X5 Tech

SEQ2SEQ
И ATTENTION

Андреева Дарья
Data Scientist, X5 Tech

машинный перевод

1954г. – джорджтаунский эксперимент

до 2010г. – статистические модели

с 2016г. – машинный перевод

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формально

source: $x = (x_1, \ldots, x_n)$

target: $y = (y_1, \ldots, y_m)$

C – корпус из пар (x, y)

$$P_\theta(Y|X) = \prod_{i=1}^{n} p(y_i|X, y_{<i}) \longrightarrow \max$$

$$\hat{y}_i = argmax(p_\theta(y_i|X, \hat{y}_{<i}))$$

жадно семплируем?

кодировщик-декодировщик

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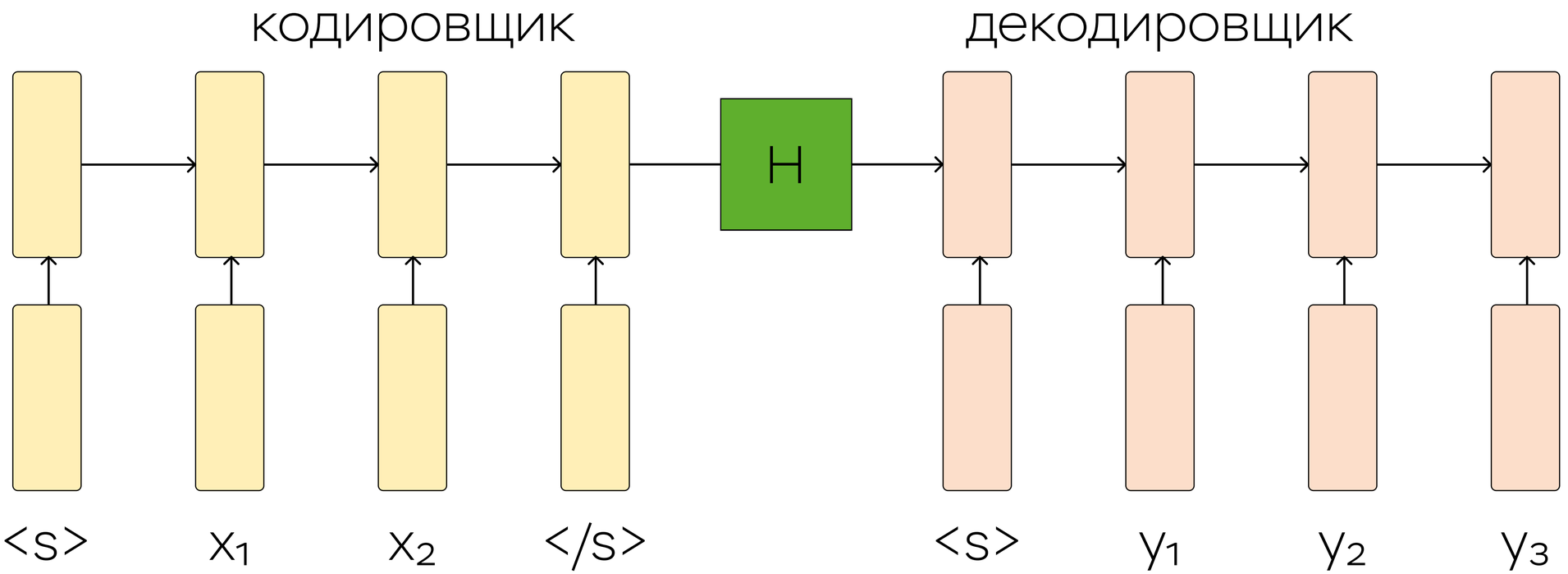
target: $y = (y_1, \ldots, y_m)$

C – корпус из пар (x, y)



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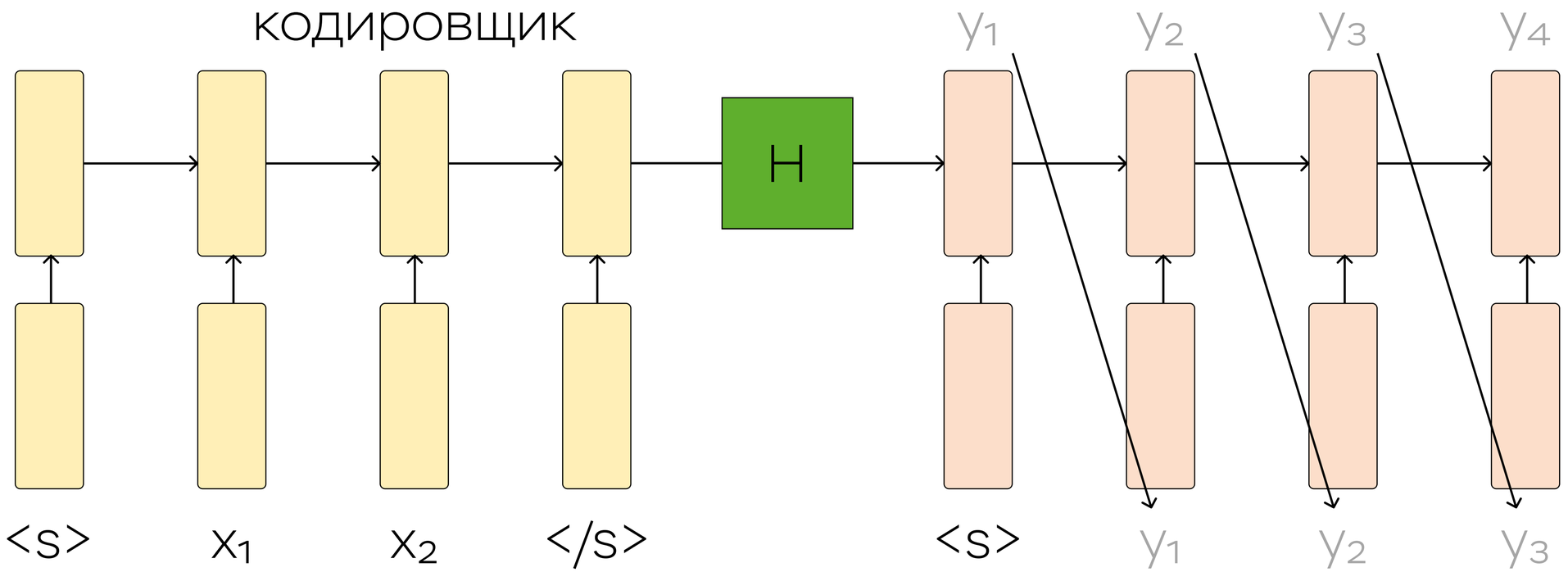

