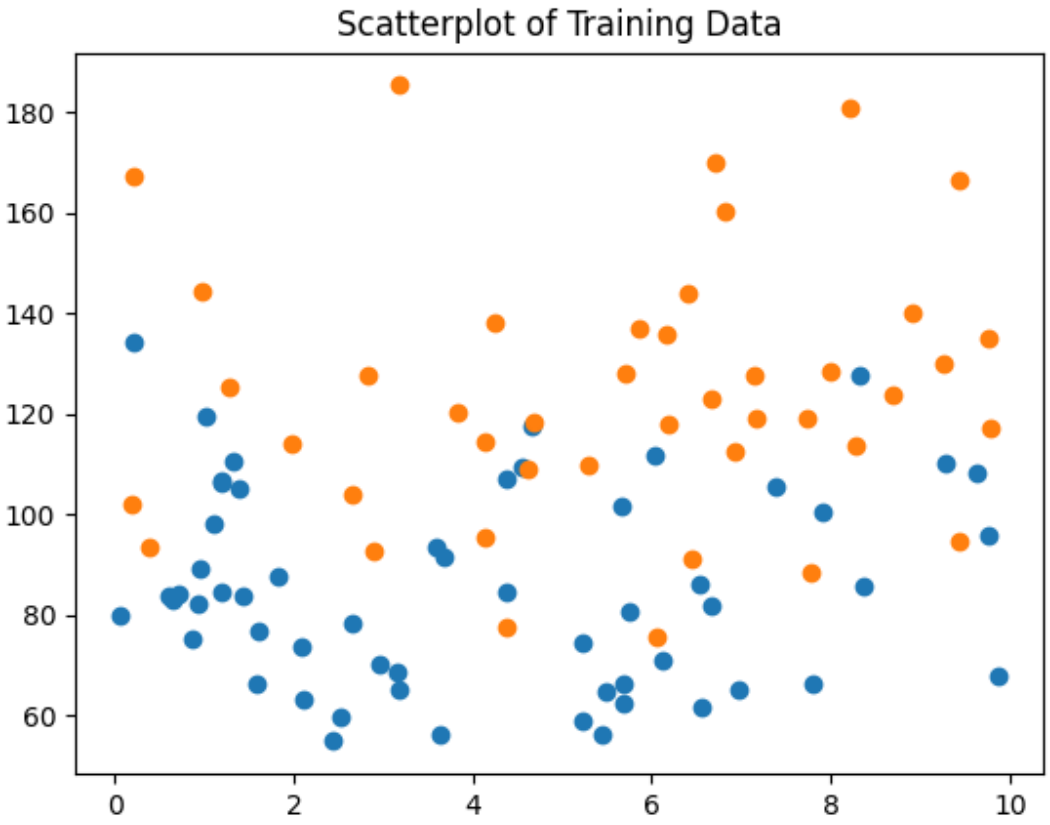
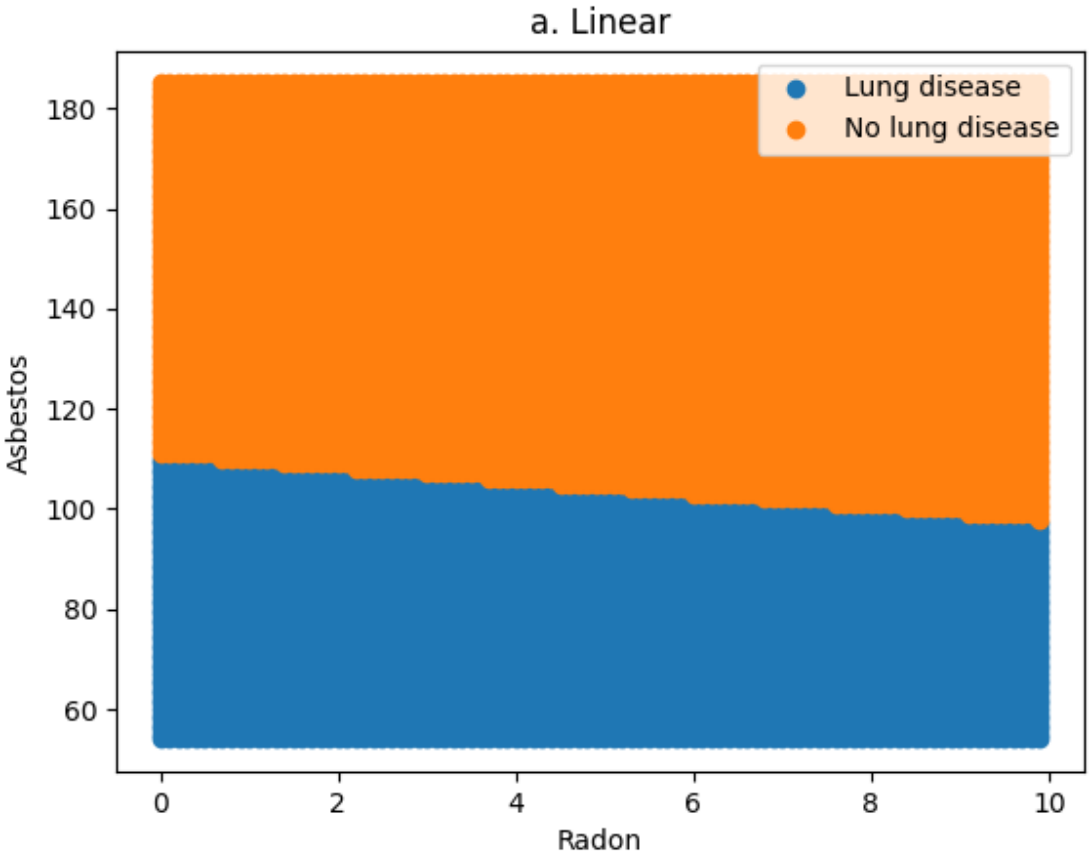
CS 4342 - Machine Learning
Homework - 5 SVMs
By Suryansh Goyal

