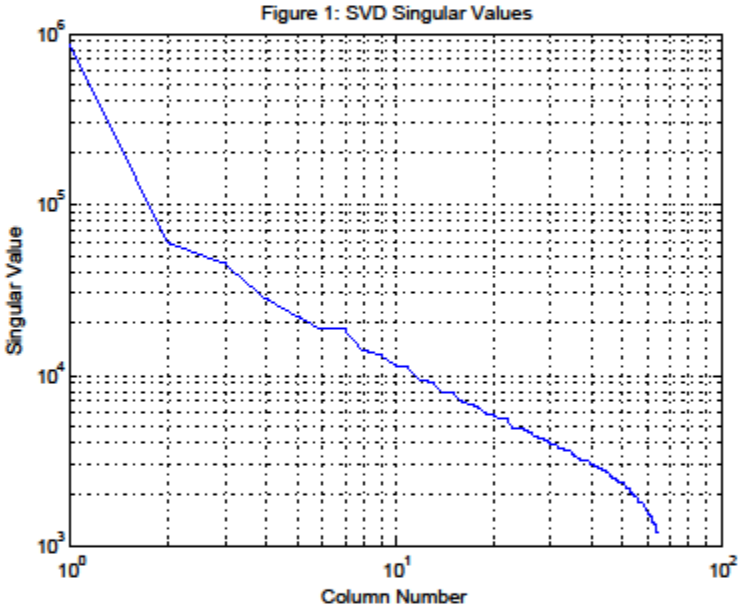
Chang, James
CNS 187 HW 7

Collaborators: Debbie Tsai, Ruchi J., Eric Gorlin
Hours to complete: 5

1.1



1.2

Figure 2: First 64 Images of SVD U

1.3

Figure 3: Original Image

Figure 4: Reconstruction with R = 2

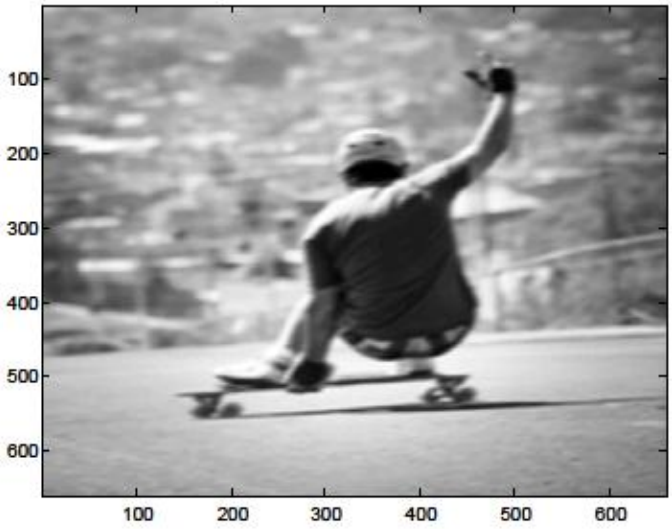
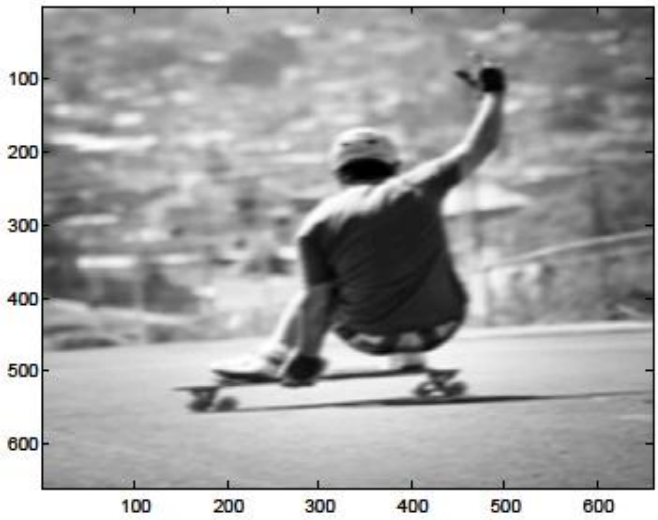


Figure 5: Reconstruction with R = 8

Figure 6: Reconstruction with R = 32



1.4

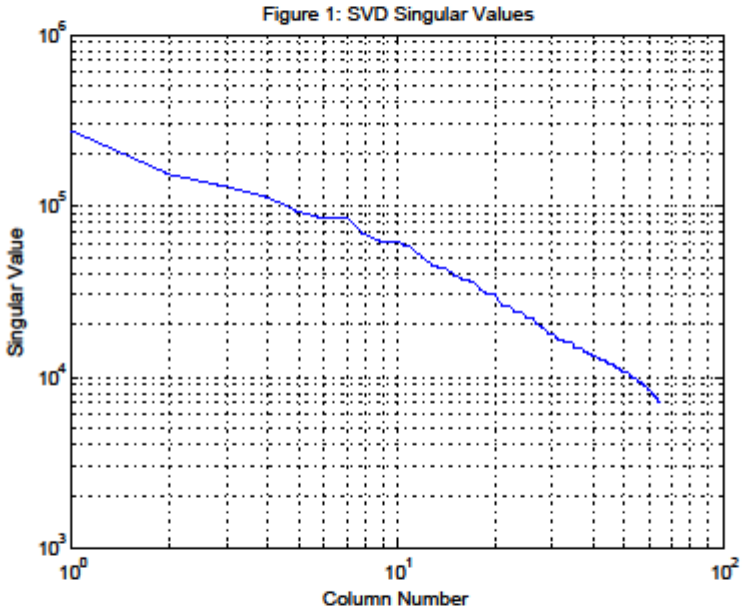


Figure 1: SVD Singular Values
Singular Value
Column Number
10^6
10^5
10^4
10^3
10^0
10^1
10^2

