

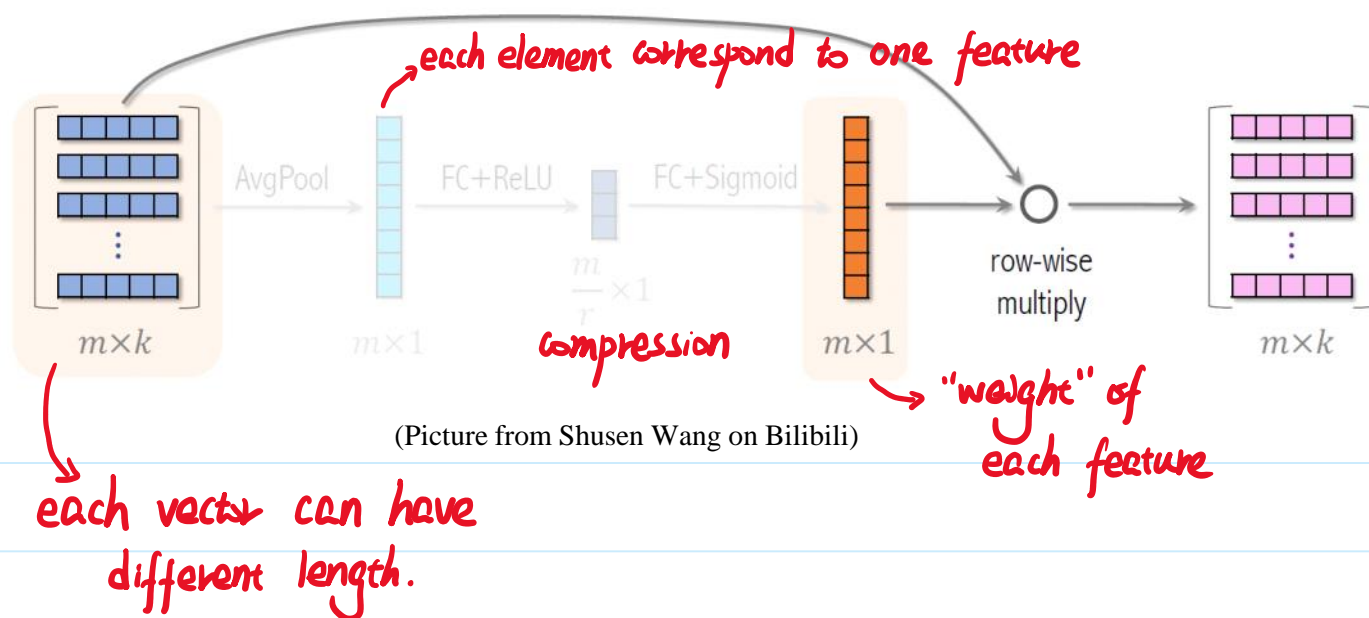
SENet: from computer vision ;
can be used in recommender system.

Categorical Features:

user ID		[.....] _{1×k}	} m features
item ID	embedding →	[.....] _{1×k}	
item genre		[.....] _{1×k}	
key word		[.....] _{1×k}	

embedding vector.

Structure :




Feature Cross

Tuesday, April 9, 2024

9:11 AM

embedding

Example: item location $\rightarrow [\dots\dots\dots]$
user location $\rightarrow [\dots\dots\dots]$  feature cross.