Training Data

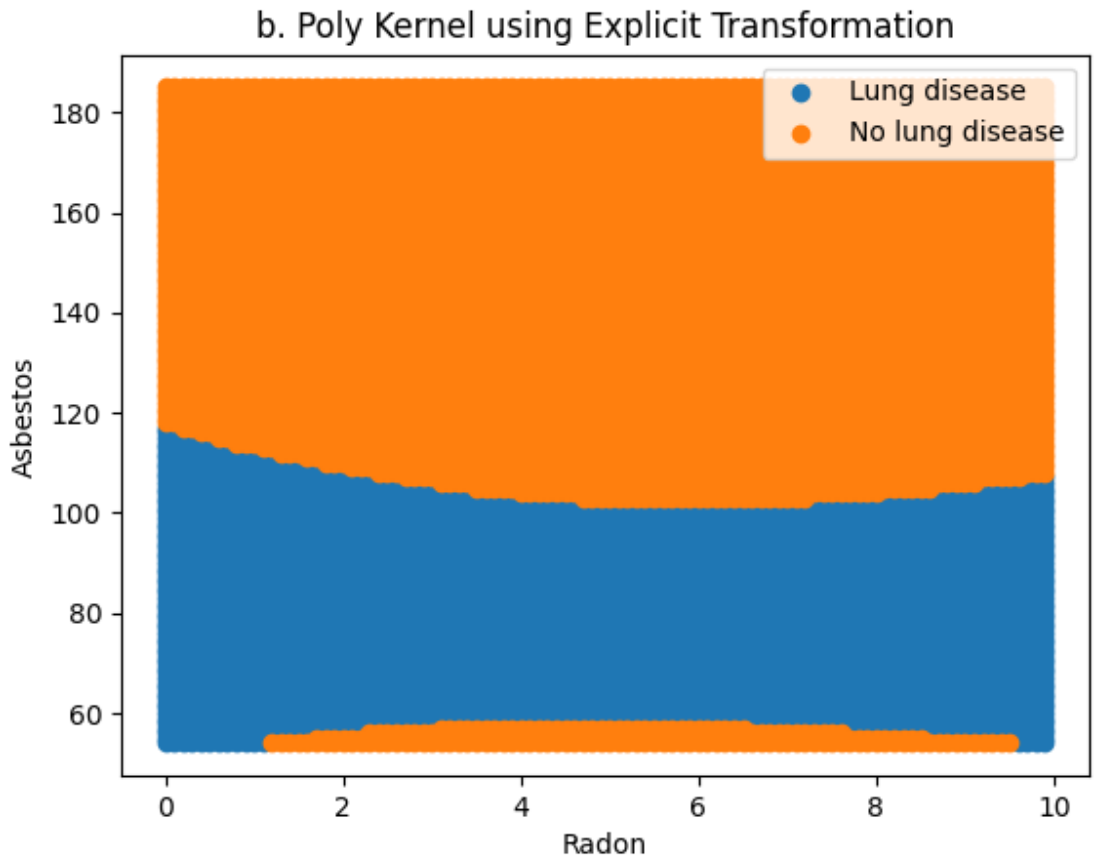


Part A - Linear SVM

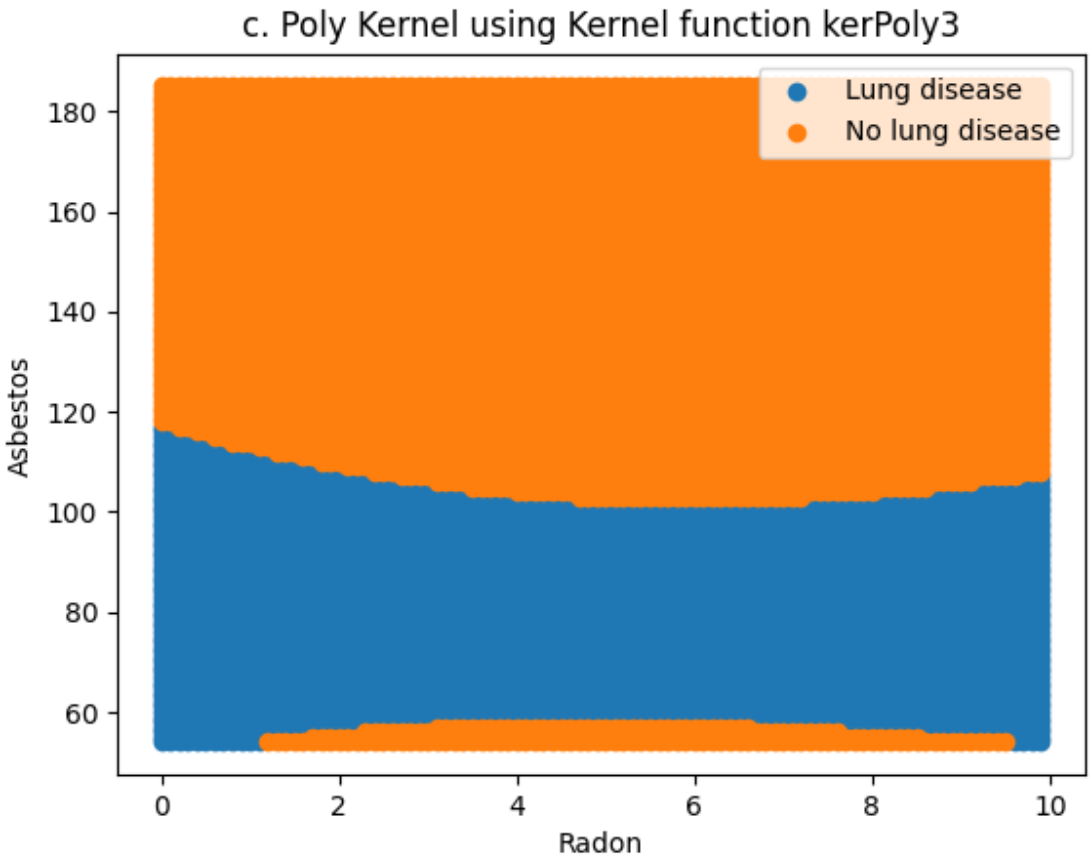


Part B
Poly-SVM using Explicit transformation

