ME 793 - Assignment 2

Department of Mechanical Engineering, IIT Bombay

Spring 2023

Due Date: 11:59 PM, Friday, Feb 9, 2023, Marks 20

Assignment Date: 11:00 PM, Saturday, Feb 03, 2023

Objective and Instructions

1. The objective is to learn image compression using SVD. Instruction: Do Q.2 to Q.6 using greyscale image and Q.7 using RGB image..
2. Submit Jupyter Notebook / Google Colab notebook and the corresponding pdf file to Moodle.
3. For marking Answer No. and to make a commentary, use Markdown cells in your notebook.

Q 1. 2 points A file Dog.jpg is provided with this assignment. Convert the RGB image to Greyscale image.

Q 2. 5 points Write code to perform SVD image compression with varying numbers of singular values and plot the reconstructed images. Explore how the image quality changes with different numbers of singular values. Take singular values(r) as 2, 5, 10, 25, 50, 100, 500.

Q 3. 2 points How does the memory space required for storage change with different values of 'r'?

Q 4. 3 points Plot cumulative distribution curve change with different values of singular values?

Q 5. 3 points Calculate the compression ratio and plot with respect to singular values.

Q 6. 2 points Plot the Singular Values Plot (Semilogarithmic Scale) between Number of singular values and Singular values.

Q 7. 3 points Repeat Q. 2 for the original RGB image. Show three channels of RGB image along with the original images.

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