Answer: 1

- As represented in graph dataset1 is having Gaussian distribution.
- As represented in graph dataset2 is having Uniform distribution.

Answer: 2

- PCA
  - For PCA I took 2 components and plotted a scattered graph.
  - The scattered graph when rotated at an angle gives the maximum variance.
  - I also took 80 components and applied it to power function to get values of alpha value & xmin value.
- DCT
  - For DCT I used the formula $u_i = \alpha_i \sum_{j=0}^{k-1} v_j \cos[\frac{(2j+1)i\pi}{2k}]$
  - Created a data frame of 100x1000
  - Then taking row wise mean of all 100 rows and adding them in an array.
  - Passing that array into power function and getting value of alpha = 9.622051407430899 & xmin = 0.005275363982498005

Answer: 3

- PCA
  - Dataset1
    - For PCA with 2 components we get a 2-dimensional array through which we can plot a scatter graph.
    - For PCA with 80 components we get a multi-dimensional array.

        - Getting row wise mean and adding them to another list and performing power function on them and getting values of alpha & xmin which are stated below
        - Alpha = 5.884178733731587
        - Xmin = 0.151878866897002 28
    - Dataset2
        - For PCA with 2 components we get a 2-dimensional array through which we can plot a scatter graph.
        - For PCA with 80 components we get a multi-dimensional array.
        - Getting row wise mean and adding them to another list and performing power function on them and getting values of alpha & xmin which are stated below.
        - Alpha = 6.8202859301104075
        - Xmin = 0.1817429652336
- DCT
    - Dataset1
        - Using this formula $u_i = \alpha_i \sum_{j=0}^{k-1} v_j \cos[\frac{(2j+1)i\pi}{2k}]$ generating a data frame with 100x1000
        - And then calculating mean of all the 100 features and storing them in array to use it on power law to get alpha & xmin which are stated below.
        - Alpha = 9.622051407430899
        - Xmin = 0.005275363982498005
    - Dataset2
        - Using this formula $u_i = \alpha_i \sum_{j=0}^{k-1} v_j \cos[\frac{(2j+1)i\pi}{2k}]$ generating a data frame with 100x1000
        - And then calculating mean of all the 100 features and storing them in array to use it on power law to get alpha & xmin which are stated below.
        - Alpha = 3.582254971087886 4

        - Xmin = 0.0025631224734504092
- From the above scenario we can say that DCT is a better option to use as a feature extraction due to power consumption & power saving.

Answer: 4

- PCA
    - Dataset1
        - For PCA with 2 components we get a 2-dimensional array through which we can plot a scatter graph.
        - For PCA with 80 components we get a multi-dimensional array.
        - Getting row wise mean and adding them to another list and performing power function on them and getting values of alpha & xmin which are stated below.
        - Alpha = 5.884178733731587
        - Xmin = 0.15187886689700228
    - Dataset2
        - For PCA with 2 components we get a 2-dimensional array through which we can plot a scatter graph.
        - For PCA with 80 components we get a multi-dimensional array.
        - Getting row wise mean and adding them to another list and performing power function on them and getting values of alpha & xmin which are stated below.
        - Alpha = 6.8202859301104075
        - Xmin = 0.1817429652336
- ICA
    - Dataset1
        - For implementing I’m using FastICA

        - For ICA with 2 components we get a 2-dimensional array through which we can plot a scatter graph.
        - For ICA with 80 components we get a multi-dimensional array.
        - Getting row wise mean and adding them to another list and performing power function on them and getting values of alpha & xmin which are stated below.
        - Alpha = 9.273185111319941
        - Xmin = 0.0077712058791498 07
    - Dataset2
        - For implementing I'm using FastICA
        - For ICA with 2 components we get a 2-dimensional array through which we can plot a scatter graph.
        - For ICA with 80 components we get a multi-dimensional array.
        - Getting row wise mean and adding them to another list and performing power function on them and getting values of alpha & xmin which are stated below
        - Alpha = 3.8288164904399054
        - Xmin = 0.004706069918411729
- From the above scenario we can say that PCA is a better option to use as a feature extraction due to power consumption & power saving.