MATLAB 与 Python 矩阵分解的速度对比

实验环境

Windows7　Inter® Core™ i7-4790K CPU @ 4.00GHz 八核

Python3 的 Numpy 库

MATLAB

实验数据

随机生成的对称矩阵

矩阵规模：10000*10000

矩阵数据：双精度浮点数

实验结果：

实验环境	分解方式	消耗时间/s
MATLAB	QR	270.395395
MATLAB	SVD	737.434478
Python	QR	30.2301073
Python	SVD	339.441996

代码

Python 代码如下

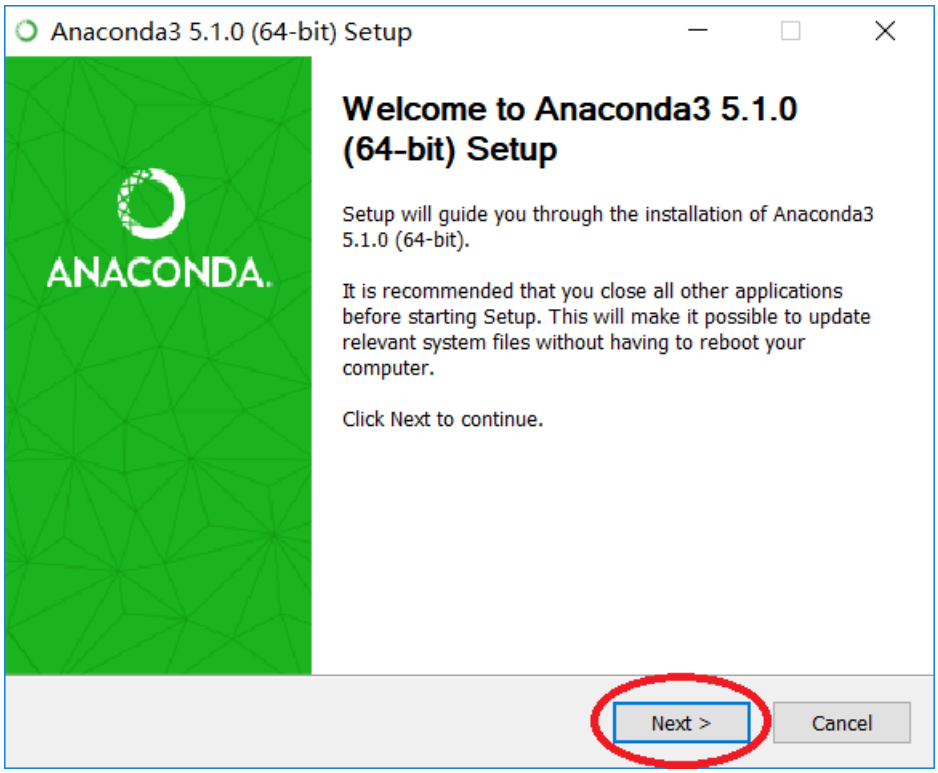
```
import numpy as np
from numpy.linalg import svd, qr
from numpy.linalg import
import time


A = np.random.rand(10000**2).reshape(10000, 10000)

A = np.triu(A)
A += A.T - np.diag(A.diagonal())

start = time.time()
x = qr(A.copy())
end = time.time()
qr_time = end - start
print(qr_time)

start = time.time()
x = svd(A.copy())
end = time.time()
svd_time = end - start
print(svd_time)
```