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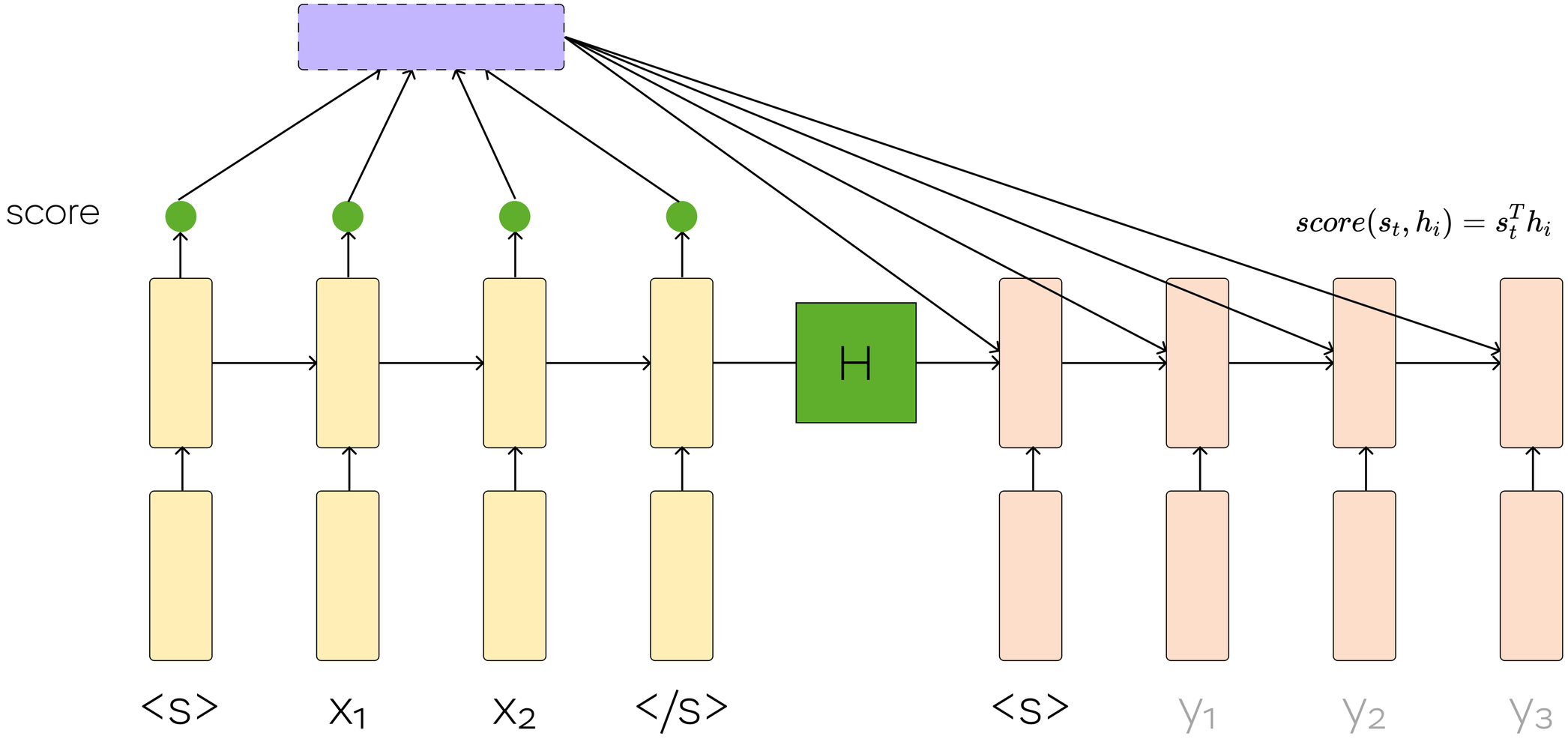
внимание



