SMAI-2020-Homework 4

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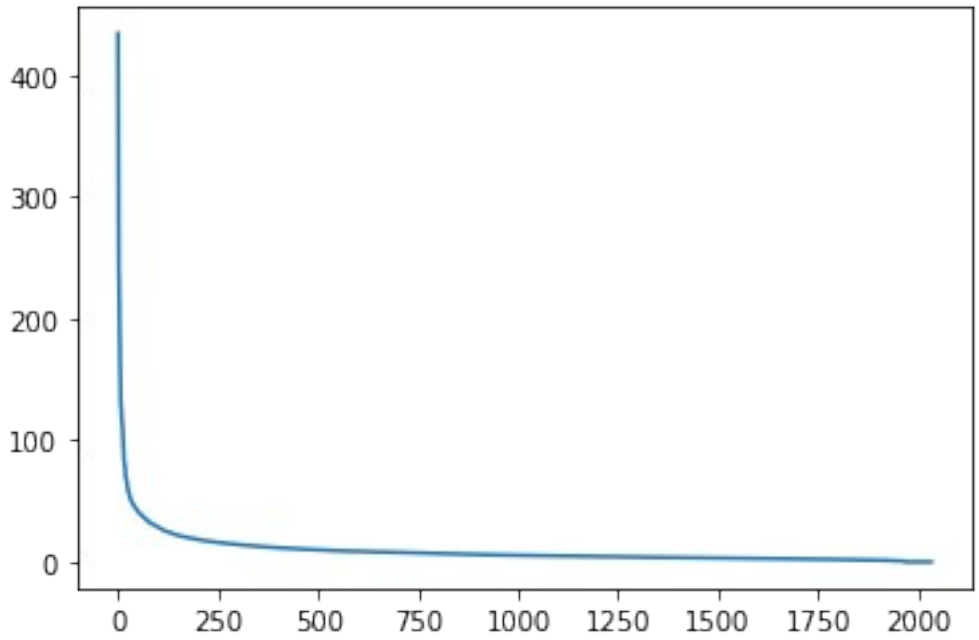
Question 2,Part A:-

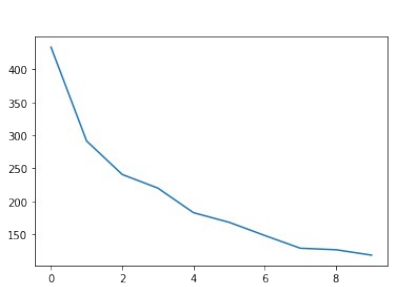
Briefly explain the plot of the singular values s (or in other words, what can we say about the singular values based on its plot).

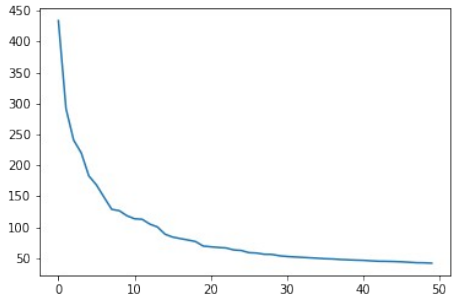
Answer:-

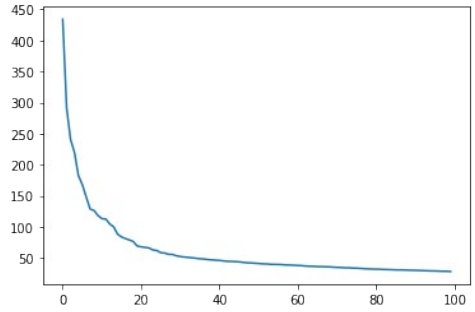
plot of s :-



After plotting the first singular values of s 10,50,100 :-







After observing these plots,we can clearly say that after a certain range,values becoming practically insignificant.As we can see,values after 40 became actually small when compared to initial values.And for the first 10 values,it was same. This clearly shows that SVD can indeed be used in

Dimensionality reduction and only a few singular values are enough to retain majority of the information of the matrix

Question 2,Part A:-

Answer:-

We obtained three matrices :- U,V,Sigma when Single Value decomposition (SVD) is performed on data matrix. Here U,Vh (transpose of V) are orthogonal . This can be confirmed by performing U(transpose)U and VhVh(transpose) , both of which give an identity Matrix I