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Oct. 7, 2018.

Assignment #1 Answers

1. Alice's 2D Representation: [-0.62562864, -0.295158]
   Closest User to Alice in 2D: Bob
   Closest User to Alice in 4D: Bob

2. U = $\begin{bmatrix} -0.33306893 & 0.73220483 & 0.37614814 \\ -0.48640367 & 0.34110504 & -0.754835 \\ -0.79307315 & -0.44109455 & 0.37868687 \\ -0.15333474 & -0.39109979 & -0.38122559 \end{bmatrix}$

   s = $\begin{bmatrix} 11.0528306 & 0 & 0 \\ 0 & 0.91374828 & 0 \\ 0 & 0 & 1.30538231\text{x}10^{-16} \end{bmatrix}$

   V = $\begin{bmatrix} -0.41903326 & -0.56492763 & -0.71082199 \\ -0.81101447 & -0.11912225 & 0.57276996 \\ -0.40824829 & 0.81649658 & -0.40824829 \end{bmatrix}$

3. ||A-A2|| = 1.327263475418025

4.

Epsilon	Min X Values	# Iterations
0.01	[-0.1373, 0.0602, 0.2578]	471
0.05	[----, Diverged..., ----]	433
0.10	[----, Diverged..., ----]	292
0.15	[----, Diverged..., ----]	248
0.20	[----, Diverged..., ----]	224
0.25	[----, Diverged..., ----]	209
0.50	[----, Diverged..., ----]	173

5. Two linearly Independent Vectors belong to the null space:

$$\begin{bmatrix} -0.75878571 \\ 0.59374776 \\ -0.02104018 \\ 0.26695535 \end{bmatrix} \qquad \begin{bmatrix} -0.33687873 \\ -0.65142615 \\ -0.50845005 \\ 0.45125961 \end{bmatrix}$$

   Column rank = 2. Since the number of columns is greater than the column rank of A, it is not linearly independent in R^3.

   Row rank = 2. Since the number of rows is greater than the row rank of A, it is not linearly independent in R^4.

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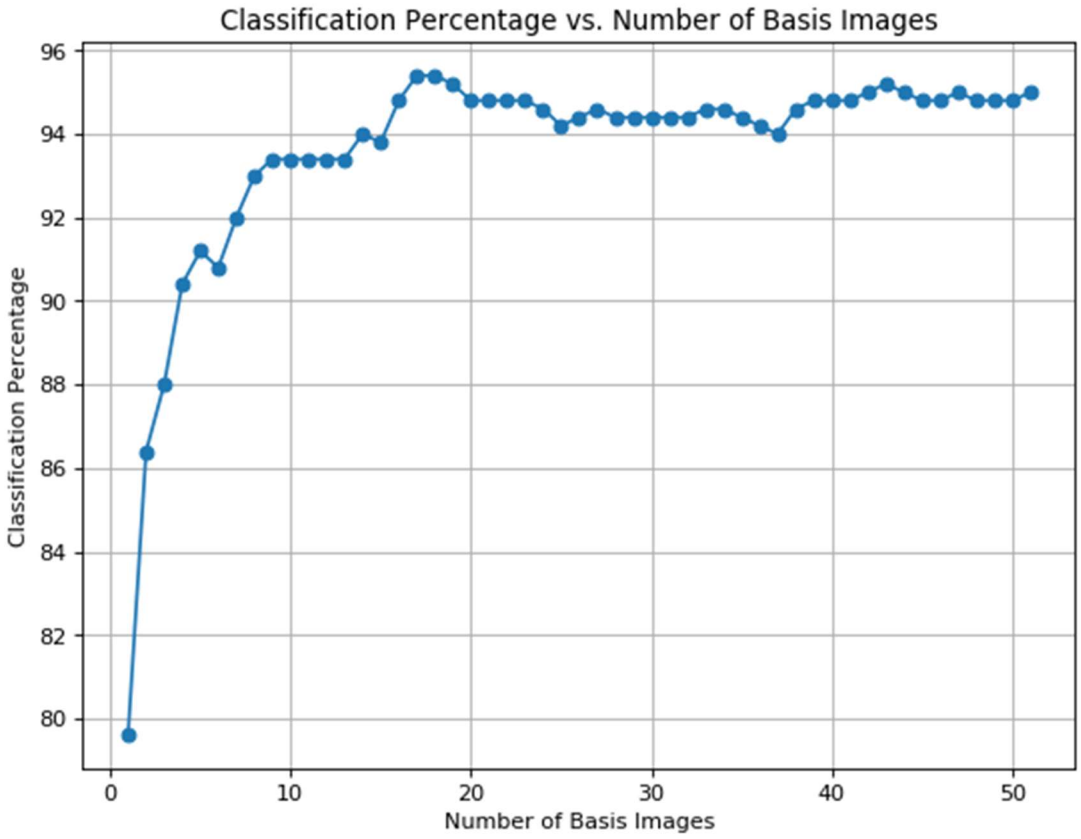
Pseduo-inverse of Matrix A = $\begin{bmatrix} 0.06507304 & 0.01460823 & -0.05046481 \\ 0.03984064 & -0.03187251 & -0.07171315 \\ -0.00929615 & 0.14077025 & 0.1500664 \\ 0.09561753 & 0.12350598 & 0.02788845 \end{bmatrix}$

6.



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7.