

Hello World

long subtitle

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哈哈哈哈

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A sample slide

一个超链接

A displayed formula:

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi}$$

An itemized list:

- itemized item 1, 你好
 - itemized item 2
- 1 The first item
 - 2 The second item

Theorem

1.1 In a right triangle, the square of hypotenuse equals the sum of squares of two other sides.

123

hello

First Item Description of first item

Second Item Description of second item

First column text and/or code

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表格

Matrix	randQB_EI(Alg. 2)		svds		Adaptive PCA Framework			
	time (s)	k	time (s)	k^*	time (s)	k	Sp1	Sp2
MovieLens-1M	3.83	118	3.0	117	1.75	118	1.8	1.7
hetrec2011	40.3	328	71.8	325	29.1	327	1.4	2.5
BookCrossing	2739	3012	6758	3004	1004	3014	2.8	6.7
MovieLens-20M	1476	883	3722	879	704	883	2.1	5.3

```
\end{document}
```

Figure: Caption here


```
def create_costco(shape, rank, nc):
    inputs = [keras.Input(shape=(1,), dtype="int32") for i in range(len(shape))]
    embeds = [
        keras.layers.Embedding(output_dim=rank, input_dim=shape[i])(inputs[i])
        for i in range(len(shape))]
    x = keras.layers.Concatenate(axis=1)(embeds)
    x = keras.layers.Reshape(target_shape=(rank, len(shape), 1))(x)
    x = keras.layers.Flatten()(x)
    x = keras.layers.Dense(nc, activation="relu")(x)
    outputs = keras.layers.Dense(1, activation="relu")(x)
    model = keras.Model(inputs=inputs, outputs=outputs)
    return model
```

Require: $\mathbf{A} \in \mathbb{R}^{m \times n}$ ($m \leq n$), block size b , pass parameter $q > 2$

Ensure: $\mathbf{U} \in \mathbb{R}^{m \times k}$, $\mathbf{S} \in \mathbb{R}^k$, $\mathbf{V} \in \mathbb{R}^{k \times n}$ for certain accuracy criterion

```

1:  $\mathbf{Q} = [\ ]$ ,  $\mathbf{B} = [\ ]$ 
2: for  $l = 1, 2, 3, \dots$ , do
3:   if  $q$  is an even number
4:      $\mathbf{\Omega} = \text{randn}(n, b)$ ,  $\mathbf{Y} = \mathbf{A}\mathbf{\Omega} - \mathbf{Q}(\mathbf{B}\mathbf{\Omega})$ 
5:      $[\mathbf{Q}_l, \sim] = \text{lu}(\mathbf{Y})$  # LU factorization replaces QR factorization
6:   else
7:      $\mathbf{Q}_l = \text{randn}(m, b)$  # when  $q$  is an odd number
8:   for  $t = 1, 2, \dots, \lfloor \frac{q-1}{2} \rfloor$  do
9:     if  $t == \lfloor \frac{q-1}{2} \rfloor$ 
10:       $\mathbf{R} = \mathbf{A}^T \mathbf{Q}_l$  # remove one orthogonalization
11:       $\mathbf{Q}_l = \text{orth}(\mathbf{A}\mathbf{R} - \mathbf{Q}(\mathbf{B}\mathbf{R}))$  # the last one in power iteration
12:    else
13:       $[\mathbf{Q}_l, \sim] = \text{lu}(\mathbf{A}(\mathbf{A}^T \mathbf{Q}_l))$  # LU factorization replaces QR factorization
14:    end for
15:     $\mathbf{Q}_l = \text{orth}(\mathbf{Q}_l - \mathbf{Q}(\mathbf{Q}^T \mathbf{Q}_l))$ ,  $\mathbf{B}_l = \mathbf{Q}_l^T \mathbf{A}$ 
16:     $\mathbf{Q} = [\mathbf{Q} \quad \mathbf{Q}_l]$ ,  $\mathbf{B} = \begin{bmatrix} \mathbf{B} \\ \mathbf{B}_l \end{bmatrix}$ 
17:    if termination criterion is met
18:       $k$  is determined and then break
19:    end for
20:     $[\hat{\mathbf{U}}, \hat{\mathbf{S}}, \hat{\mathbf{V}}] = \text{eigSVD}(\mathbf{B}^T)$  # use eigen-decomposition to compute SVD
21:     $\text{ind} = lb : -1 : lb - k + 1$ 
22:     $\mathbf{U} = \mathbf{Q}\hat{\mathbf{V}}(:, \text{ind})$ ,  $\mathbf{S} = \hat{\mathbf{S}}(\text{ind})$ ,  $\mathbf{V} = \hat{\mathbf{U}}(:, \text{ind})$ 

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研究方法与数据集特征

- First point, shown on all slides.

研究方法 with 数据集特征

- First point, shown on all slides.
- Second point, shown on slide 2 and later.

研究方法与数据集特征

- First point, shown on all slides.
- Second point, shown on slide 2 and later.
- Third point, also shown on slide 2 and later.

研究方法与数据集特征

- First point, shown on all slides.
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- Third point, also shown on slide 2 and later.
- Fourth point, shown on slide 3.

Questions?