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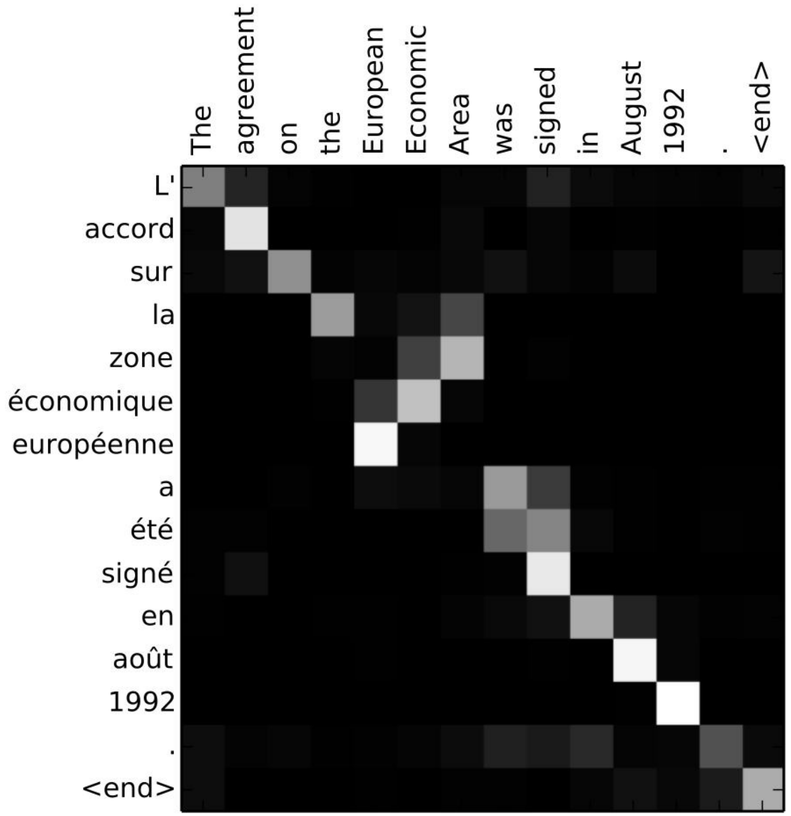
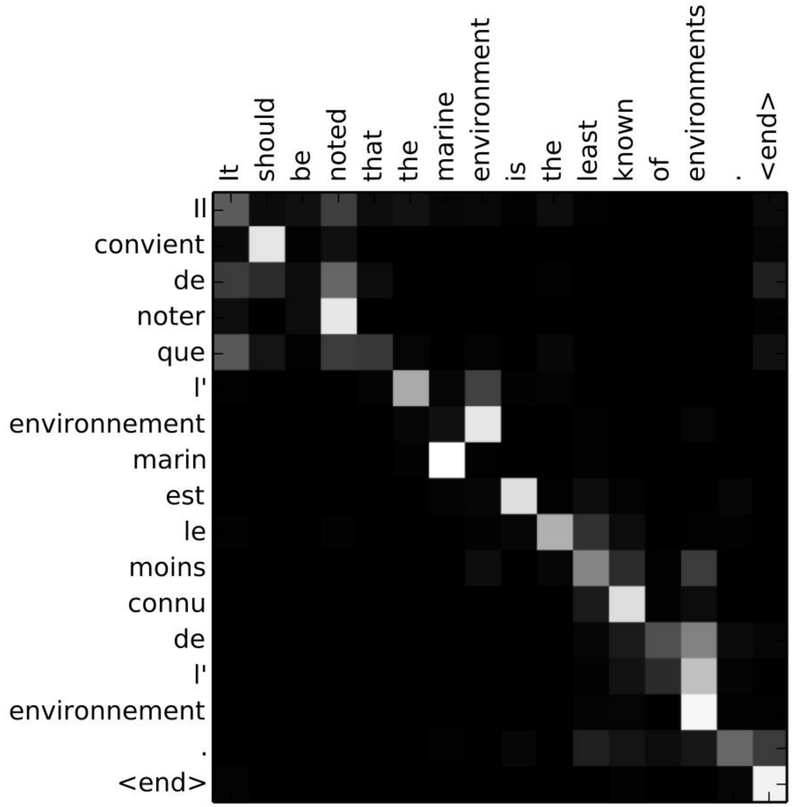
Neural Machine Translation by Jointly Learning to Align and Translate: https://arxiv.org/abs/1409.0473

внимание



(a)



(b)

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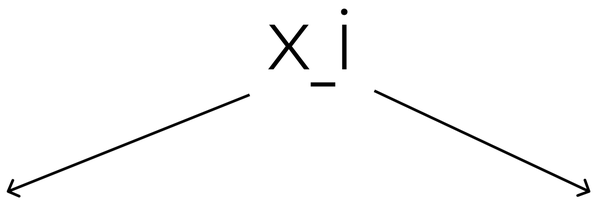
ATTENTION IS ALL YOU NEED

