Build and SVM to classify the MNIST dataset into classes 0 to 9

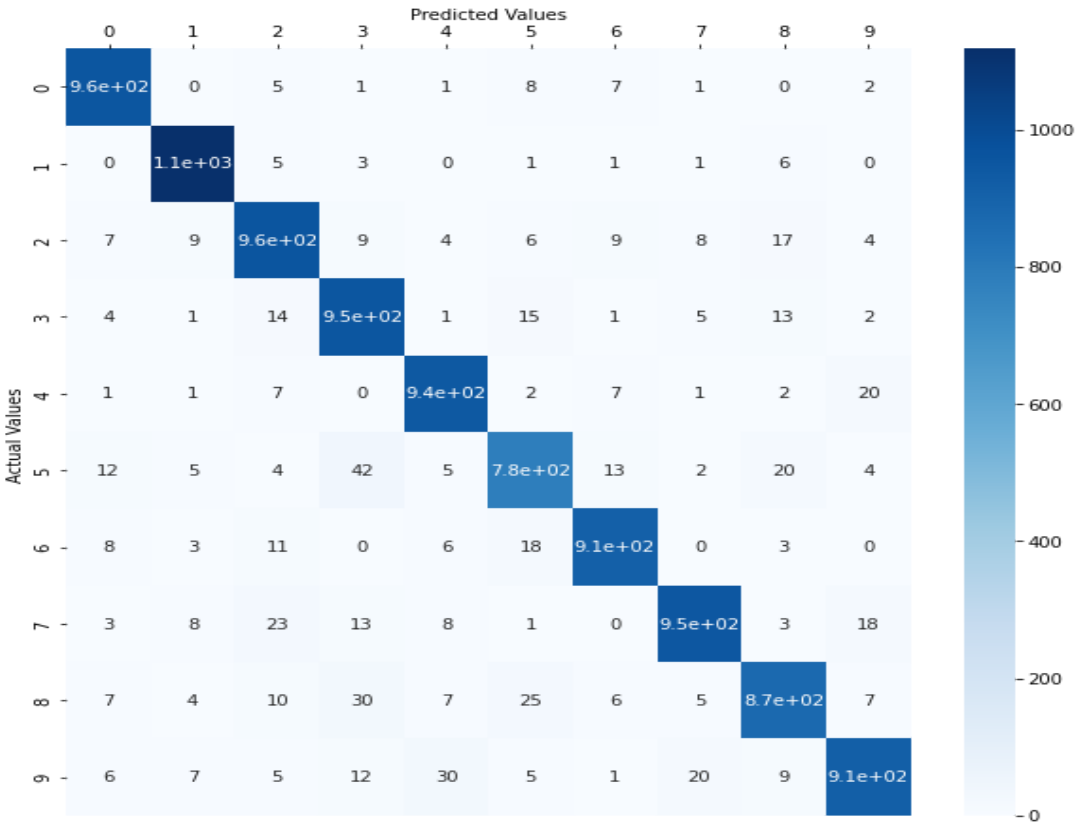
Kernel used for this assignment :

1. Linear
2. Polynomial (Degree =3 , 4 , 5)
3. Radial Basis Function
4. Sigmoid

Results:

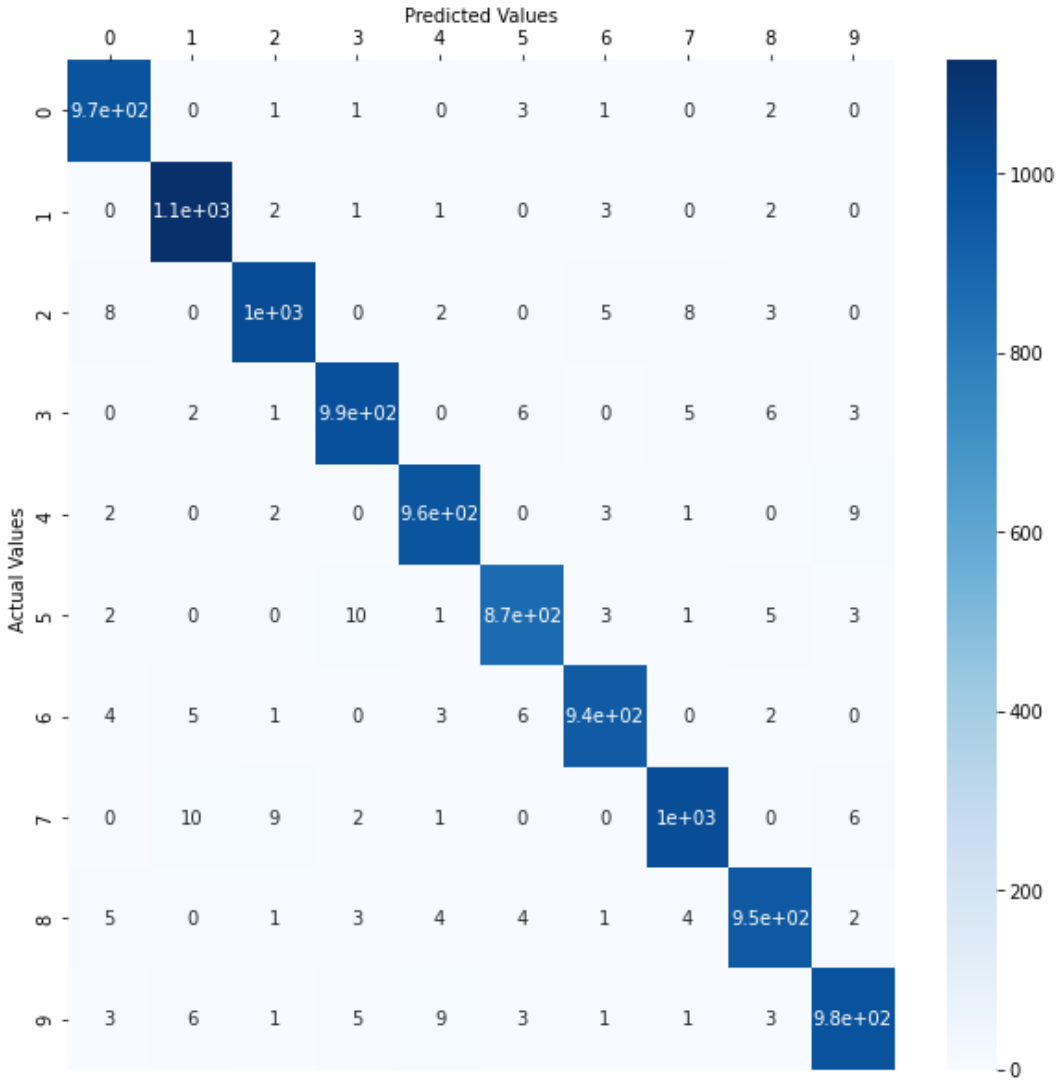
1. **<u>Linear Kernel:</u>**

   Accuracy = 0.9404
   Error Rate(%) =5.96%
   C = 1
   Gamma = 0.1
   Confusion Matrix:



2. **Polynomial Kernel (Degree =3):**

Accuracy = 0.9787
Error Rate(%) = 2.13
C = 4
Gamma = 0.05
Confusion Matrix:

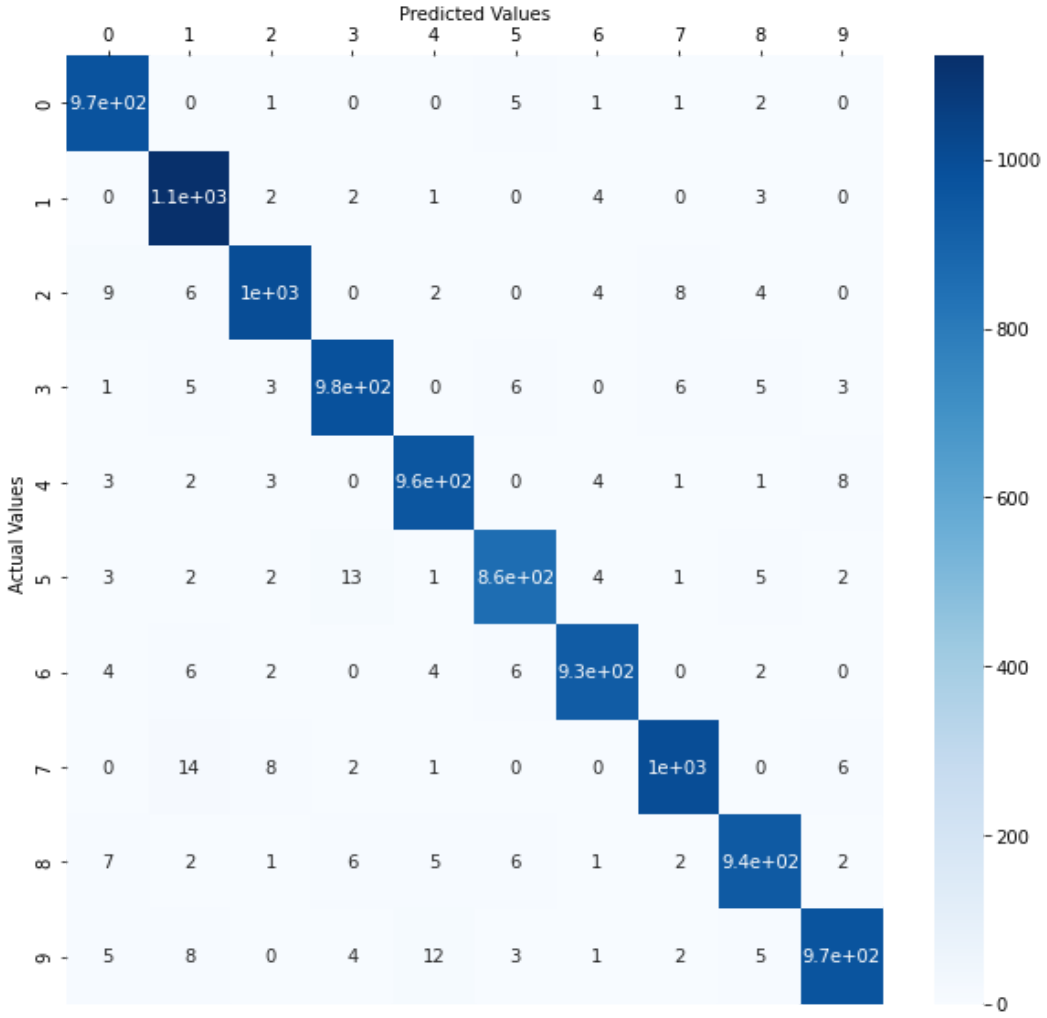


3. **Polynomial Kernel (Degree =4):**

Accuracy = 0.9734

Error Rate (%) = 2.66
C = 4
Gamma = 0.05

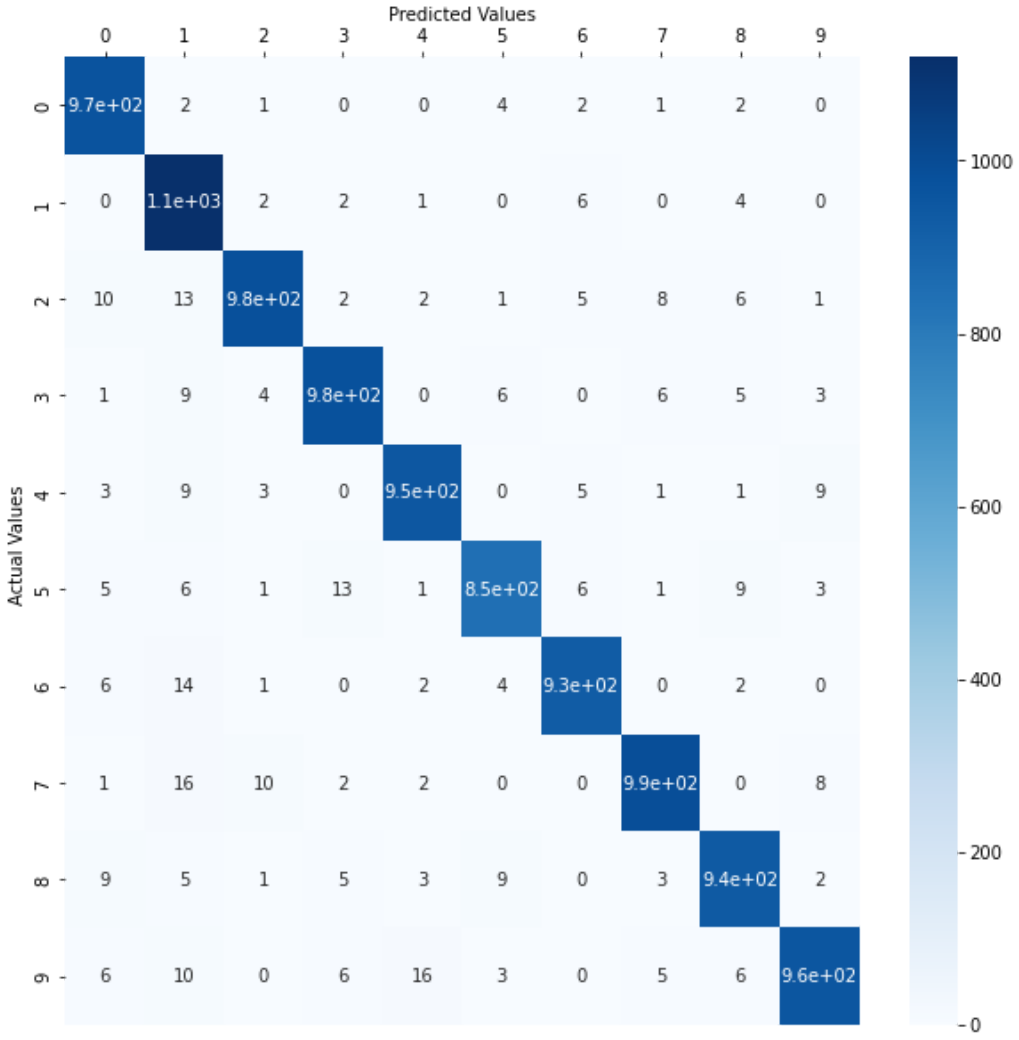
Confusion Matrix:



4. **<u>Polynomial Kernel (Degree =5):</u>**

Accuracy = 0.9658
Error Rate (%) = 3.42
C = 6
Gamma = 0.05

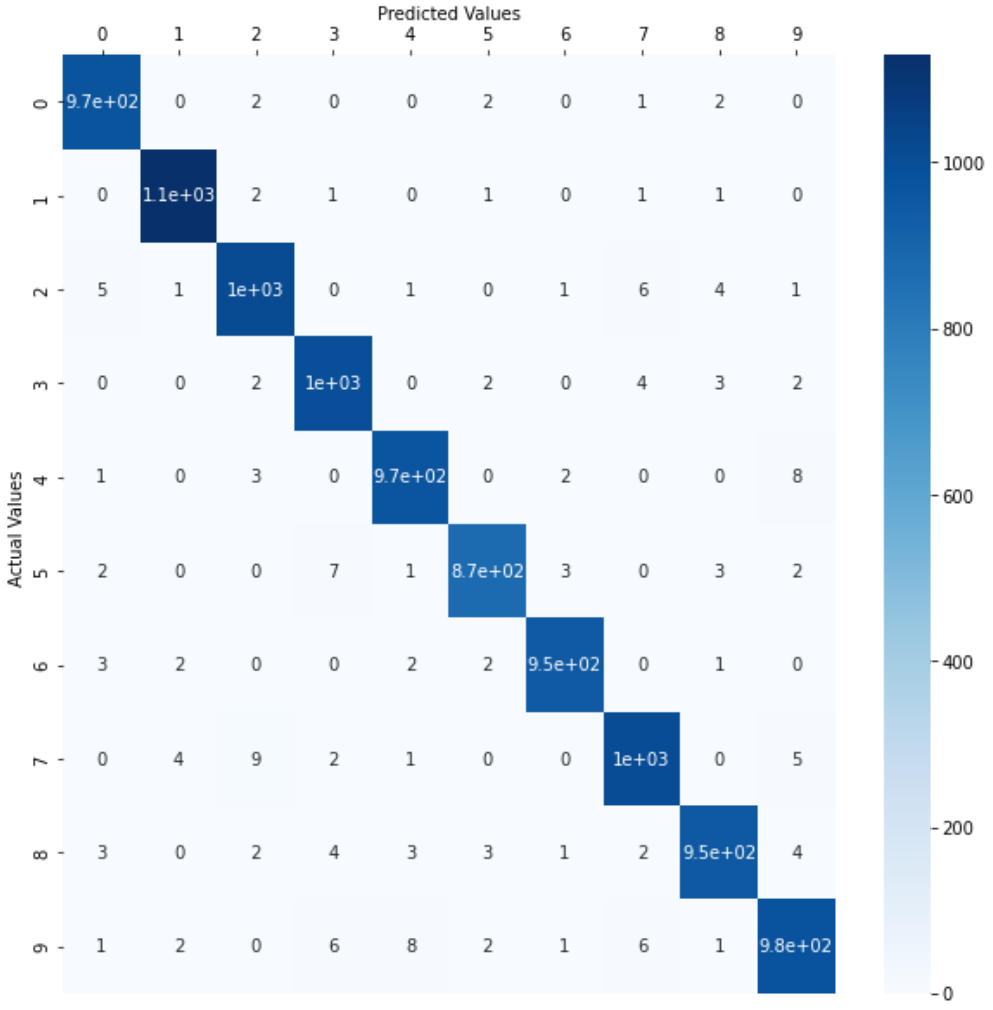
Confusion Matrix:



5. **RBF:**

Accuracy = 0.9843
Error Rate (%) = 1.57
C= 4
Gamma =Default

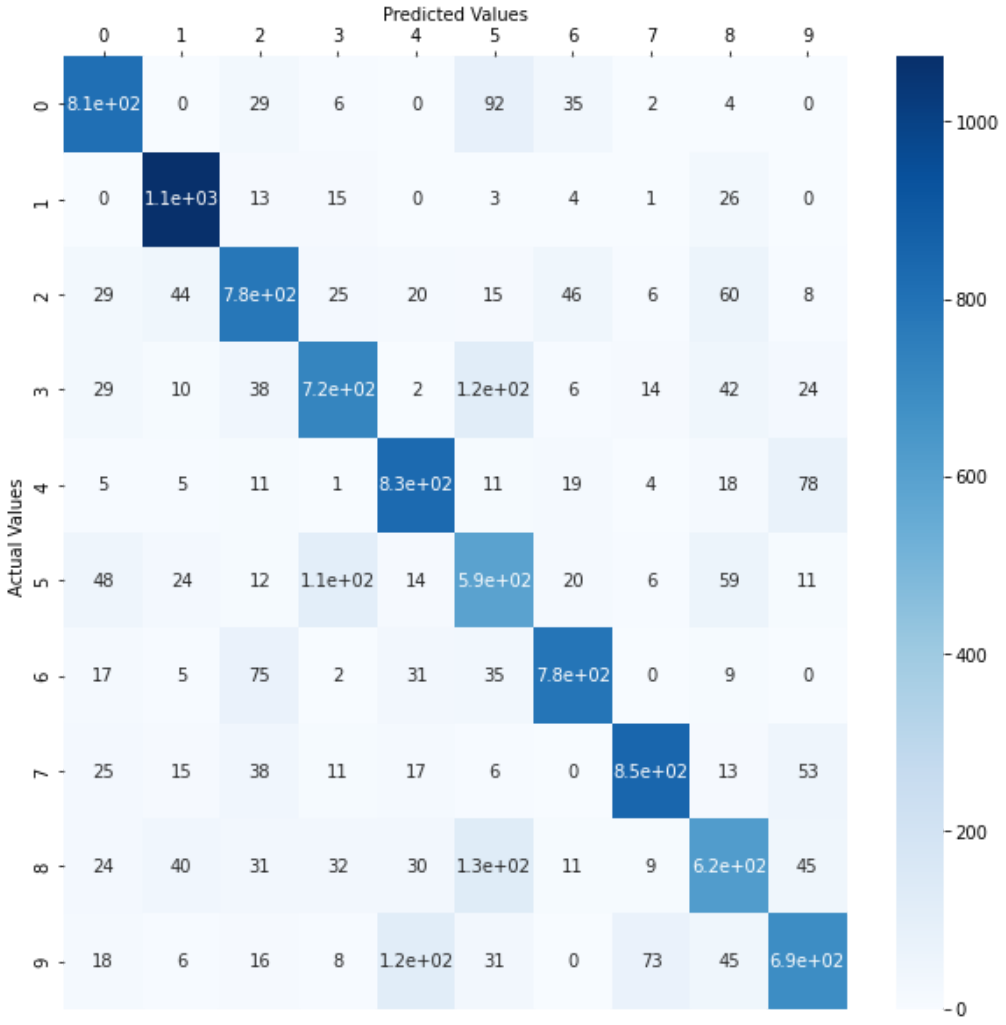
Confusion Matrix:



6. **Sigmoid:**

Accuracy = 0.7759
Error Rate(%) = 22.41
C= 1

Confusion Matrix:



So from the above the best accuracy achieved was 0.9843 by RBF Kernel and
Error Rate (%) = 1.57
And the worst was by Sigmoid kernel where accuracy achieved was 0.7759