

SENet & Bilinear Cross

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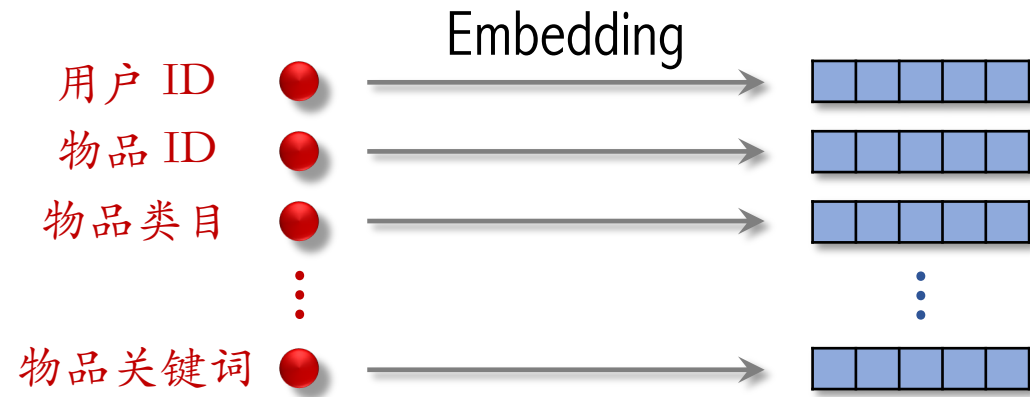


SENet

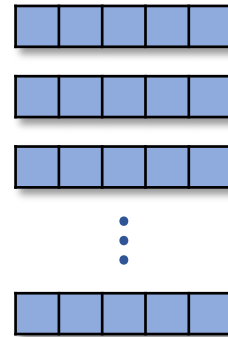
参考文献：

1. Jie Hu, Li Shen, and Gang Sun. [Squeeze-and-Excitation Networks](#). In *CVPR*, 2018.
2. Tongwen Huang, Zhiqi Zhang, and Junlin Zhang. [FiBiNET: Combining Feature Importance and Bilinear feature Interaction for Click-Through Rate Prediction](#). In *RecSys*, 2019.