1.5

Figure 2: First 64 Images of SVD U

1.6

Figure 3: Original Image

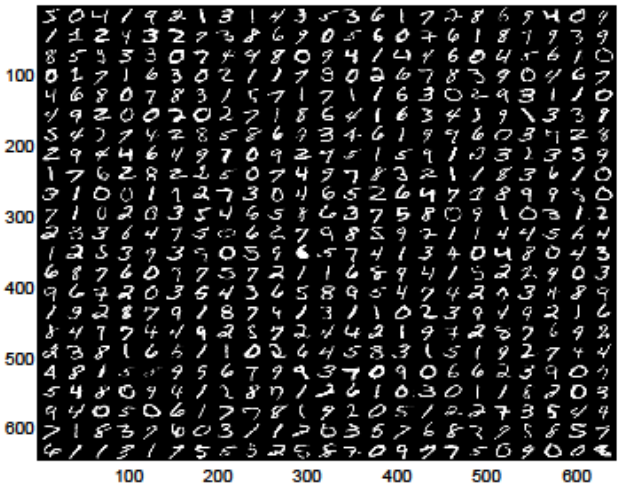


Figure 4: Reconstruction with R = 2

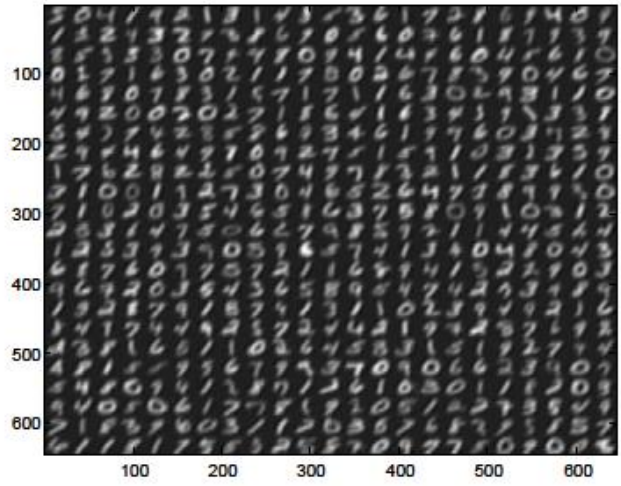


Figure 5: Reconstruction with R = 8

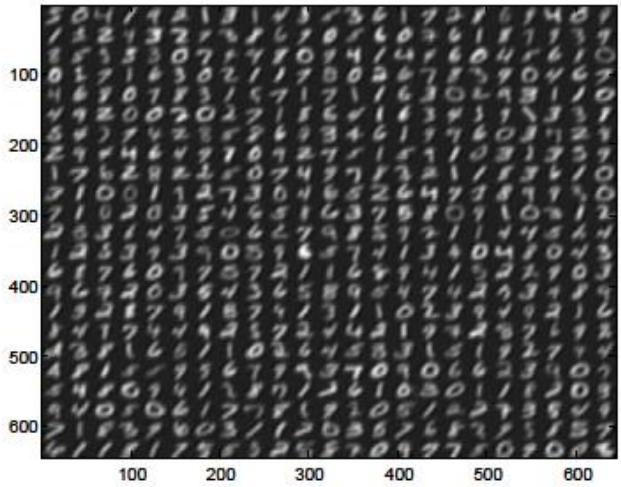
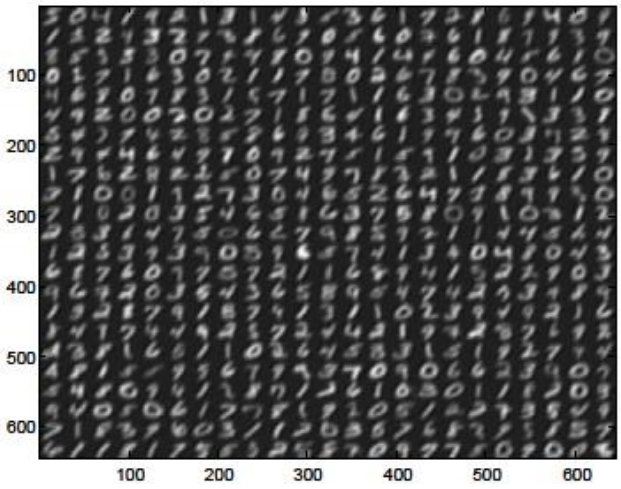


Figure 6: Reconstruction with R = 32



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2.1 Redundant and unnecessary basis functions are removed, and the result is a deviation from expected linear input-output relationship.

2.2 A, C, then B. A natural image has the least sparseness because nothing has been stripped. The NIST set has the most sparseness because there is an extremely limited number of edges and lines that describe it.