Attention is all you need: https://arxiv.org/abs/1706.03762

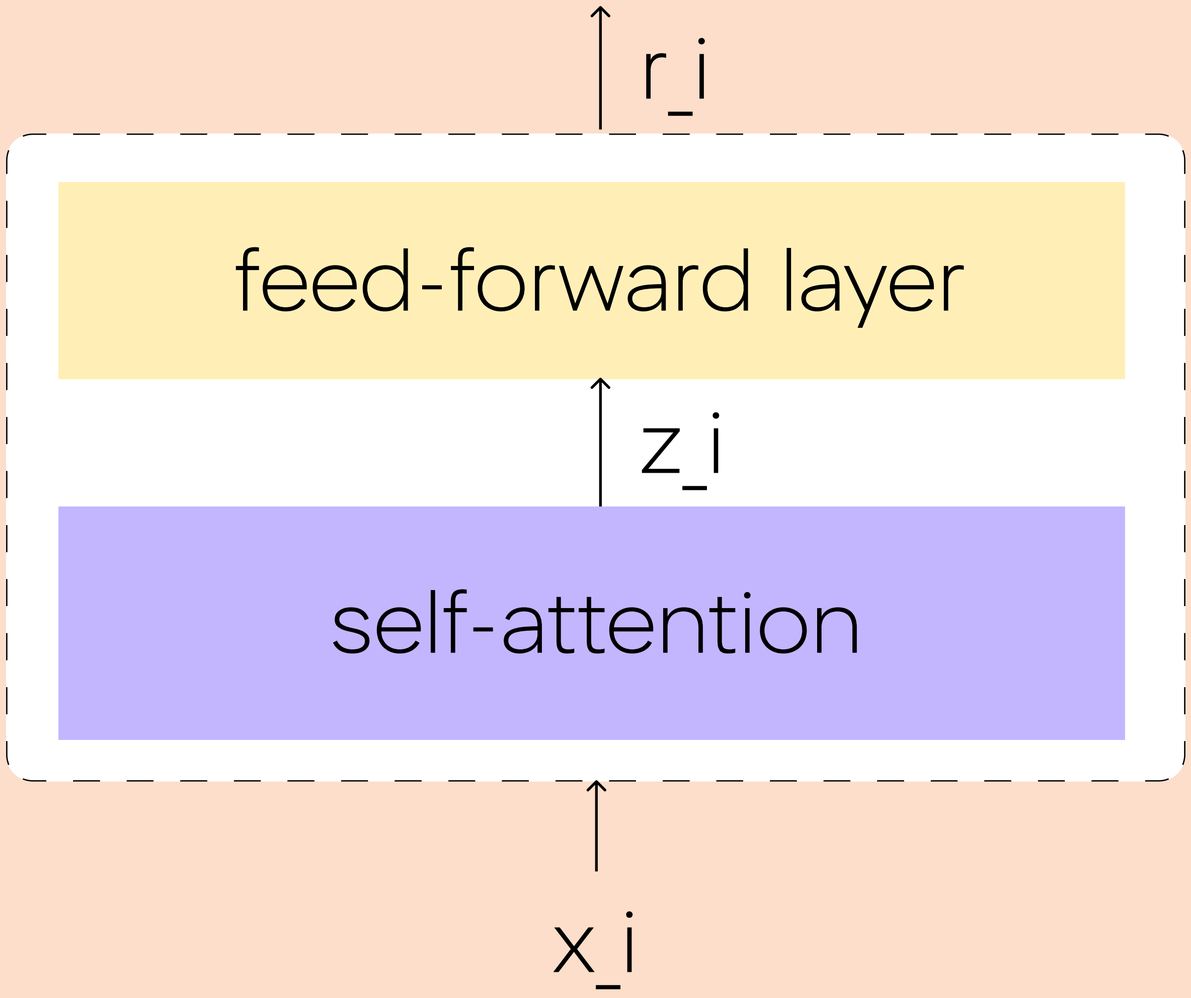
encoder



embedding

$q_i : W_Q * x\_i$
$k_i : W_K * x\_i$
$v_i : W_V * x\_i$

attention:



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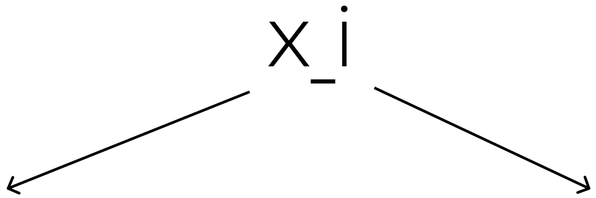
encoder



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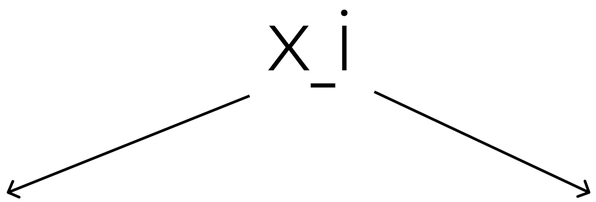

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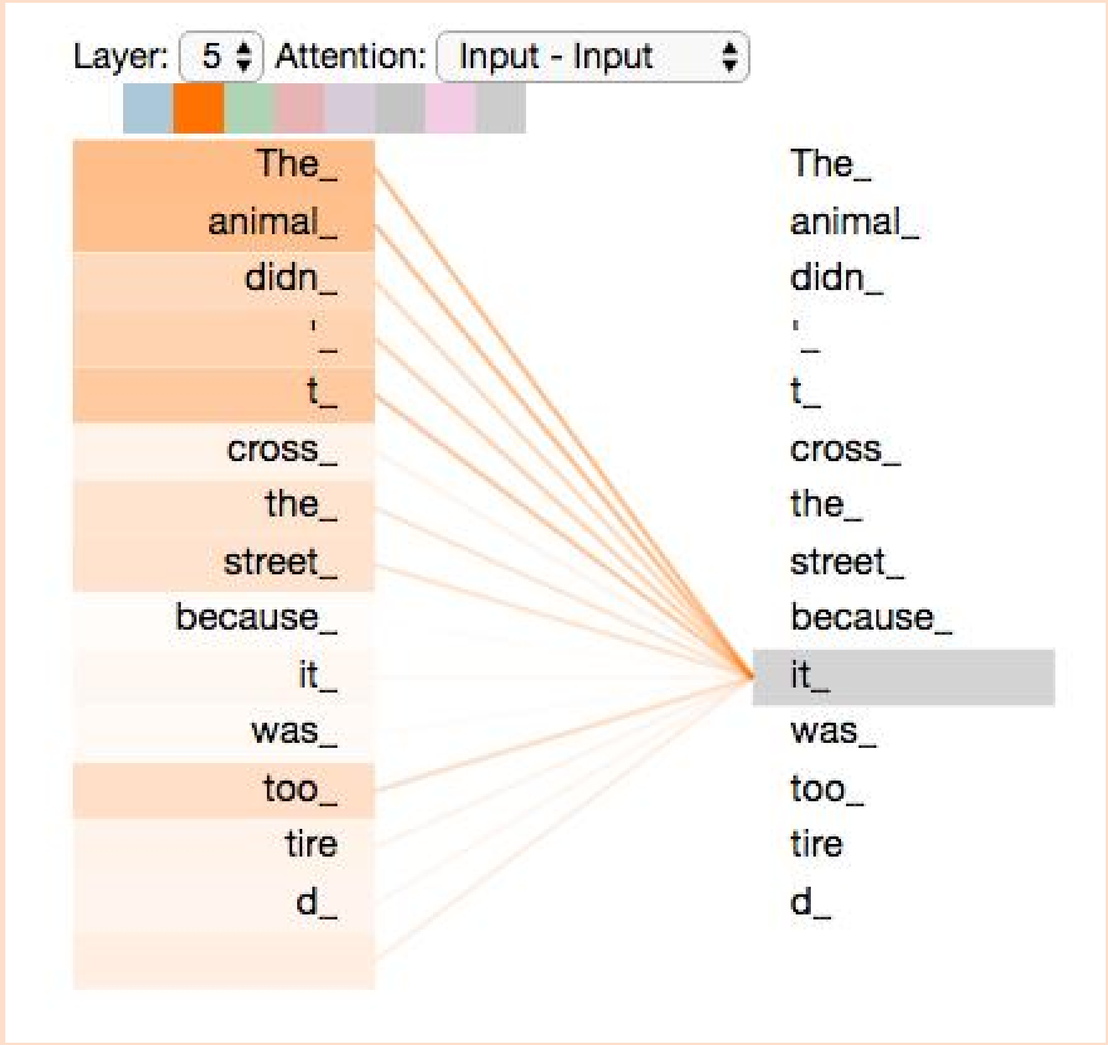

