Institute of Technology of Cambodia

Seminar
Lecturer: Chann Sophal
Room 4
Tuning Kernel Parameters

Members Name:

1. **OUN VIKRETH**	**e20200485**
2. **KEO VONMONYROTH**	**e20200759**
3. **PHUN SREYPICH**	**e20200179**
4. **SENG VATHANAK**	**e20200463**
5. **NOR PHANIT**	**e20200241**
6. **HUN SOKRARITH**	**e20201218**
7. **HONG KIMLENG**	**e20200766**

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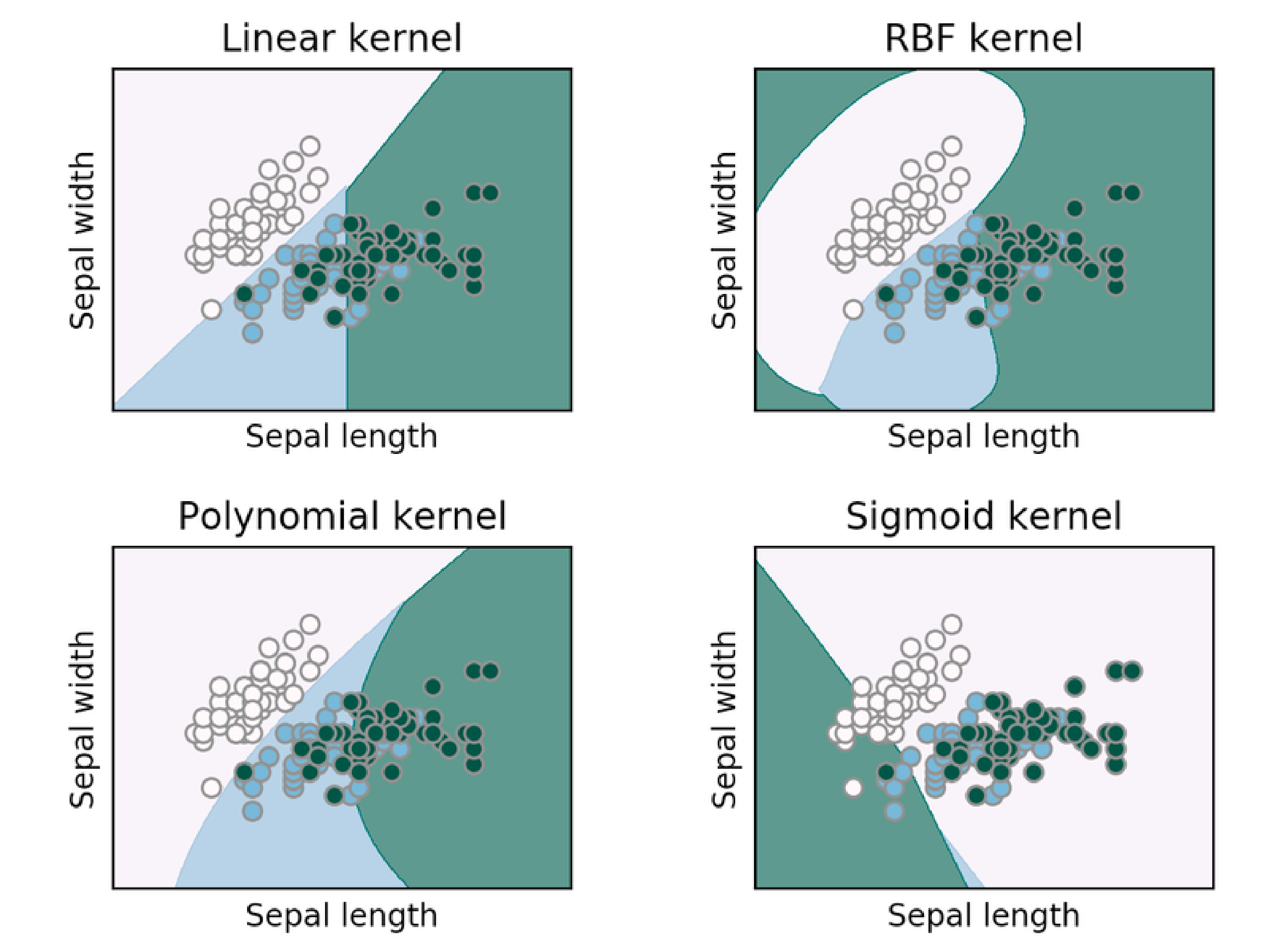
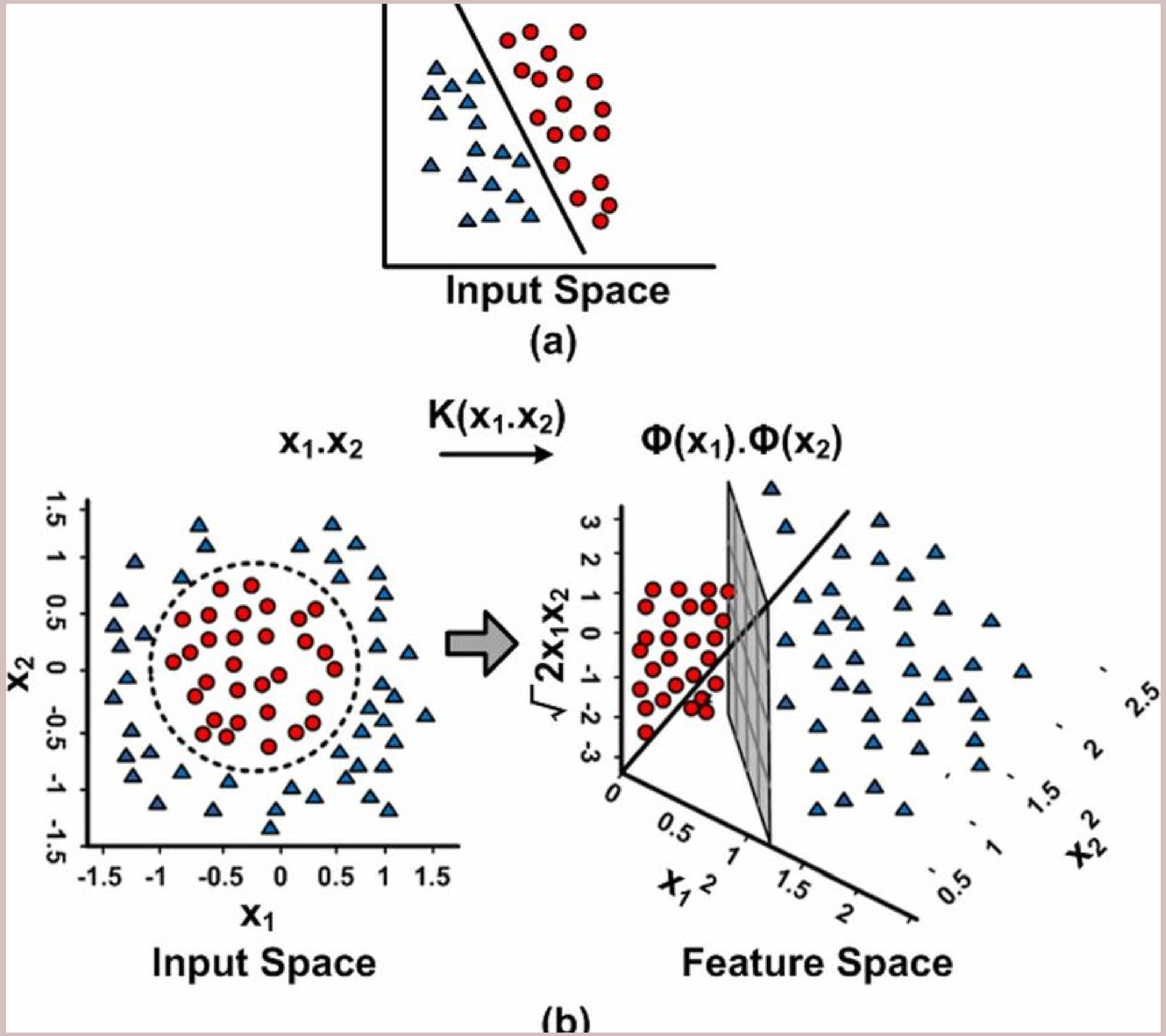
1. Exploring the parameters associated with different kernel functions



