

The SVM model has important hyperparameters:

Parameter	Description
C	Regularization parameter
kernel	Linear / RBF / Polynomial
gamma	Influence of single training example (RBF)
degree	Degree of polynomial kernel

Conduct Controlled Experiments

You must:

1. Change **only one hyperparameter at a time**
2. Keep all others constant
3. Record performance metrics
4. Tabulate results

Experiment 1: Effect of C

Test: C = [0.01, 0.1, 1, 10, 100]

Questions:

- What happens when C is very small?
- What happens when C is very large?
- Which value gives best generalization?

Experiment 2: Effect of Kernel

Test:

- Linear
- RBF
- Polynomial (degree=3)

Compare accuracy and F1-score.

Experiment 3: Effect of Gamma (RBF kernel only)

Test: gamma = [0.001, 0.01, 0.1, 1]

Questions:

- When gamma is small → what happens?
- When gamma is large → what happens?
- Does overfitting occur?