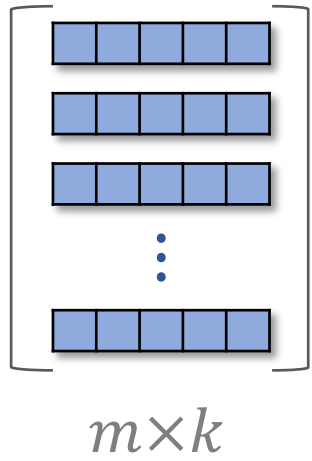
SENet



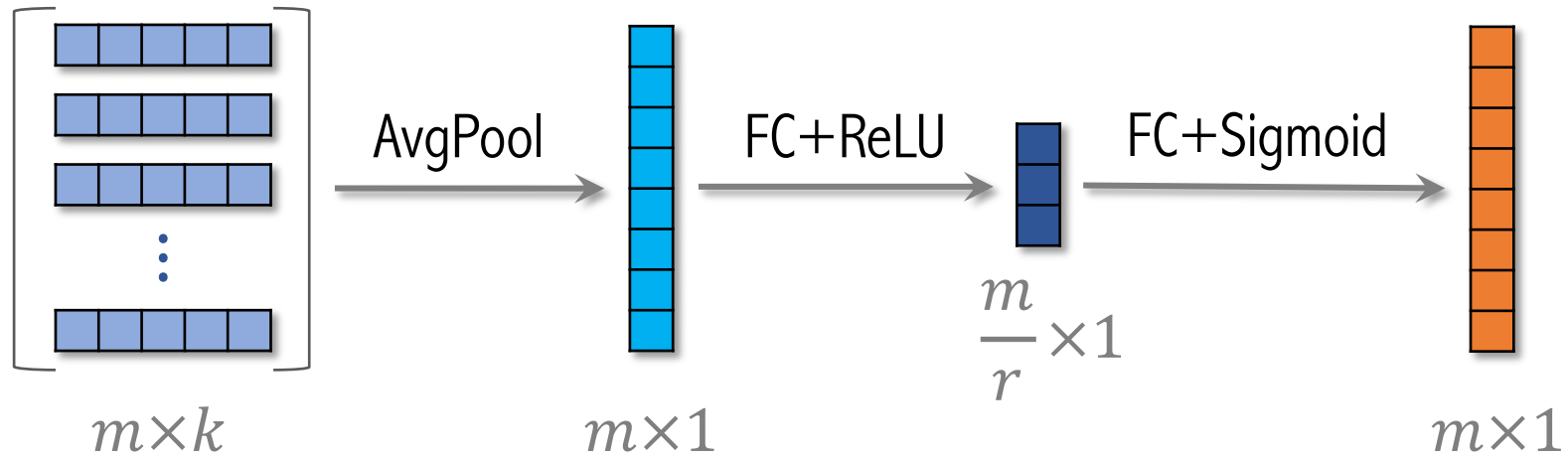
SENet



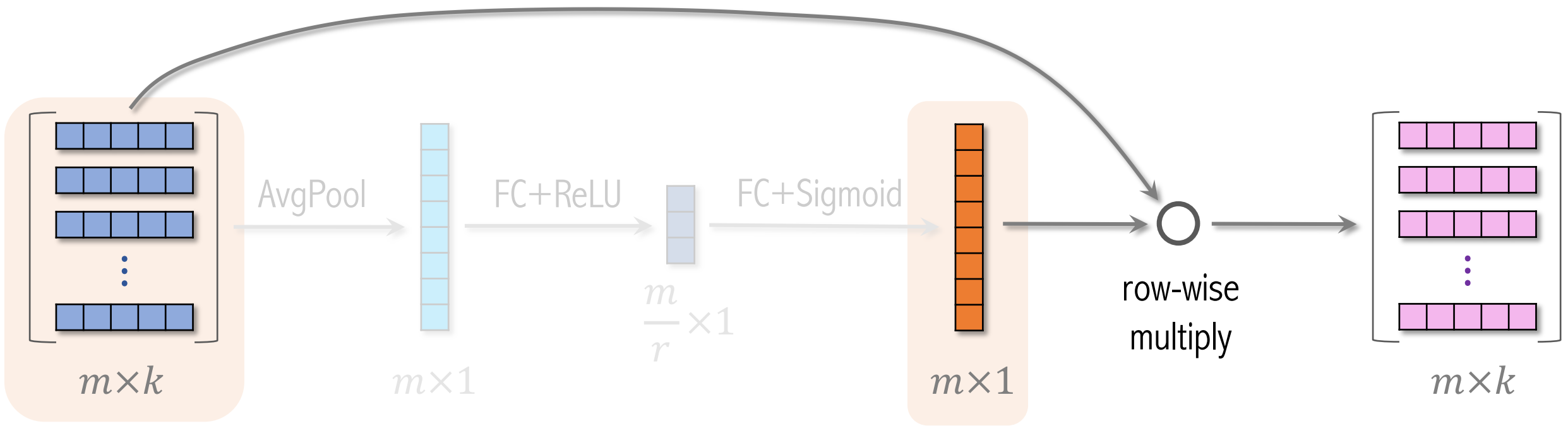
SENet



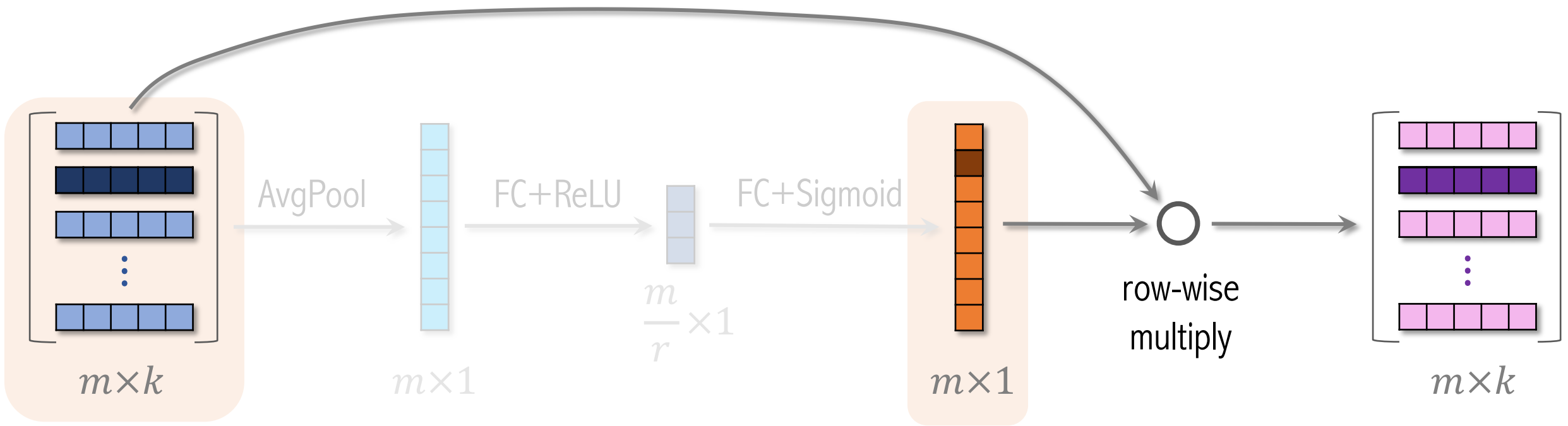
SENet



SENet

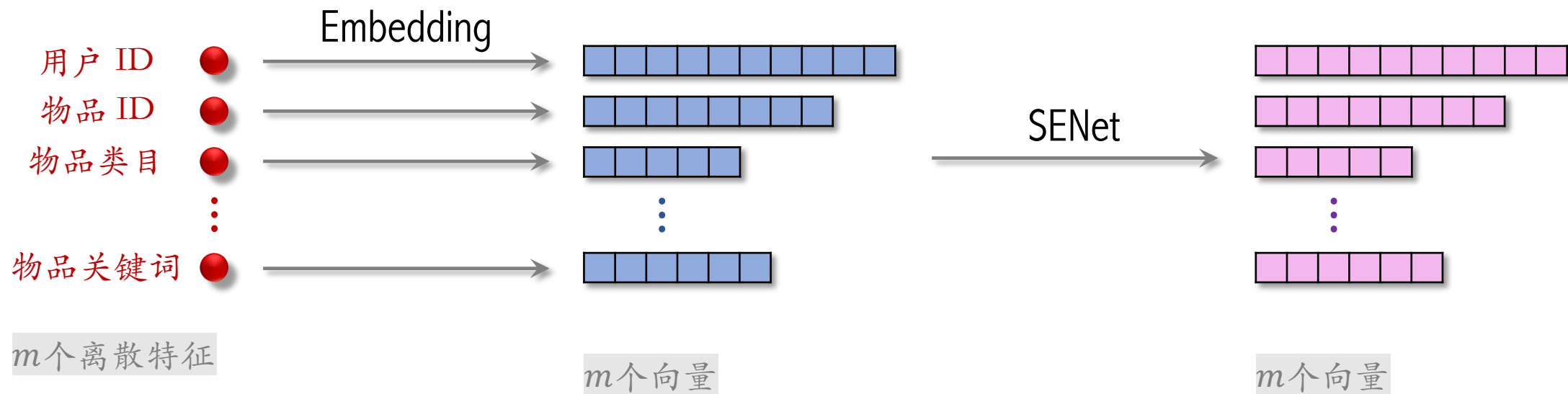


SENet



SENet

Embedding 向量维度可以不同



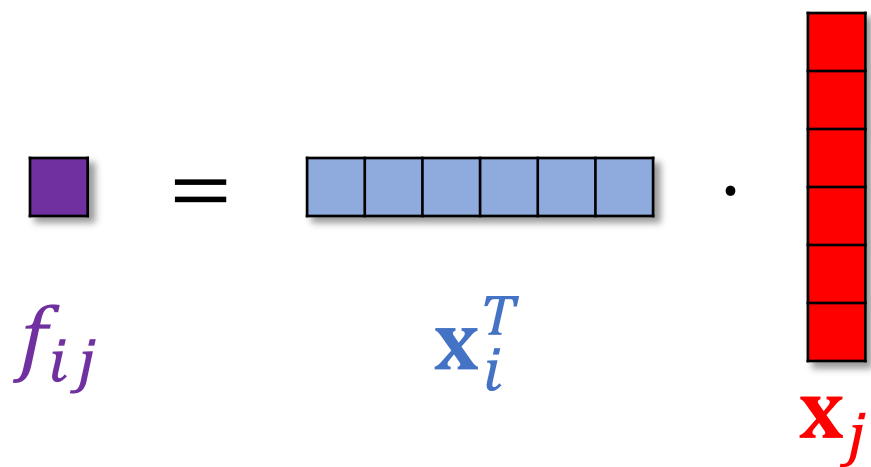
SENet

- SENet 对离散特征做 field-wise 加权。
- Field :
 - 用户 ID Embedding 是 64 维向量。
 - 64 个元素算一个 field，获得相同的权重。
- 如果有 m 个 fields，那么权重向量是 m 维。

Field 间特征交叉

