

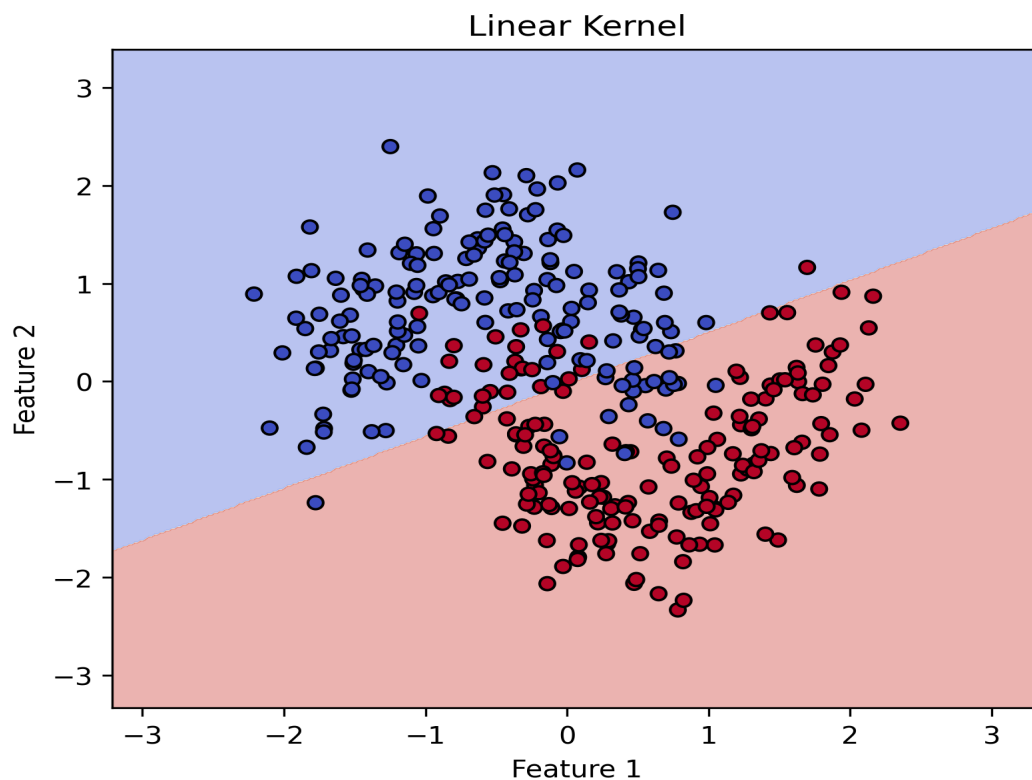
EXPERIMENT-8 REPORT : 23/CS/072

Model Comparison (Validation Accuracy)