MATLAB 代码如下

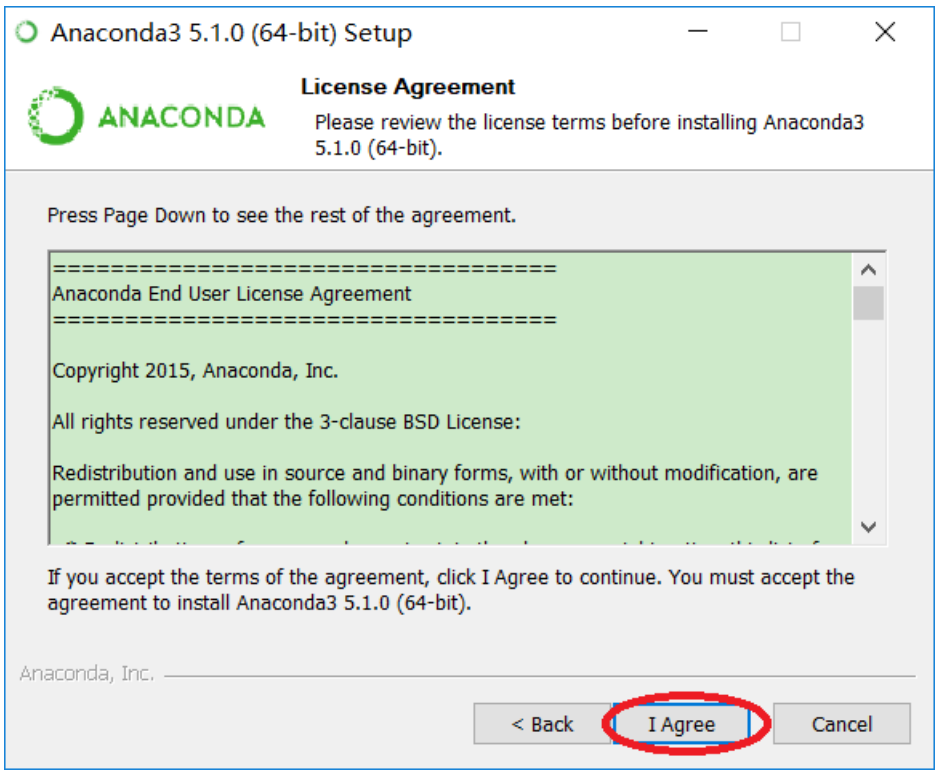
```
>> A = rand(10000,10000);X = triu(A, 0) + triu(A', -1);tic;[B C D]=
qr(X);toc;
时间已过 270.395395 秒。
>> A = rand(10000,10000);X = triu(A, 0) + triu(A', -1);tic;[U S V]=
svd(X, 0);toc;
时间已过 737.434478 秒。
```

实验环境的搭建（Python）

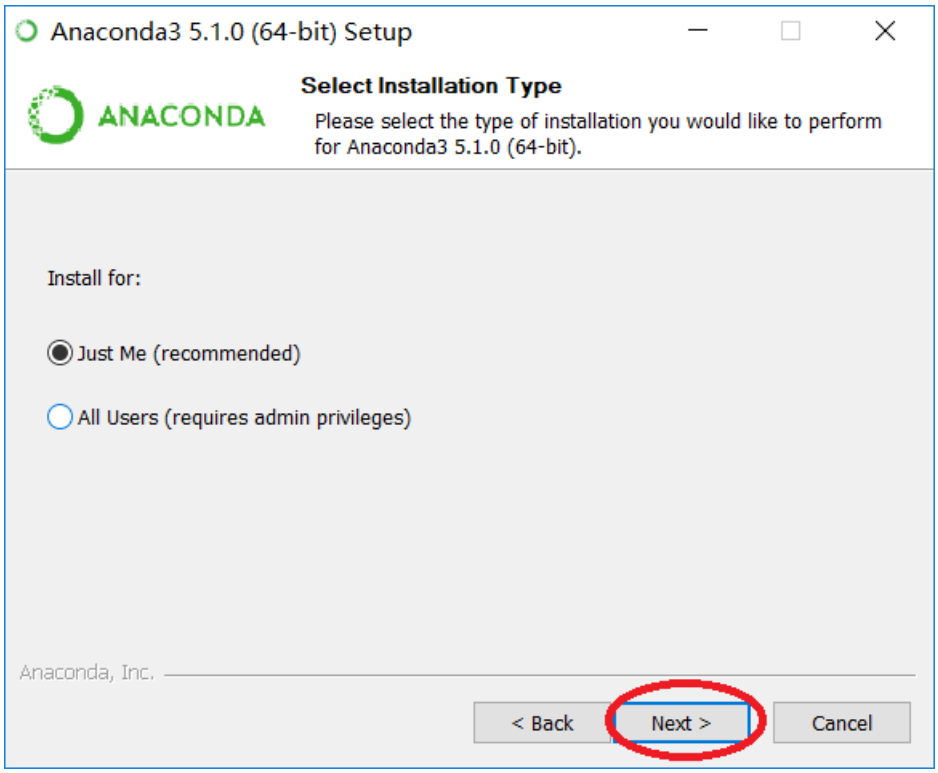
1. 到官网下载对应系统环境的安装包， 下载地址
2. 下载完成后，双击打开安装包，按照如下图的步骤，进行安装
3. 点击 Next



