

## User-Item历史评分数据

	Item 1	Item 2	...	Item n
User1	$r_{1,1}$	$r_{1,2}$	...	$r_{1,n}$
User2	$r_{2,1}$	$r_{2,2}$	...	$r_{2,n}$
...	...	...	...	...
User m	$r_{m,1}$	$r_{m,2}$	...	$r_{m,n}$

MF embedding

## User-Item embedding

	V 1	...	V n
User1	...	...	...
User2	...	...	...
...	...	...	...

User embedding



	V 1	...	V m
Item1	...	...	...
Item2	...	...	...
...	...	...	...

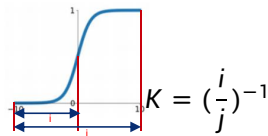
Item embedding

Scaling 1

Sub-Model1

Scaling 2

Sub-Model2

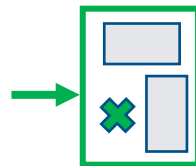
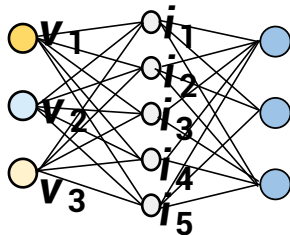
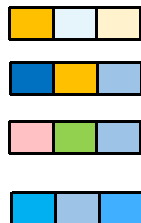


$$R_{m \times n} = U_m \times I_n \in Q_{m \times n}$$

其中  $r_{i,j}$  表示用户  $i$  对 item  $j$  的评分

$$r_{i,j} = \begin{cases} \text{null, 未有交互记录需要预测} \\ n \in \{0, 1, 2, 3, 4, 5\}, \text{记录打分数据} \end{cases}$$

Scaling n



Sub-Model3