特征交叉

内积

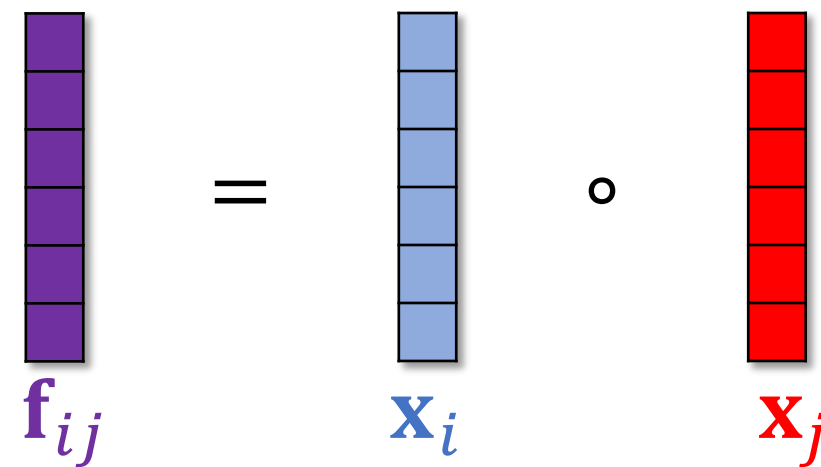


A diagram illustrating the inner product operation. On the left, a small purple square represents the output f_{ij} . This is followed by an equals sign. To the right of the equals sign is a horizontal row of six light blue squares representing the vector \mathbf{x}_i^T . This is followed by a dot operator. To the right of the dot is a vertical column of six red squares representing the vector \mathbf{x}_j .