Inner Product:

$$f_{i,j} = \vec{x}_i^T \cdot \vec{x}_j$$

$1 \times 1 \quad 1 \times k \quad k \times 1$

m^2 scalars = m field \times m field

Hadamard Product:

$$\vec{f}_{ij} = \vec{x}_i \cdot \vec{x}_j$$

$1 \times k \quad 1 \times k \quad 1 \times k$

m^2 vectors = m fields \times m fields

Bilinear Cross (inner product)

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

$1 \times 1 \quad 1 \times k \quad k \times k \quad k \times 1$

m fields $\rightarrow m^2/2$ matrices for W

Feature Cross

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Bilinear Cross (Hadamard)

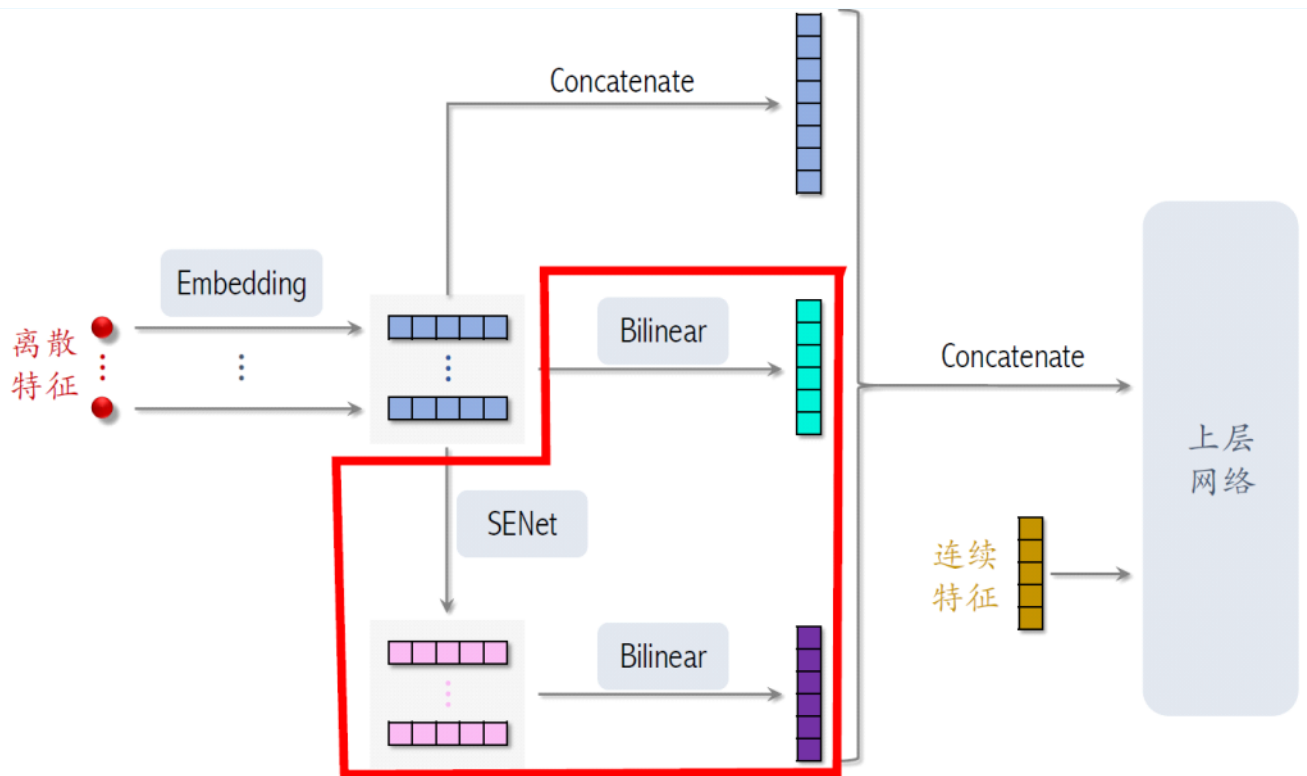
$$\vec{f}_{ij} = \vec{x}_i \circ (\mathbf{w}_{ij} \cdot \vec{x}_j)$$

$k \times 1$ $k \times 1$ $k \times k$ $k \times 1$

m fields $\rightarrow m^2$ vectors.

(Note: A yellow square symbol \circ is used for Hadamard product, and a blue arrow points to it with the word "Hadamard")

SENet + Bilinear Cross \rightarrow FiBiNet



(Picture from Shusen Wang on Bilibili)