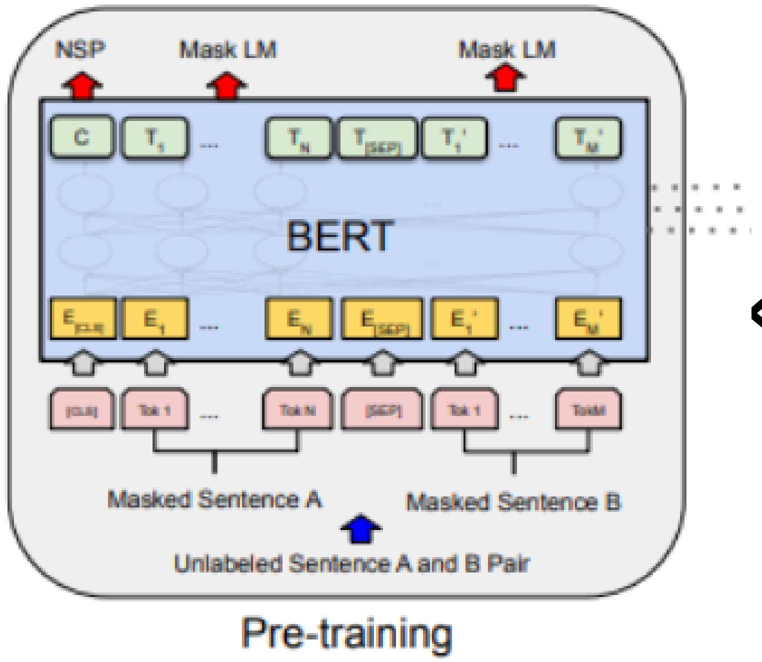


Figure 2: BERT input representation. The input embeddings is the sum of the token embeddings, the segmentati
embeddings and the position embeddings.