$$f_{ij} = \mathbf{x}_i^T \cdot \mathbf{x}_j$$

m fields $\rightarrow m^2$ 个实数

哈达玛乘积



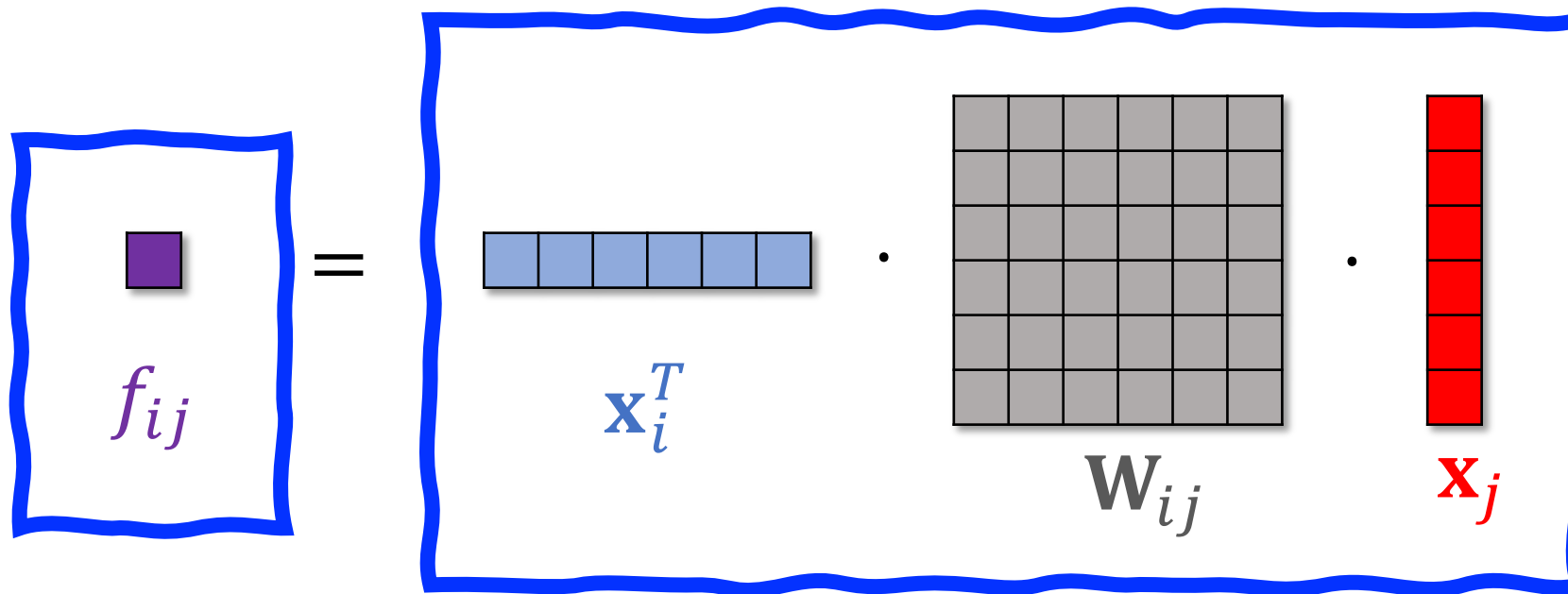
A diagram illustrating the Hadamard product operation. On the left, a vertical column of six purple squares represents the output \mathbf{f}_{ij} . This is followed by an equals sign. To the right of the equals sign is a vertical column of six light blue squares representing the vector \mathbf{x}_i . This is followed by a circle operator. To the right of the circle is a vertical column of six red squares representing the vector \mathbf{x}_j .

