Assignment 7 *

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1   Singular Value Decomposition

A

k= 1
l2 Norm = 100.32714045354201
k= 2
l2 Norm = 92.16583013526113
k= 3
l2 Norm = 88.03482730182394
k= 4
l2 Norm = 70.55158902863175
k= 5
l2 Norm = 58.8056455425344
k= 6
l2 Norm = 57.287008697427126
k= 7
l2 Norm = 25.886380964163436
k= 8
l2 Norm = 24.808096606586826
k= 9
l2 Norm = 24.445395387554285
k= 10
l2 Norm = 23.273775133160008
k= 11
l2 Norm = 21.7389818015331
k= 12
l2 Norm = 20.973260637177983
k= 13
l2 Norm = 18.93597370761065
k= 14
l2 Norm = 18.749018006462457

B

k=7

C

Step 1: Calculate the SVD matrices for A
Step 2: Take the first 2 rows of V^T as store it as V_{temp}
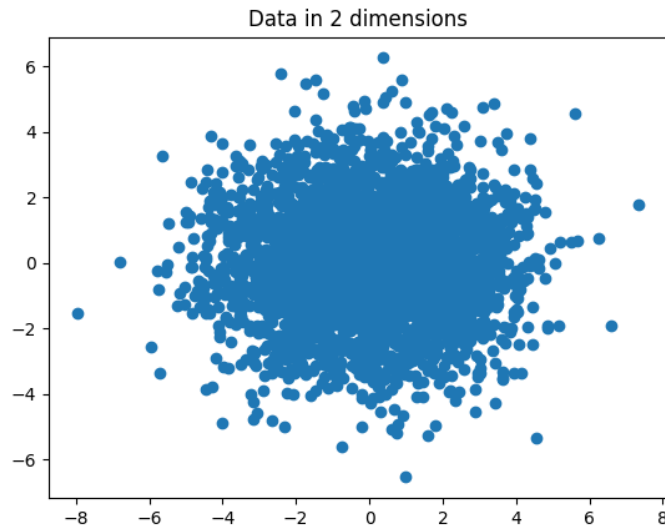Step 3: Multiply A with V_{Temp}
Step 4: Plot the output

Figure 1:

2 Frequent Directions & Random Projections

A

for l=11 we get our error less than the threshold value

B

$$||Ax||^2 - ||Bx||^2 \leq ||A - A_k||_F^2/20$$

C

for l= 20 we get an error less than the threshold value