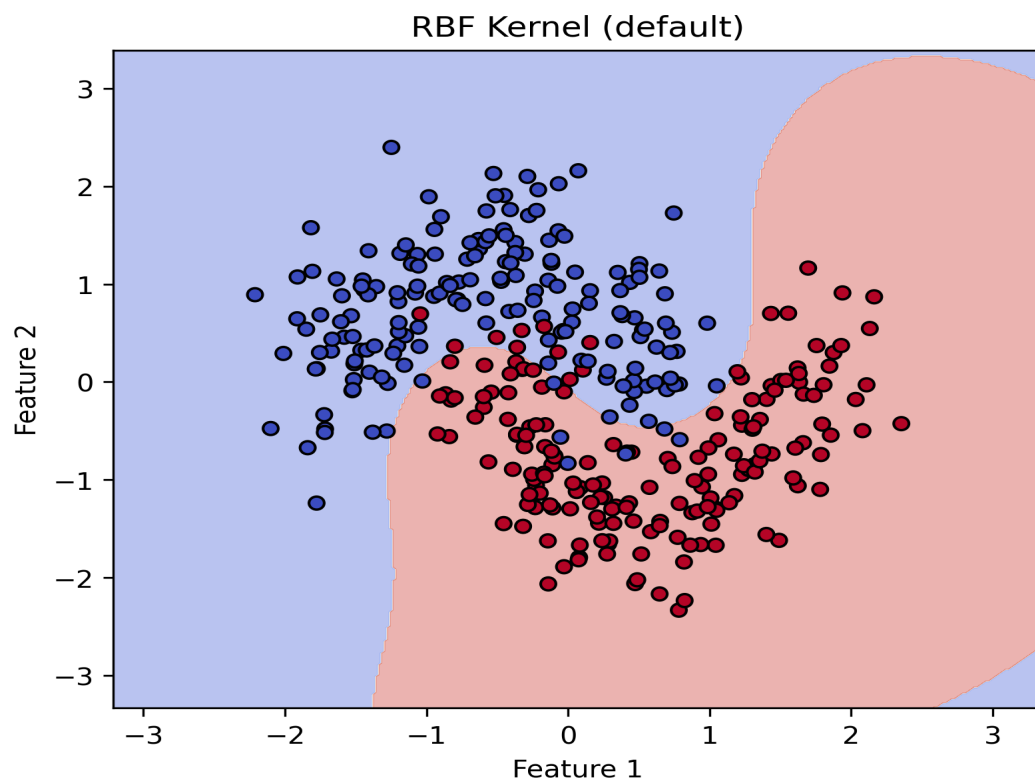
| Model | Kernel | Parameters | Validation Accuracy |
|--------------|--------|---------------------------------------|---------------------|
| SVC | linear | C=1 | 0.83 |
| SVC | rbf | default | 0.94 |
| SVC | poly | degree=3 | 0.89 |
| GridSearchCV | rbf | {'C': 1, 'gamma': 1, 'kernel': 'rbf'} | 0.951 |