$$\mathbf{f}_{ij} = \mathbf{x}_i \circ \mathbf{x}_j$$

m fields $\rightarrow m^2$ 个向量

特征交叉

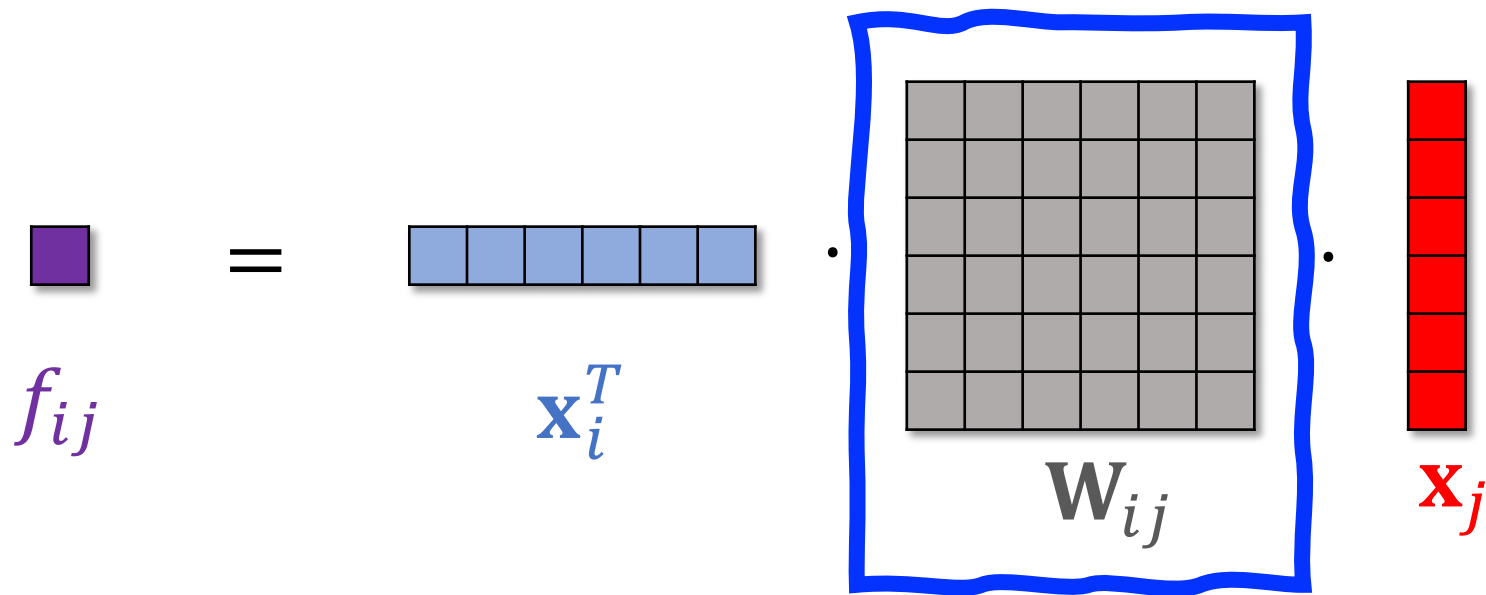
Bilinear Cross (内积)



m fields $\rightarrow m^2$ 个交叉特征 (实数)

特征交叉

Bilinear Cross (内积)



m fields $\rightarrow m^2/2$ 个参数矩阵

特征交叉

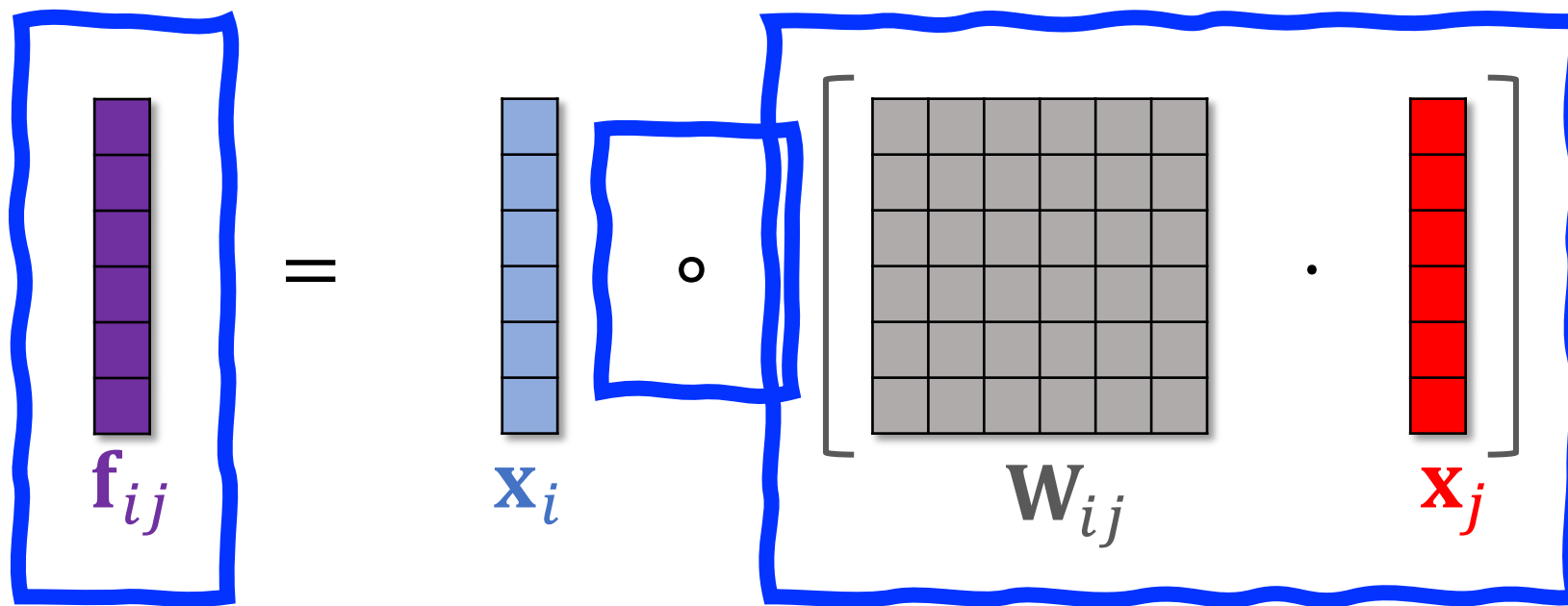
Bilinear Cross (哈达玛乘积)