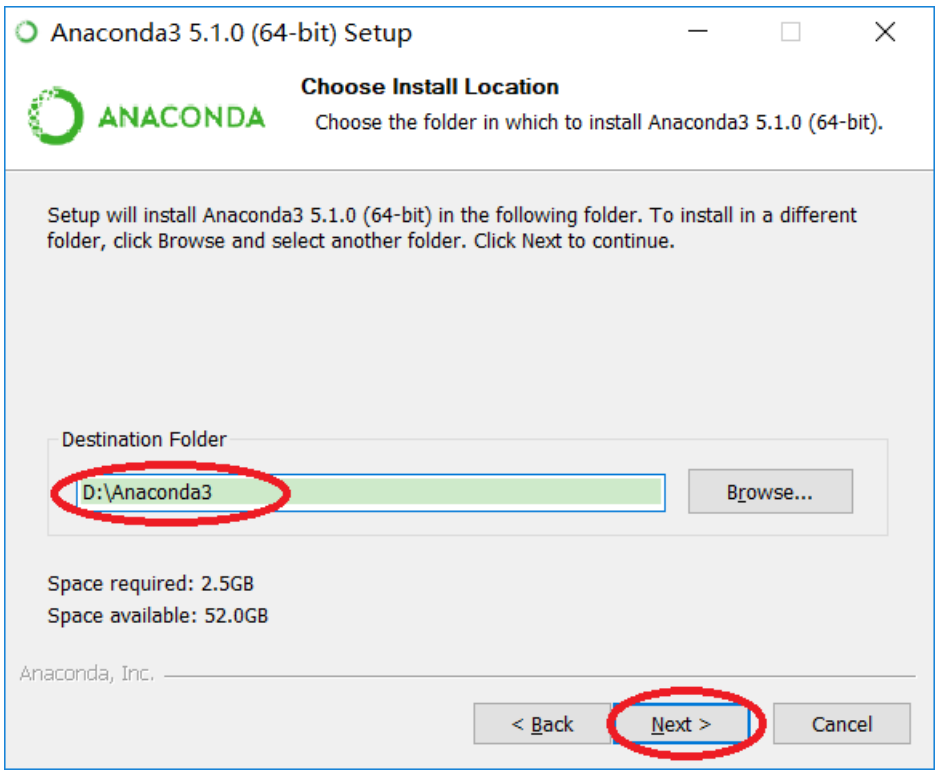
4. 点击 I Agree



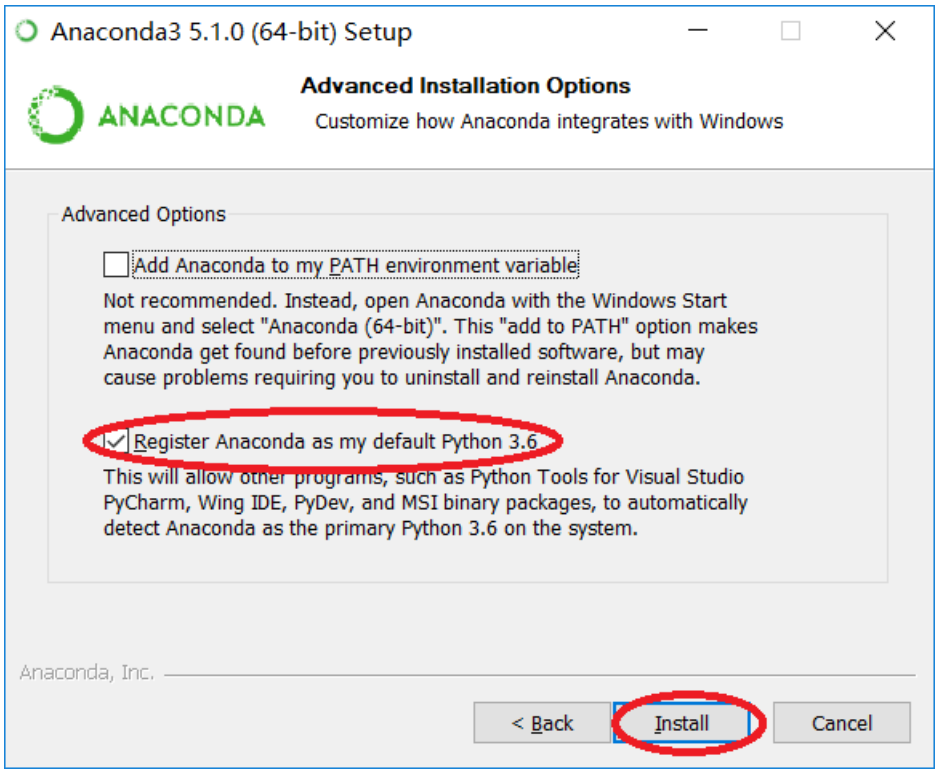
5. 点击 Next



6. 更改路径，点击 Next



7. 勾选当前 python 版本为默认版本，点击 Install



8. 等待安装完成之后，Python 实验环境就搭建完成了