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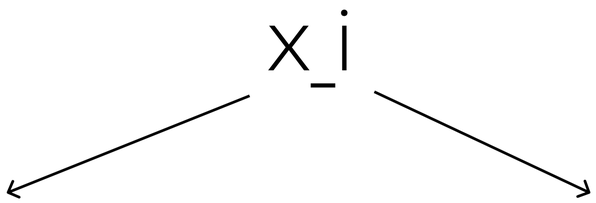
encoder



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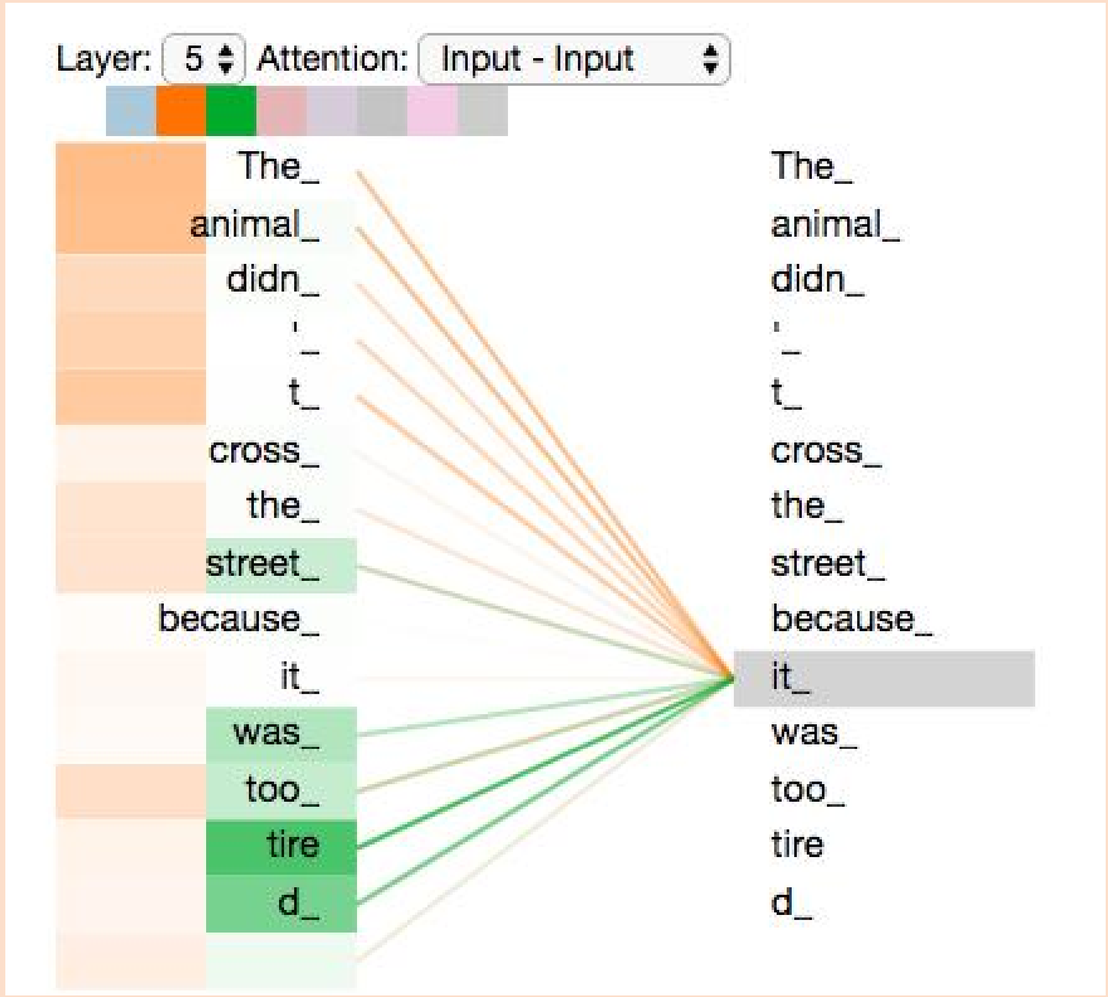