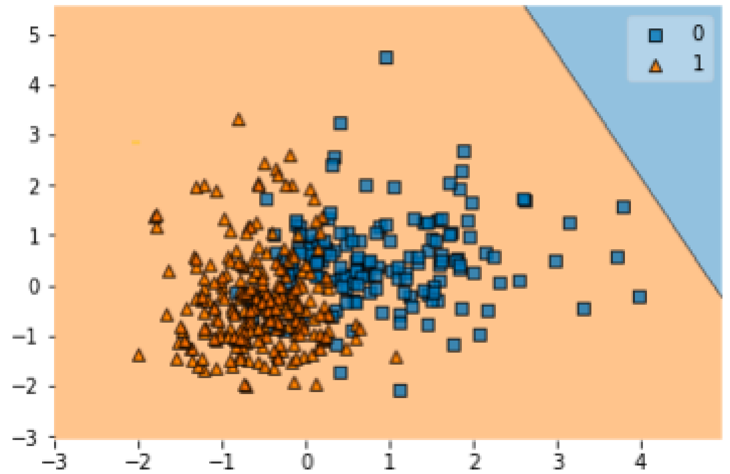
There are 4 main kernel in svm

- Linear kernel: It has no parameters. It simply calculates the dot product between feature vectors in the original space.
- Polynomial kernel: It has parameters such as degree (d) and coefficient of the polynomial term (c).
- Gaussian (RBF) kernel: It has a parameter called gamma (γ), which controls the width of the Gaussian curve.
- Sigmoid kernel: It has parameters like coefficient (c) and intercept (r).

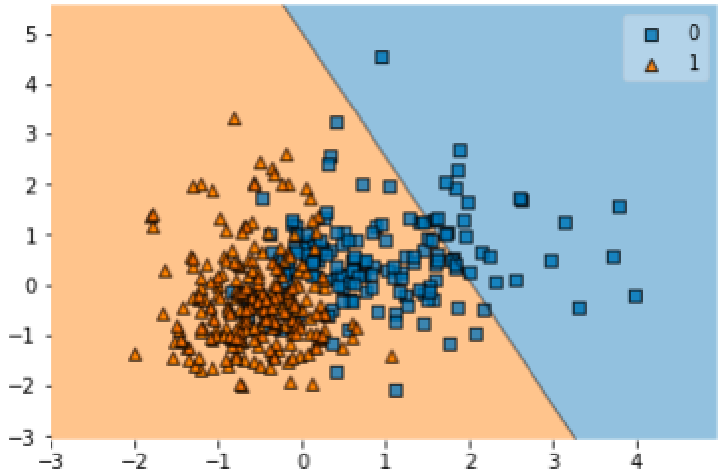
2. Understanding the effects of kernel parameters on SVM model complexity and generalization



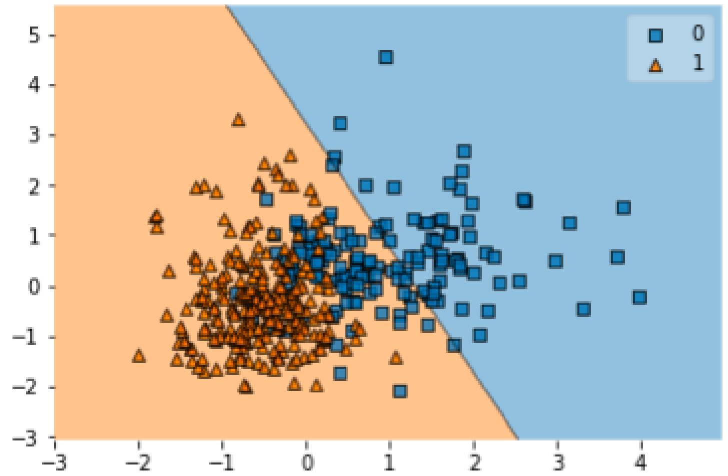
- Kernel parameters have a significant impact on the complexity and generalization ability of SVM models.
- Higher parameter values can lead to more complex decision boundaries, potentially resulting in overfitting the training data.
- Lower parameter values tend to produce simpler boundaries, which may underfit the data and result in poor generalization.
- The choice of kernel parameters should aim for an optimal balance between model complexity and generalization performance.