Decision Boundary Plots

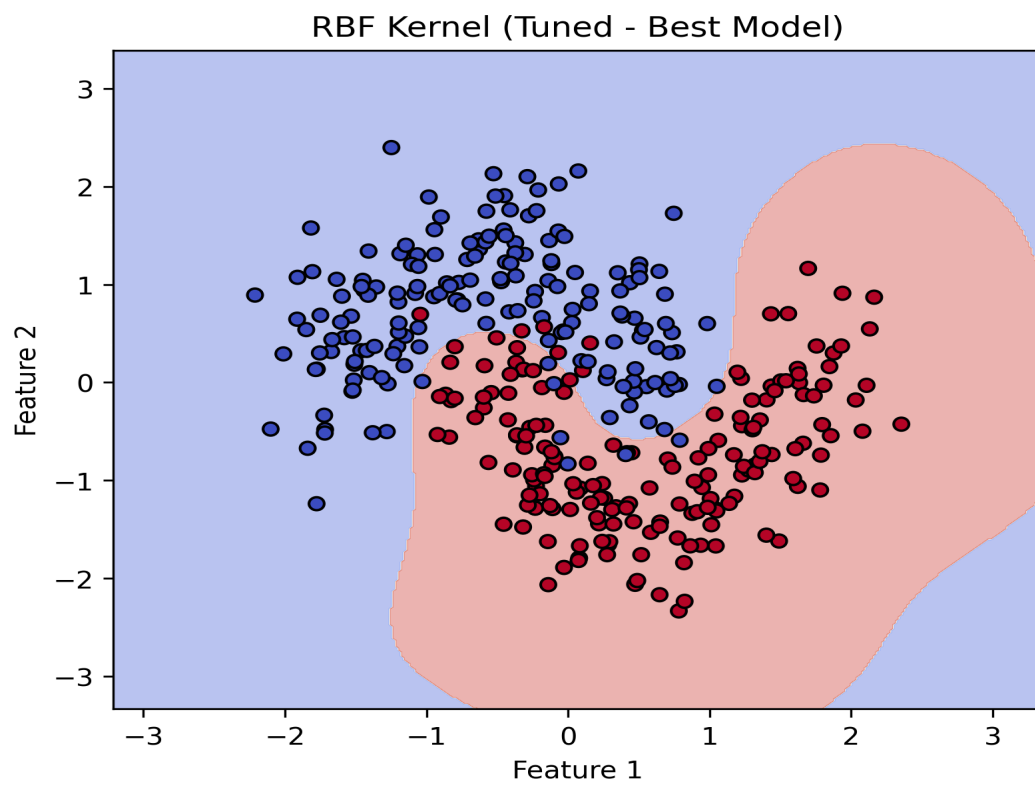
LINEAR BOUNDARY



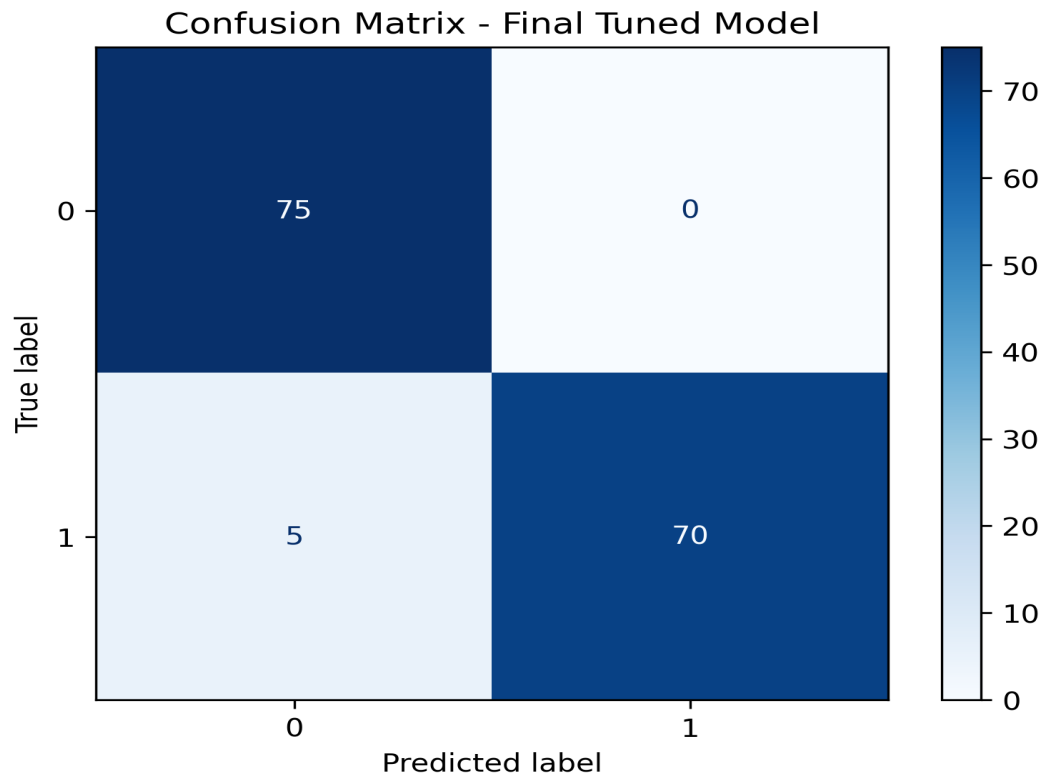
RBF BOUNDARY



BEST BOUNDARY



CONFUSION MATRIX



Conclusion

Linear SVM failed because the 'moons' dataset is non-linearly separable — a straight line can't divide the classes accurately.

RBF Kernel succeeded because it can model curved, non-linear boundaries.

GridSearchCV best parameters: {'C': 1, 'gamma': 1, 'kernel': 'rbf'}

Effect of high gamma (e.g., 1000): The model overfits and the boundary becomes too wiggly.

Effect of low C (e.g., 0.01): The model underfits, resulting in smoother but inaccurate boundaries.