The diagram illustrates the Bilinear Cross operation. On the left, a purple vertical vector \mathbf{f}_{ij} is shown. This is followed by an equals sign. To the right of the equals sign, a blue vertical vector \mathbf{x}_i is shown. Next to \mathbf{x}_i is a blue square with a wavy border and a small circle inside, representing the Hadamard product operation. To the right of this is a gray 6x6 matrix \mathbf{W}_{ij} . To the right of the matrix is a red vertical vector \mathbf{x}_j . The entire expression $\mathbf{x}_i \circ \mathbf{W}_{ij} \cdot \mathbf{x}_j$ is enclosed in large square brackets.

$$\mathbf{f}_{ij} = \mathbf{x}_i \circ \mathbf{W}_{ij} \cdot \mathbf{x}_j$$

特征交叉

Bilinear Cross (哈达玛乘积)



m fields $\rightarrow m^2$ 个向量

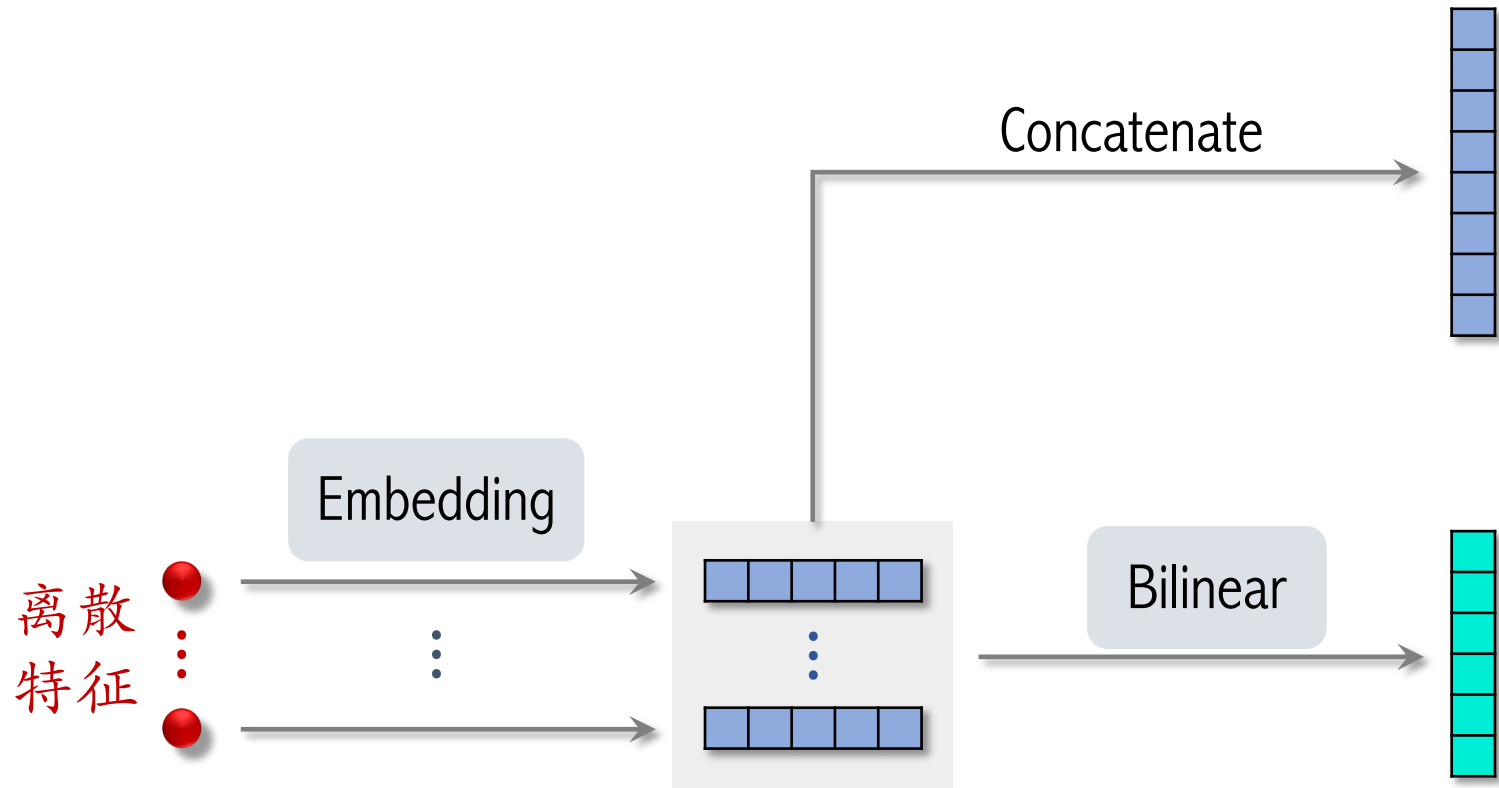
小结

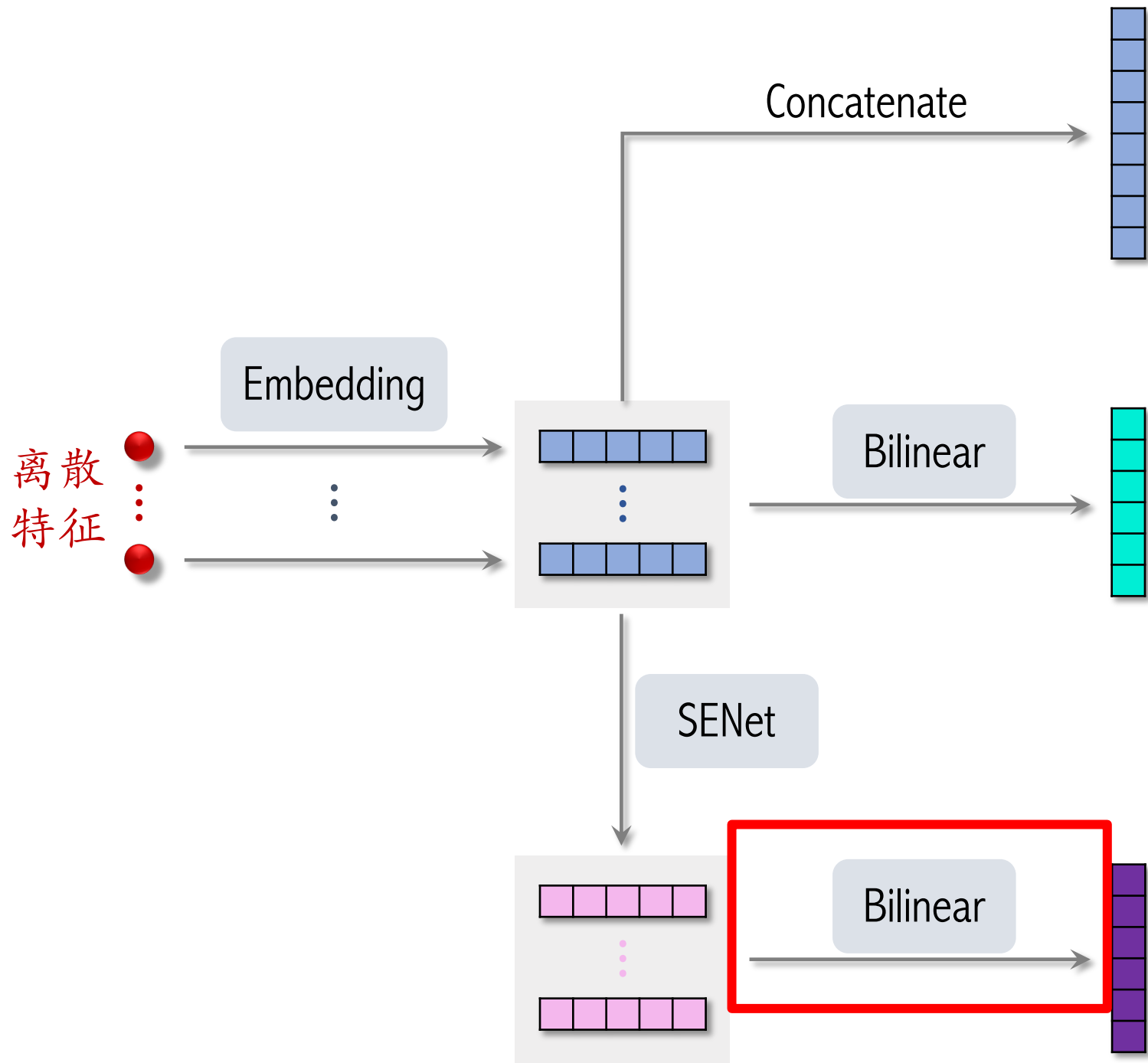
1. SENet 对离散特征做 field-wise 加权。
2. Field 间特征交叉：
 - 向量内积
 - 哈达玛乘积
 - Bilinear cross