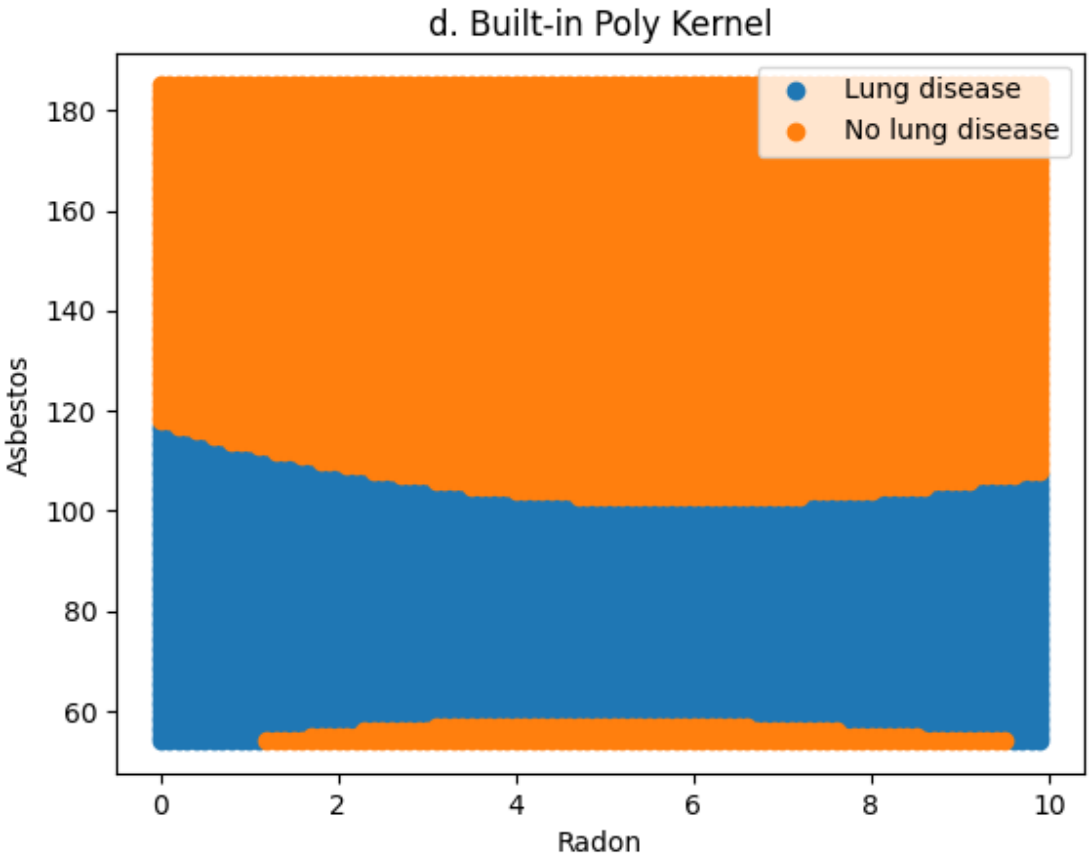
Formula for phi(x):
phi([r,a]) = [1, √3*r , √3*a, √6*r*a, √3*r*r, √3*a*a, √3*r*r*a, √3*r*a*a, r*r*r, a*a*a]