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encoder

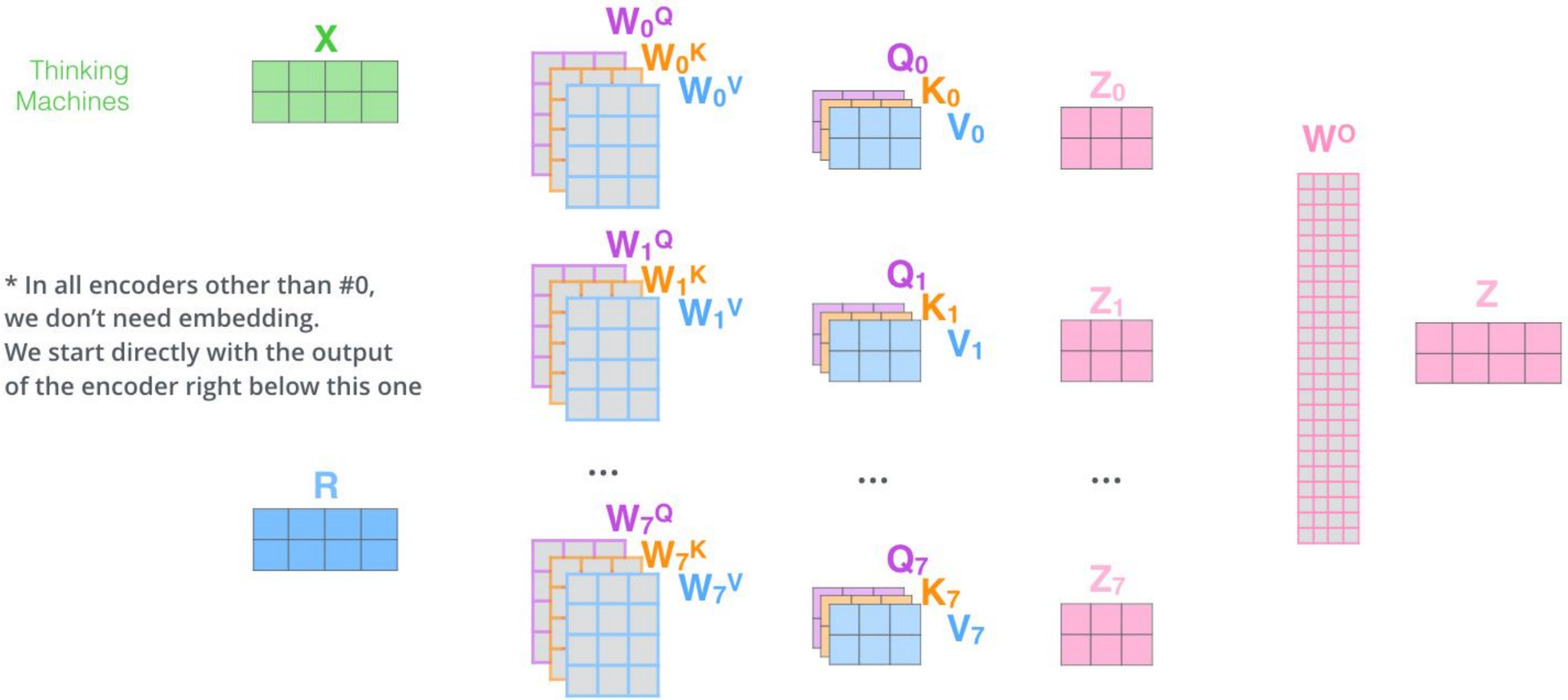
1) This is our input sentence*

2) We embed each word*

3) Split into 8 heads. We multiply X or R with weight matrices

4) Calculate attention using the resulting Q/K/V matrices

5) Concatenate the resulting Z matrices, then multiply with weight matrix W^O to produce the output of the layer



* In all encoders other than #0, we don't need embedding. We start directly with the output of the encoder right below this one

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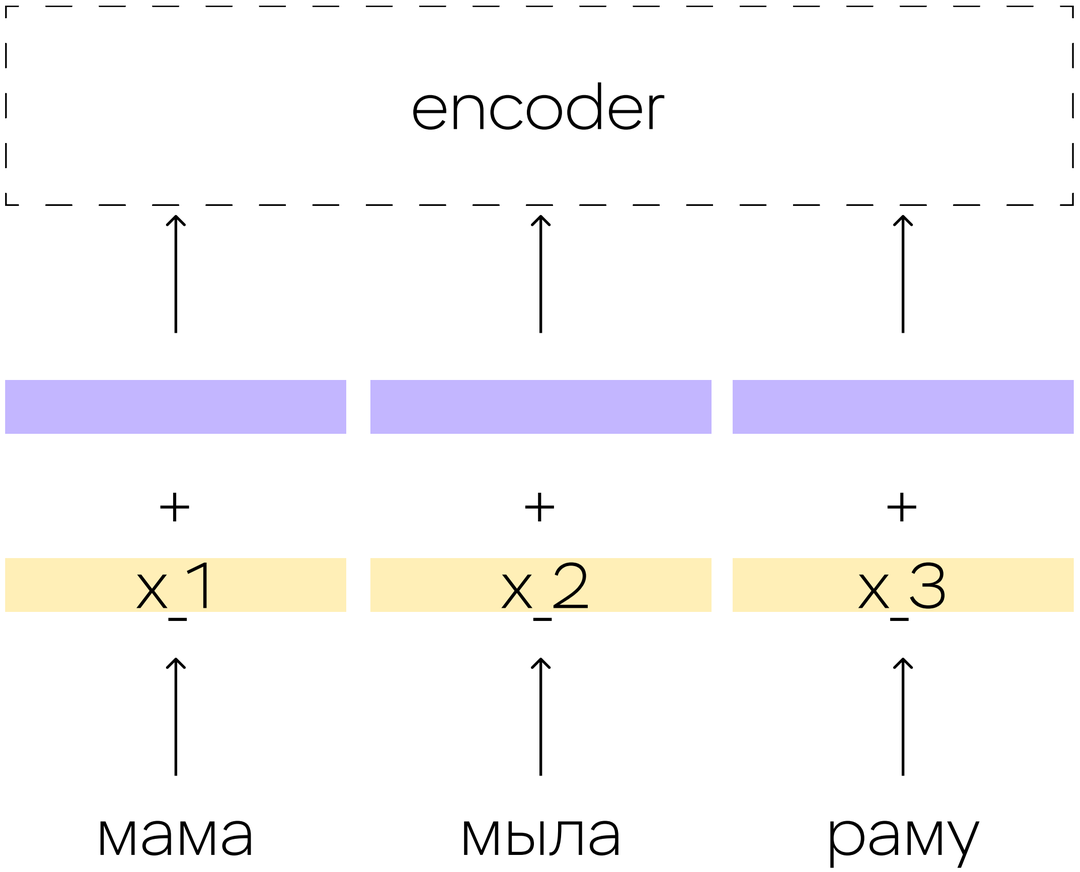
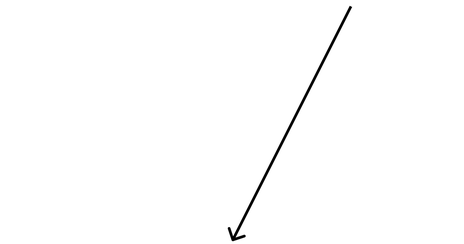
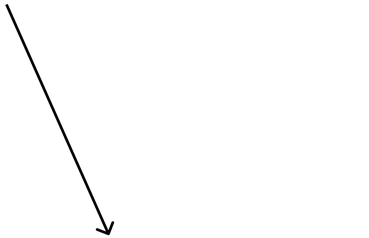
позиционный эмбеддинг