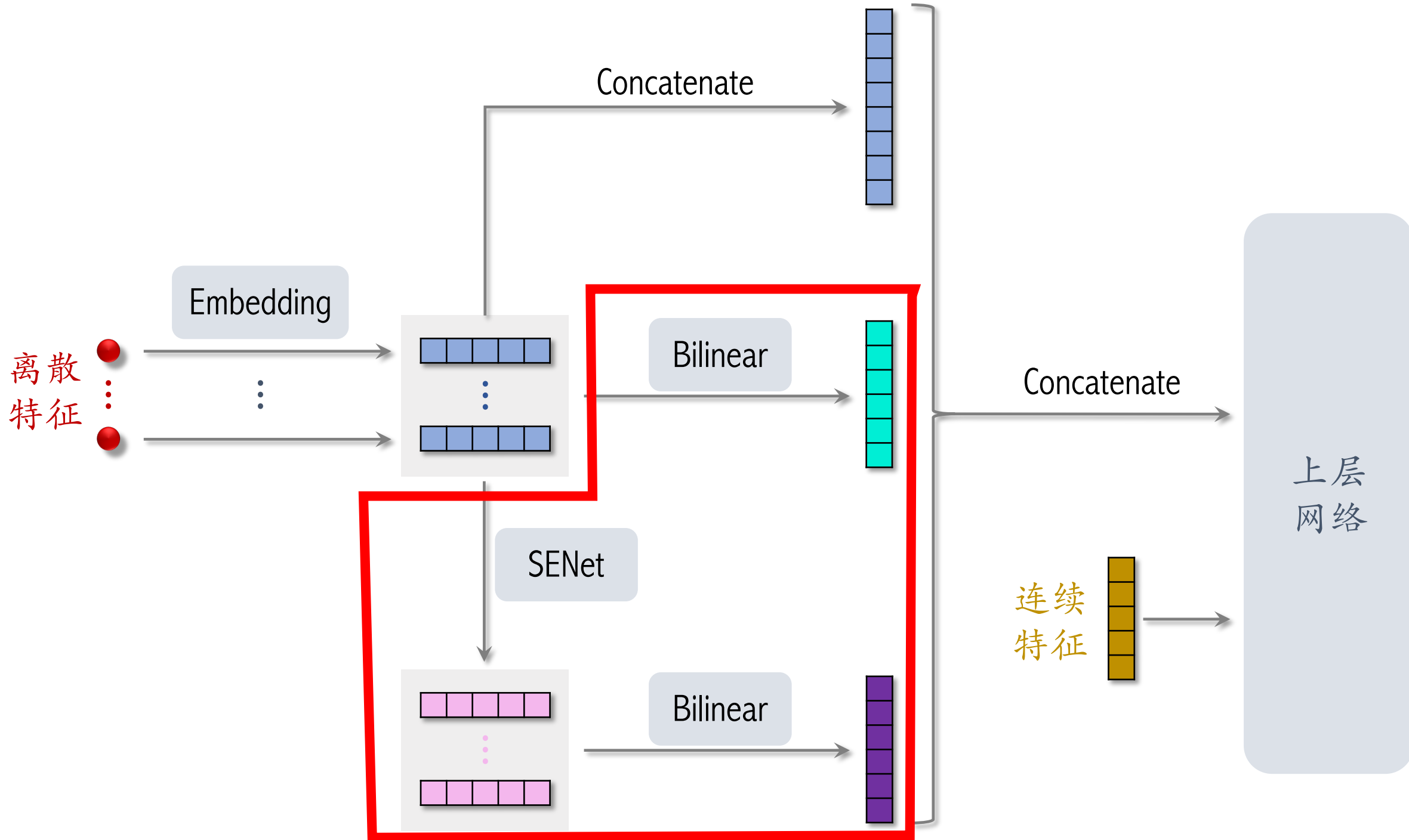
FiBiNet

参考文献：

- Tongwen Huang, Zhiqi Zhang, and Junlin Zhang. [FiBiNET: Combining Feature Importance and Bilinear feature Interaction for Click-Through Rate Prediction](#). In *RecSys*, 2019.







Thank You!

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