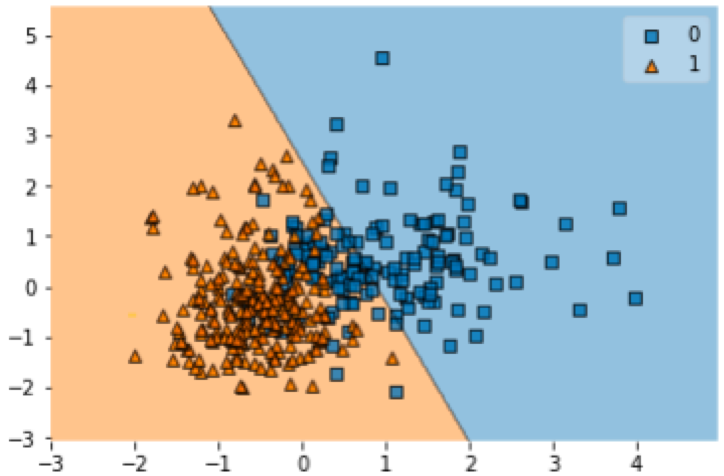
C = 0.001
Accuracy: 62.6%



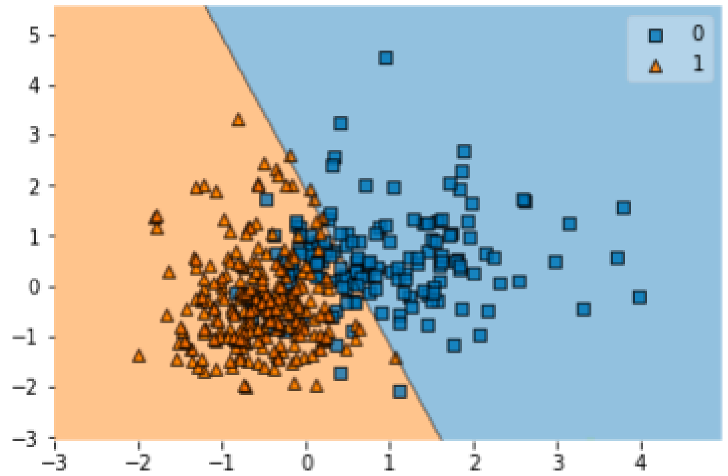
C = 0.002
Accuracy: 71.3%



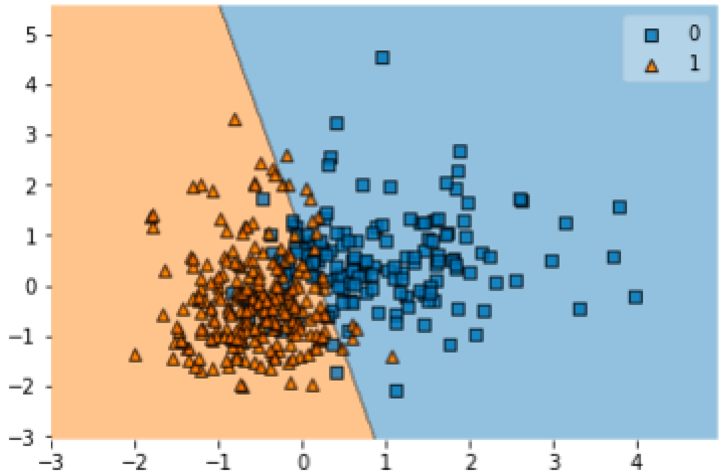
C = 0.003
Accuracy: 81.3%



C = 0.005
Accuracy: 81.7%



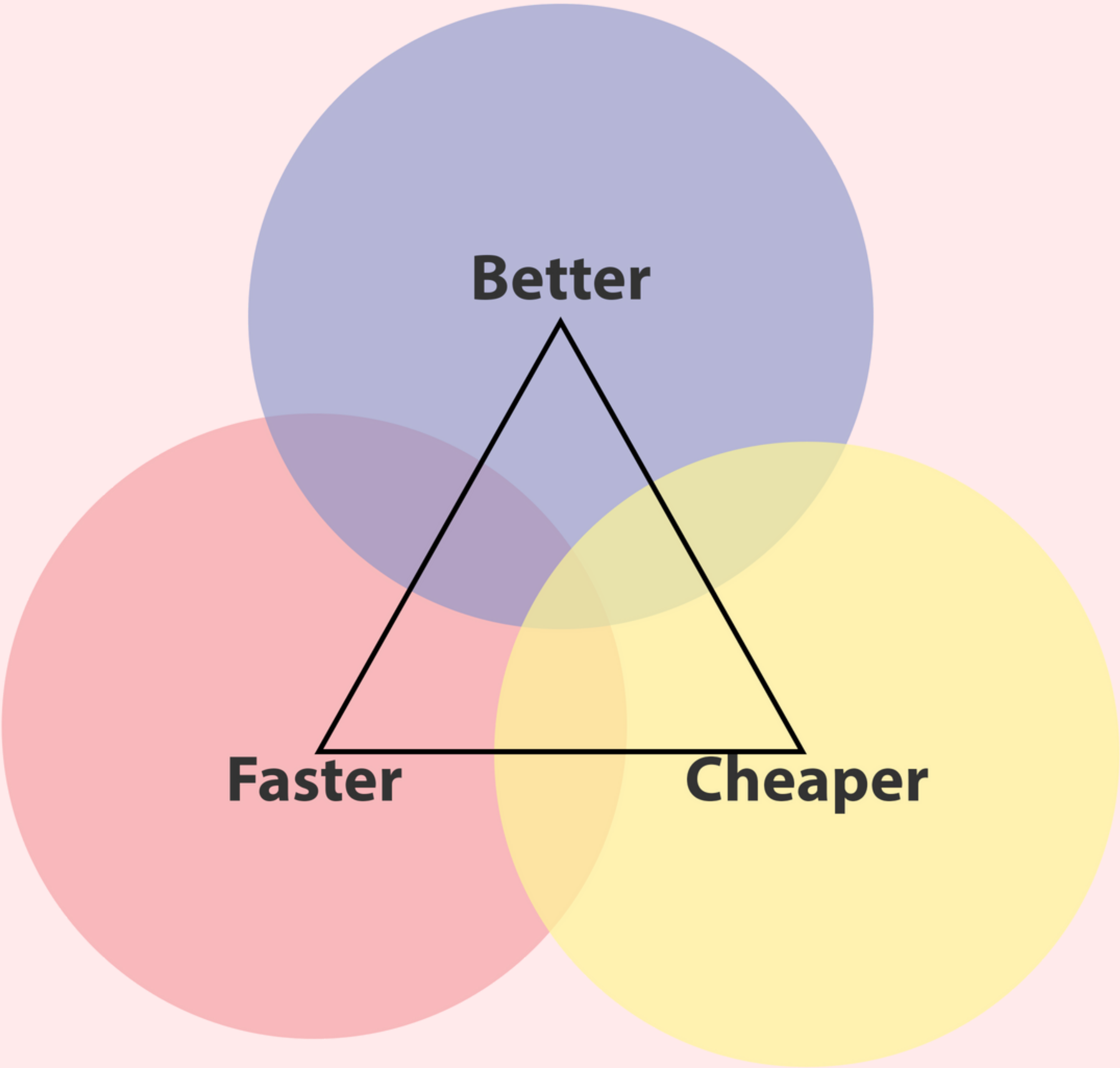
C = 0.01
Accuracy: 89.5%



C = 10.0
Accuracy: 90.1%

3. Techniques for selecting appropriate kernel parameters (e.g., grid search, cross-validation)

- Grid Search
- Cross-Validation
- Random Search
- Bayesian Optimization



4. Discussing the trade-offs and considerations when tuning kernel parameters in SVM

By carefully considering these trade-offs and utilizing techniques like grid search, cross-validation, random search, and Bayesian optimization, you can effectively tune the kernel parameters in SVM to achieve improved model performance.

- Computational Cost:
- Overfitting
- Interpretability
- Prior Knowledge

Thanks you For Watching