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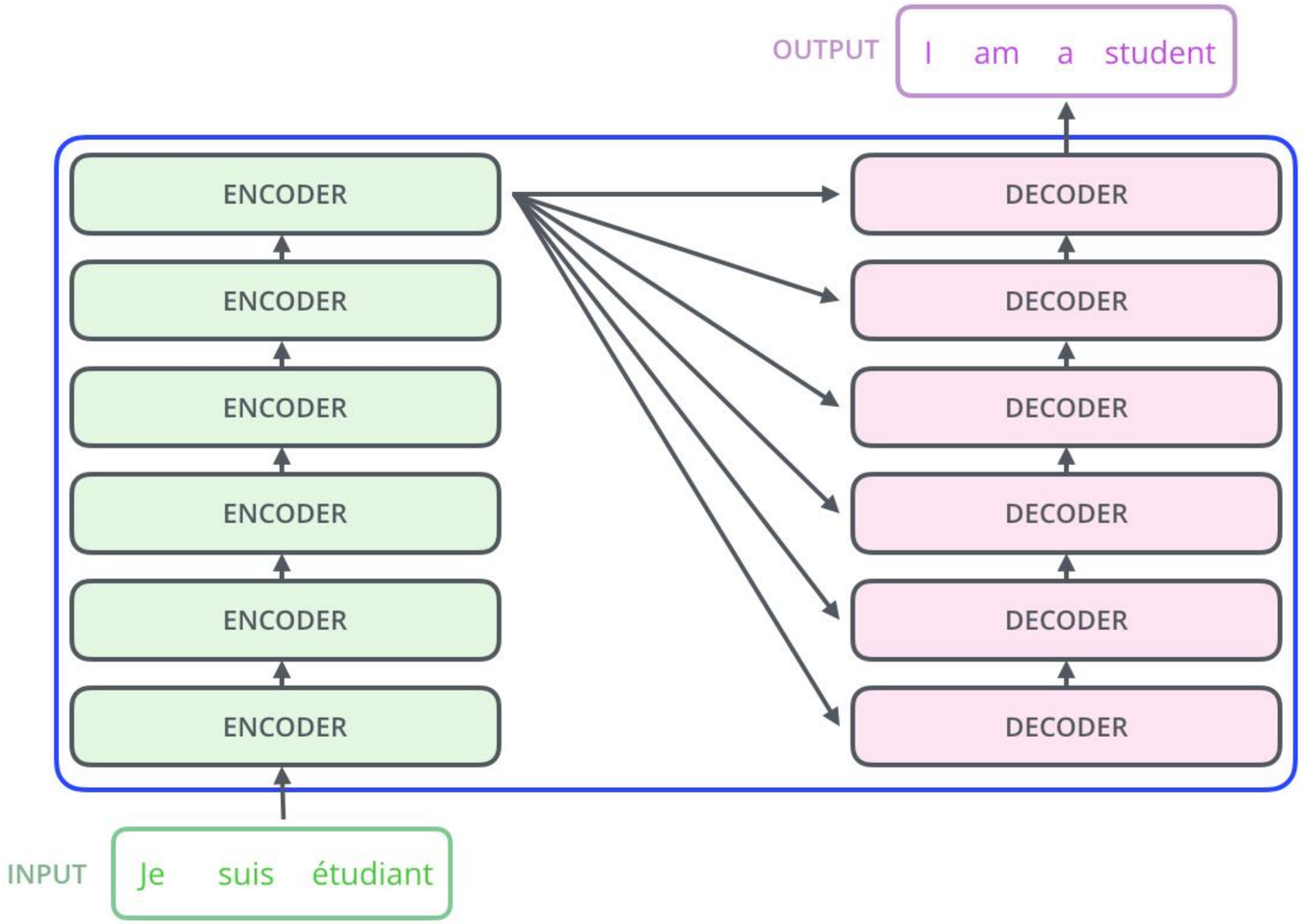
overview



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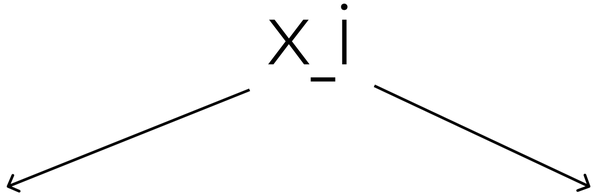
decoder