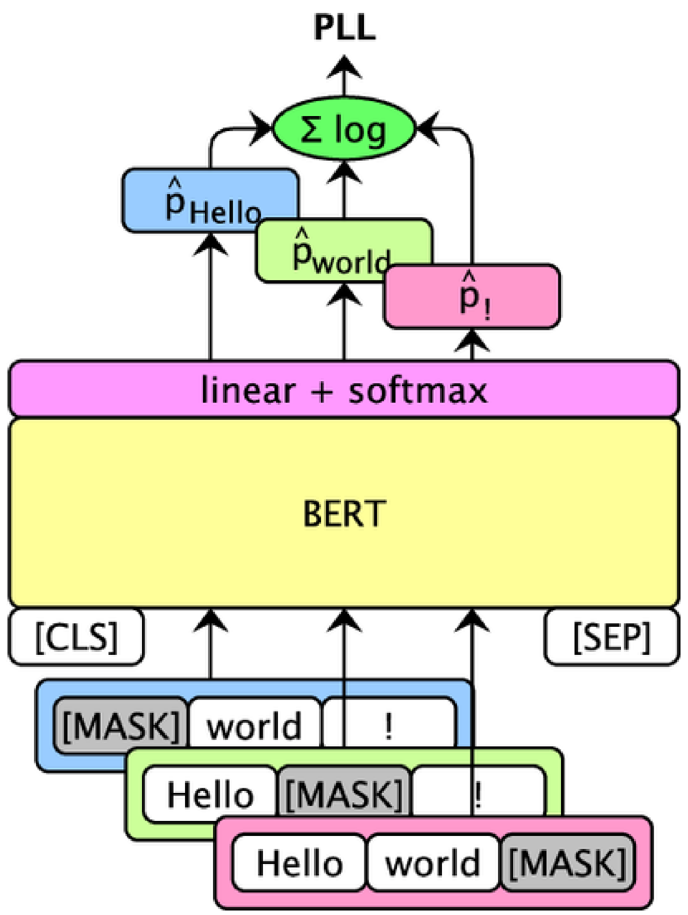
→ Thêm Segment Embedding

→ Học thêm về mối tương quan của các câu

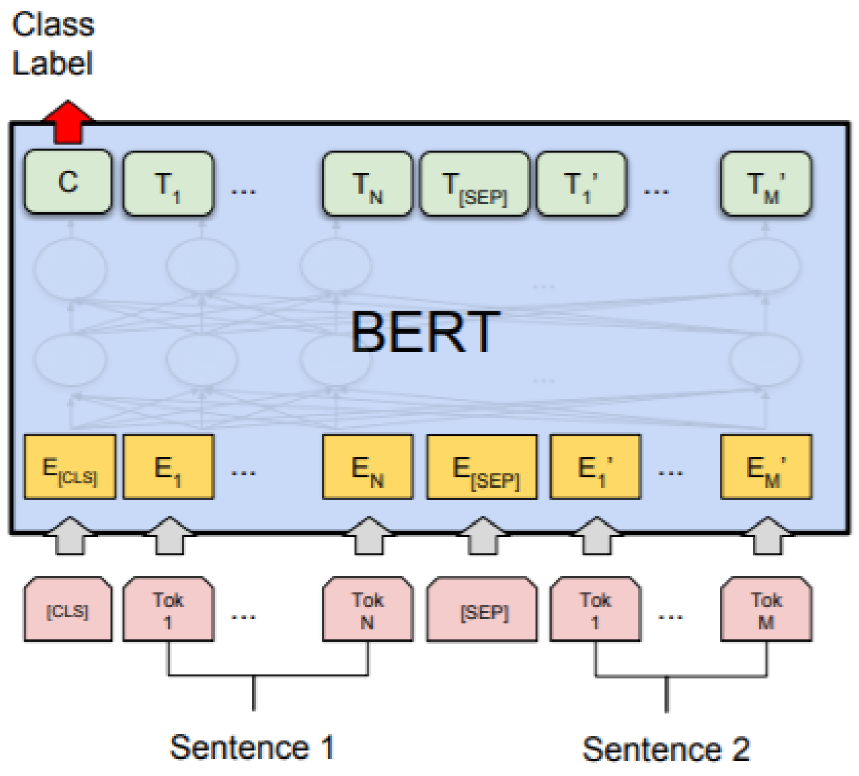
Pre-training Tasks



Mask LM



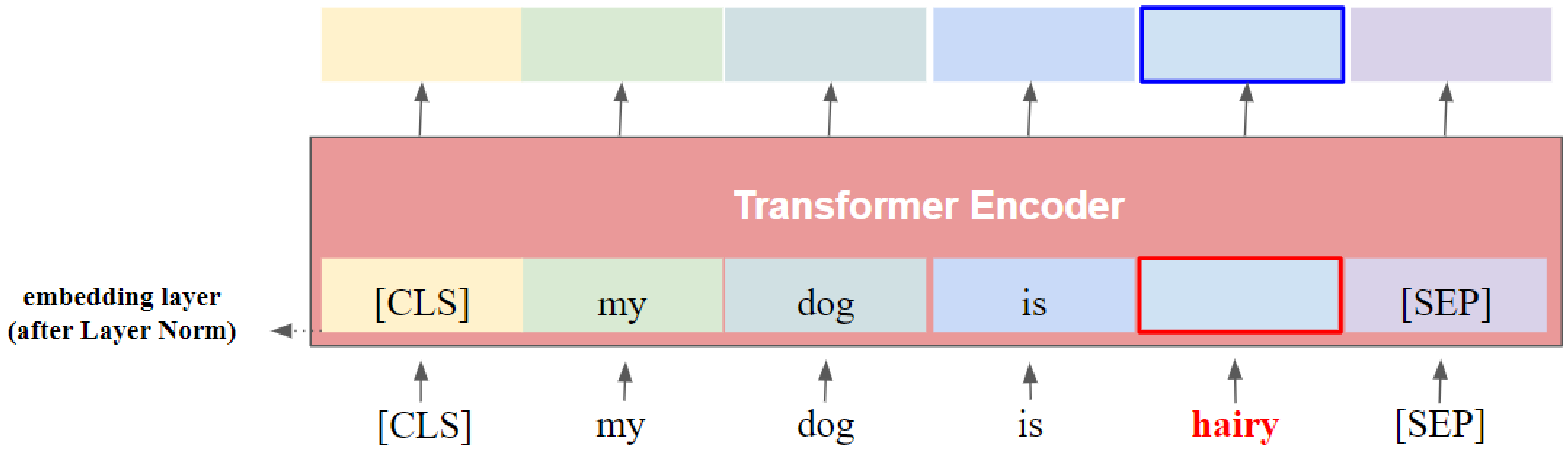
Next Sentence Prediction



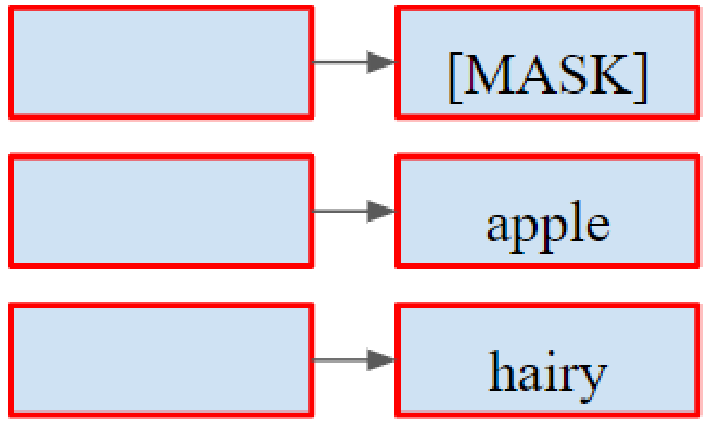
(a) Sentence Pair Classification Tasks:
MNLI, QQP, QNLI, STS-B, MRPC,
RTE, SWAG

MASK LM

Target: Học cách dự đoán dựa trên bối cảnh ⟶ Che đi một phần dữ liệu



Mask **15%** of all WordPiece tokens in each sequence at **random**. (e.g., **hairy**)

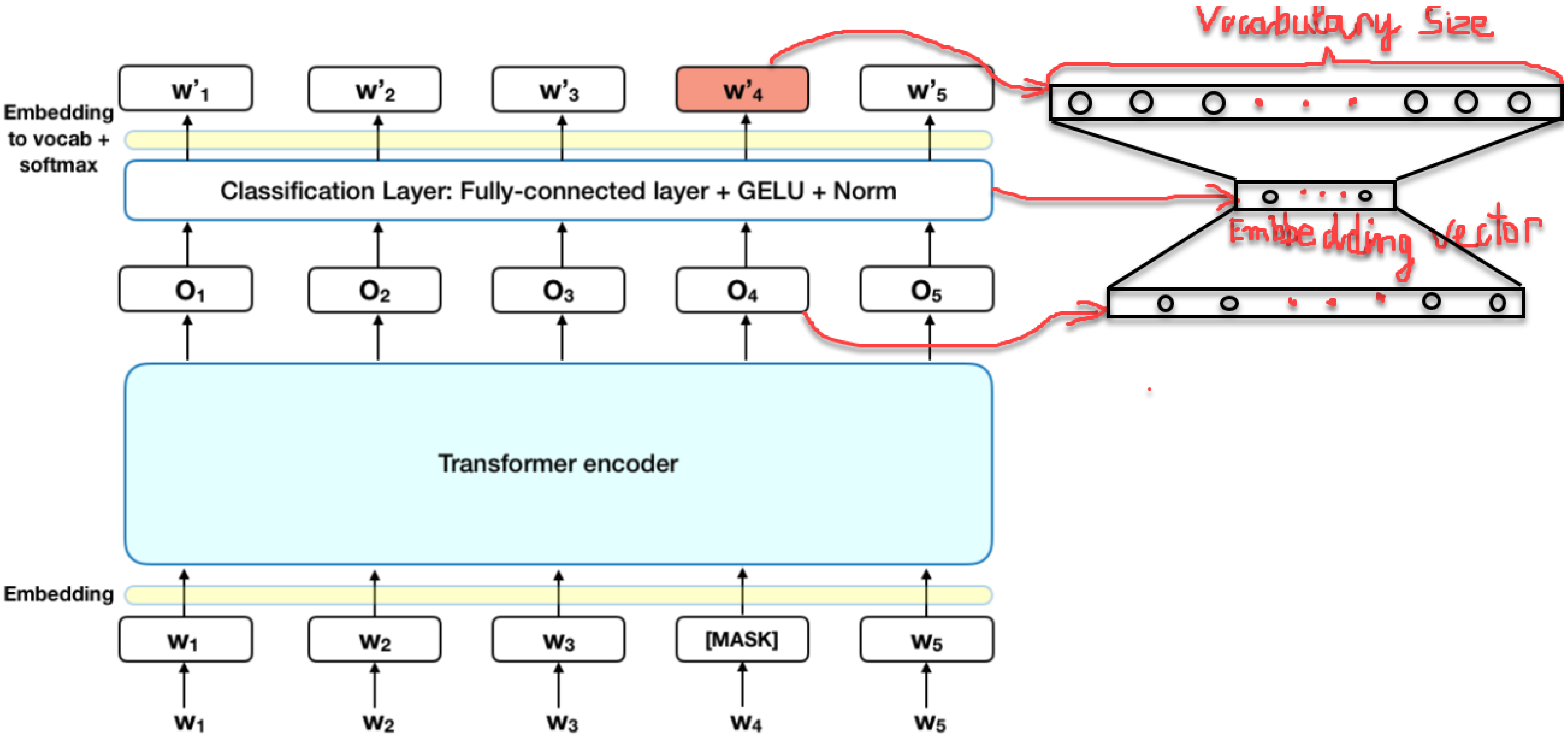


80% of the time : Replace **[MASK]** token.