Part C
Poly-SVM using Kernel Trick

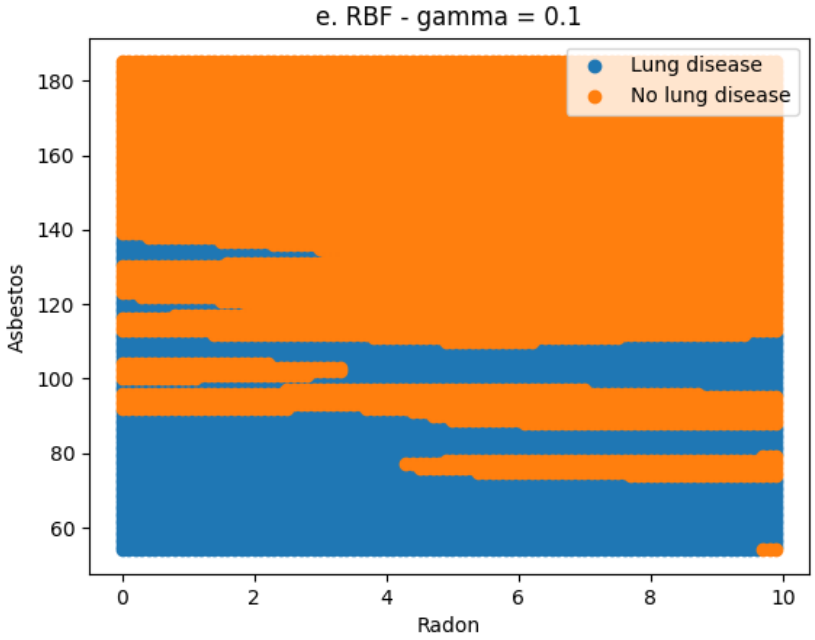


Part D
Poly-SVM using built-in “poly” kernel in scikit-learn

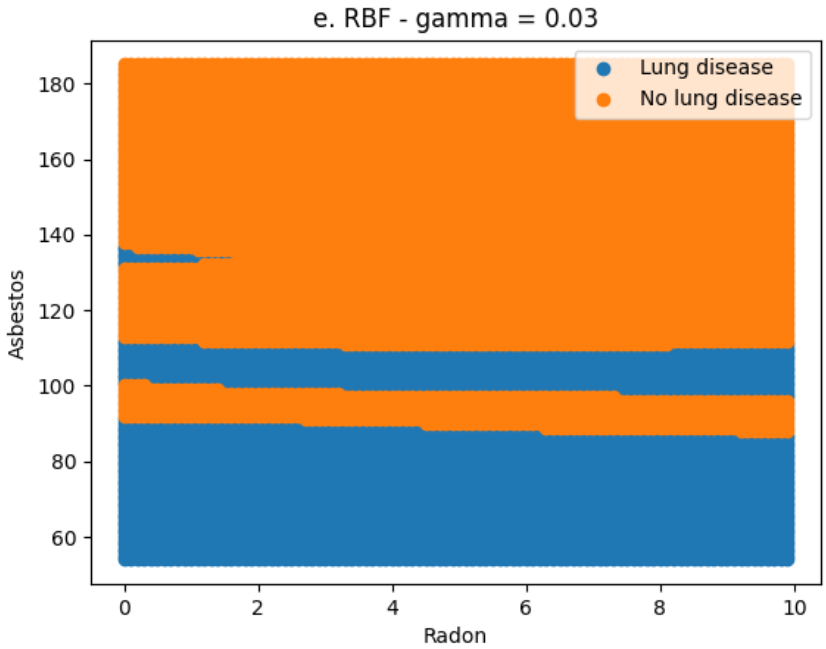


Part E
RBF-SVM using built-in RBF kernel in scikit-learn

1. **Gamma = 0.1**



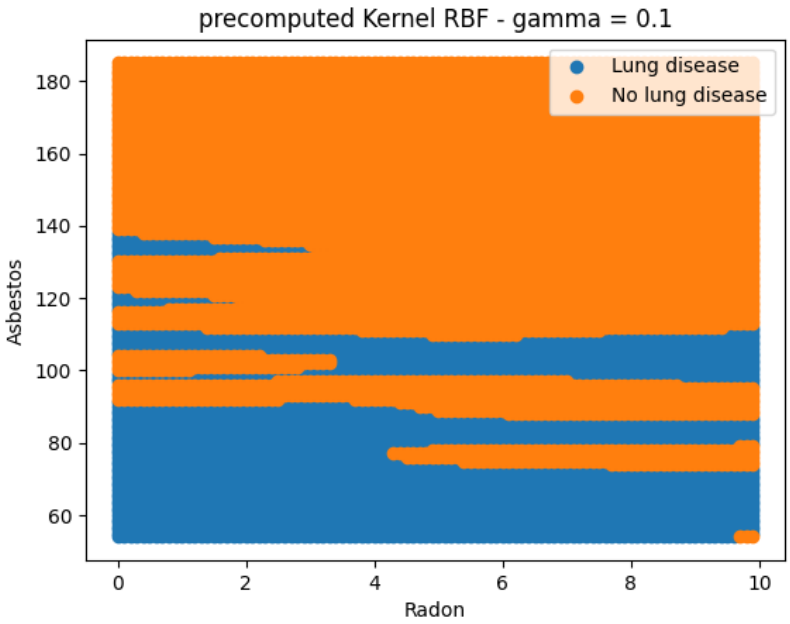