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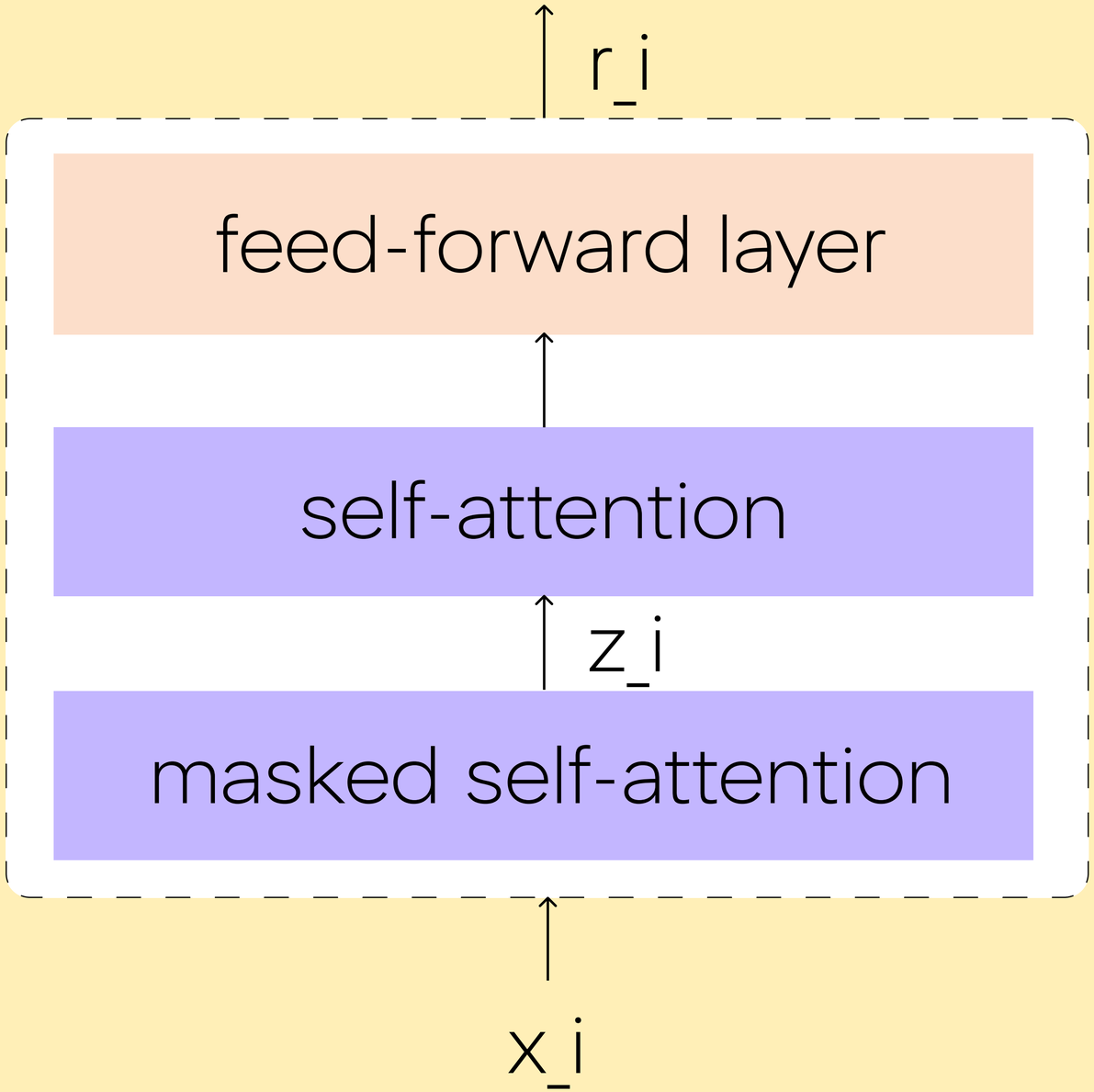

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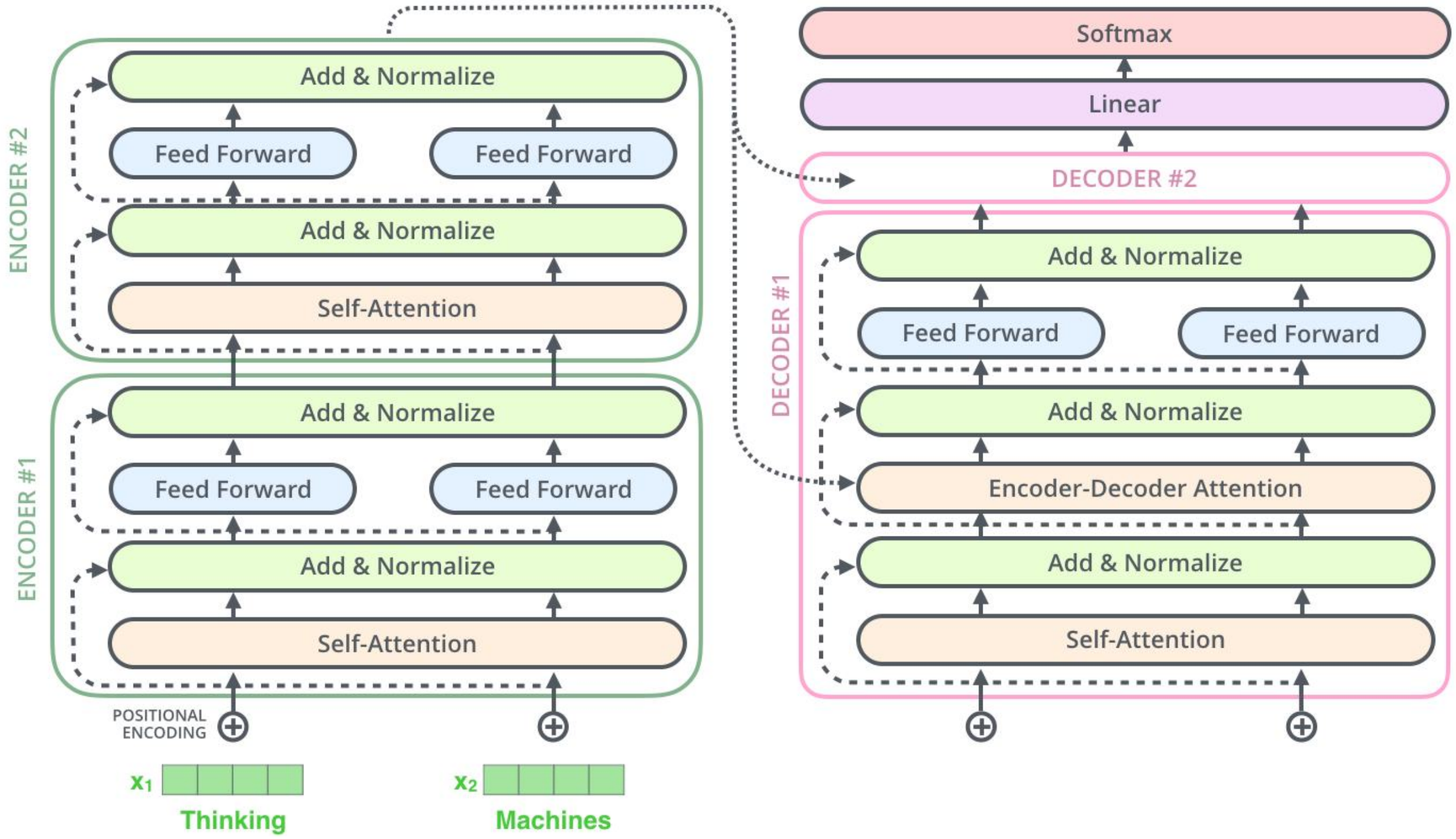

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