10% of the time : Replace the word with a **random** word

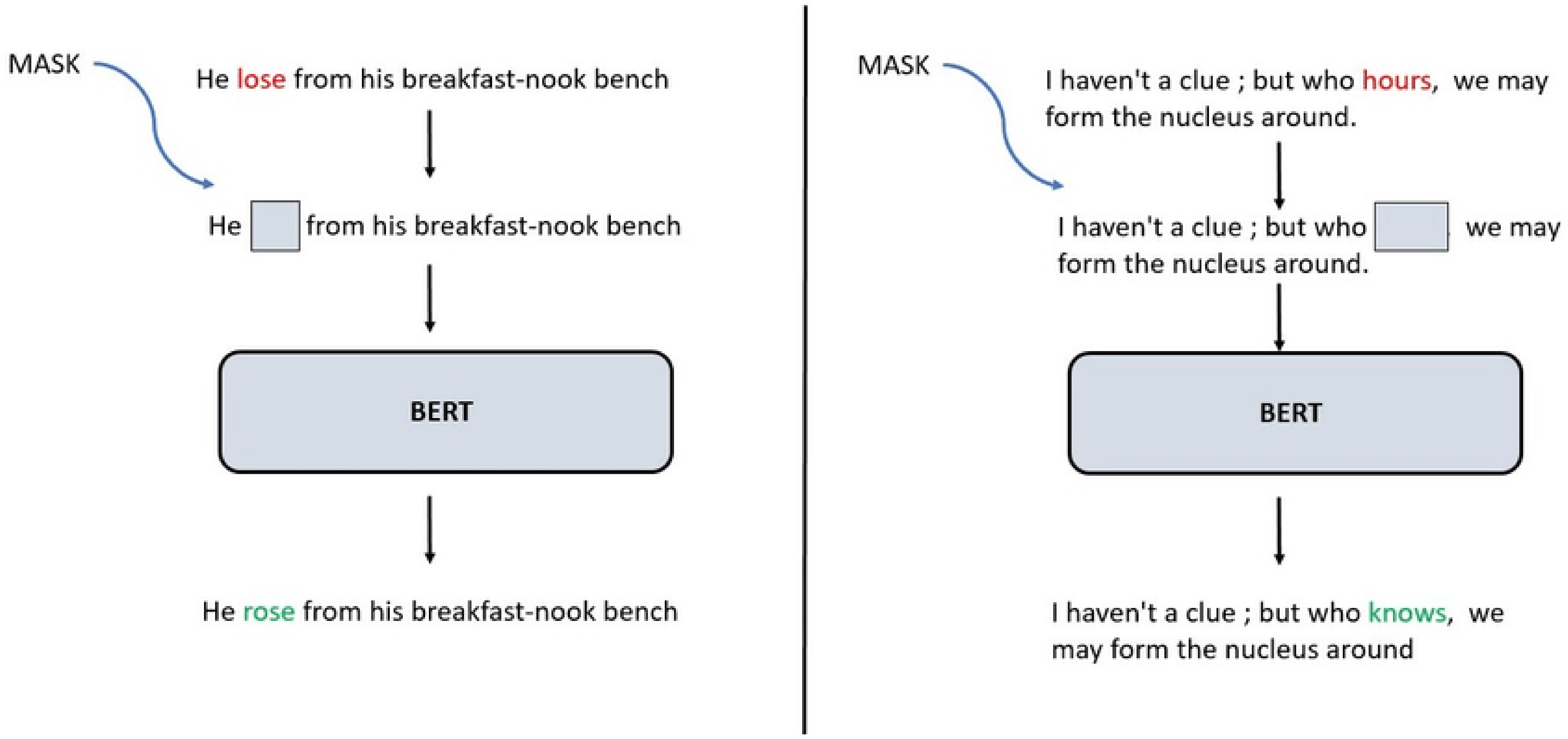
10% of the time : Keep the word **unchanged**.