2. **Gamma = 0.03**



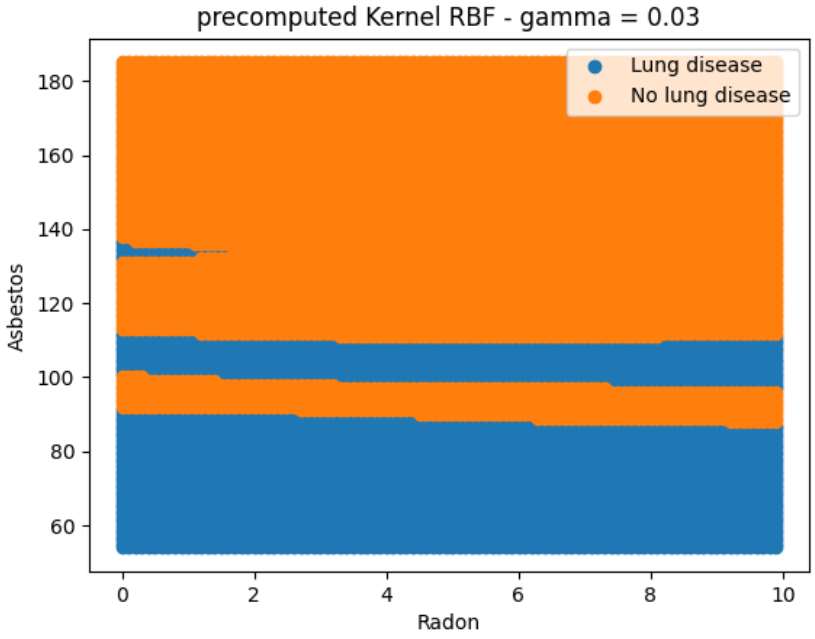
Here, the RBF with Gamma = 0.1 is more likely to overfit the data.

RBF-SVM using precomputed RBF kernel

1. **Gamma = 0.1**



2. **Gamma = 0.03**



As you can see, I have managed to get the exact same results for both kinds of RBF kernel (precomputed vs rbf)