MASK LM



Vocabulary Size
w'1
w'2
w'3
w'4
w'5
Embedding to vocab + softmax
Classification Layer: Fully-connected layer + GELU + Norm
Embedding vector
O1
O2
O3
O4
O5
Transformer encoder
Embedding
w1
w2
w3
[MASK]
w5
w1
w2
w3
w4
w5

MASK LM



MASK

He lose from his breakfast-nook bench

He □ from his breakfast-nook bench

BERT

He rose from his breakfast-nook bench

MASK

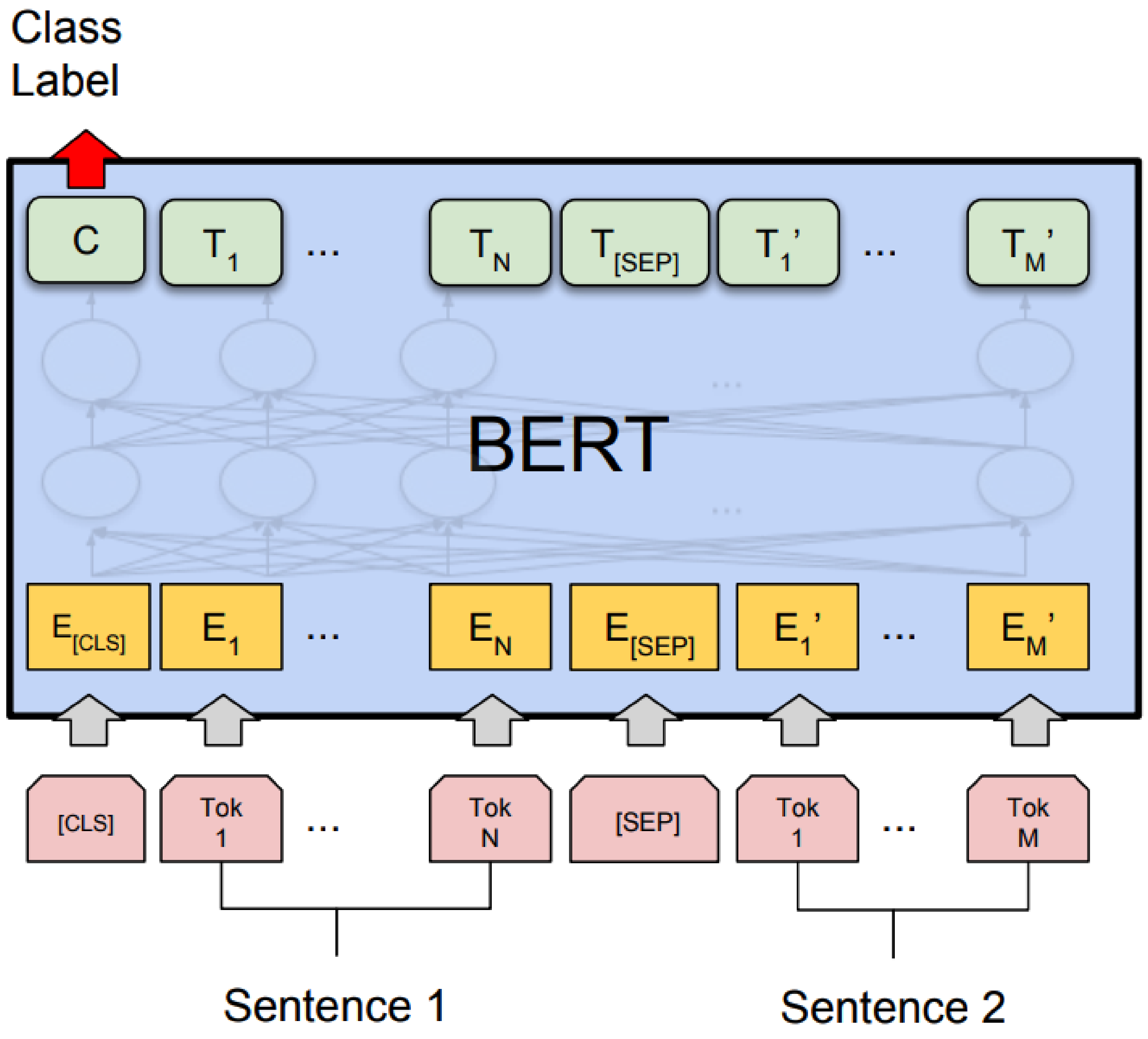
I haven't a clue ; but who hours, we may form the nucleus around.

I haven't a clue ; but who □ we may form the nucleus around.

BERT

I haven't a clue ; but who knows, we may form the nucleus around

Next Sentence Prediction



related (isNext)

not related (notNext)

Reference

- https://www.miai.vn/2020/12/14/bert-series-chuong-1-bert-la-cai-chi-chi/
- https://viblo.asia/p/hieu-hon-ve-bert-buoc-nhay-lon-cua-google-eW65GANOZDO

Thanks for watching!