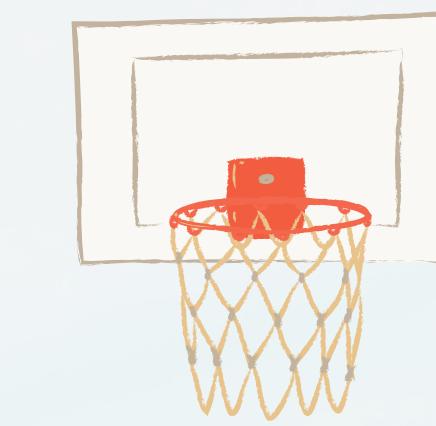


Champlt



Our Goal:

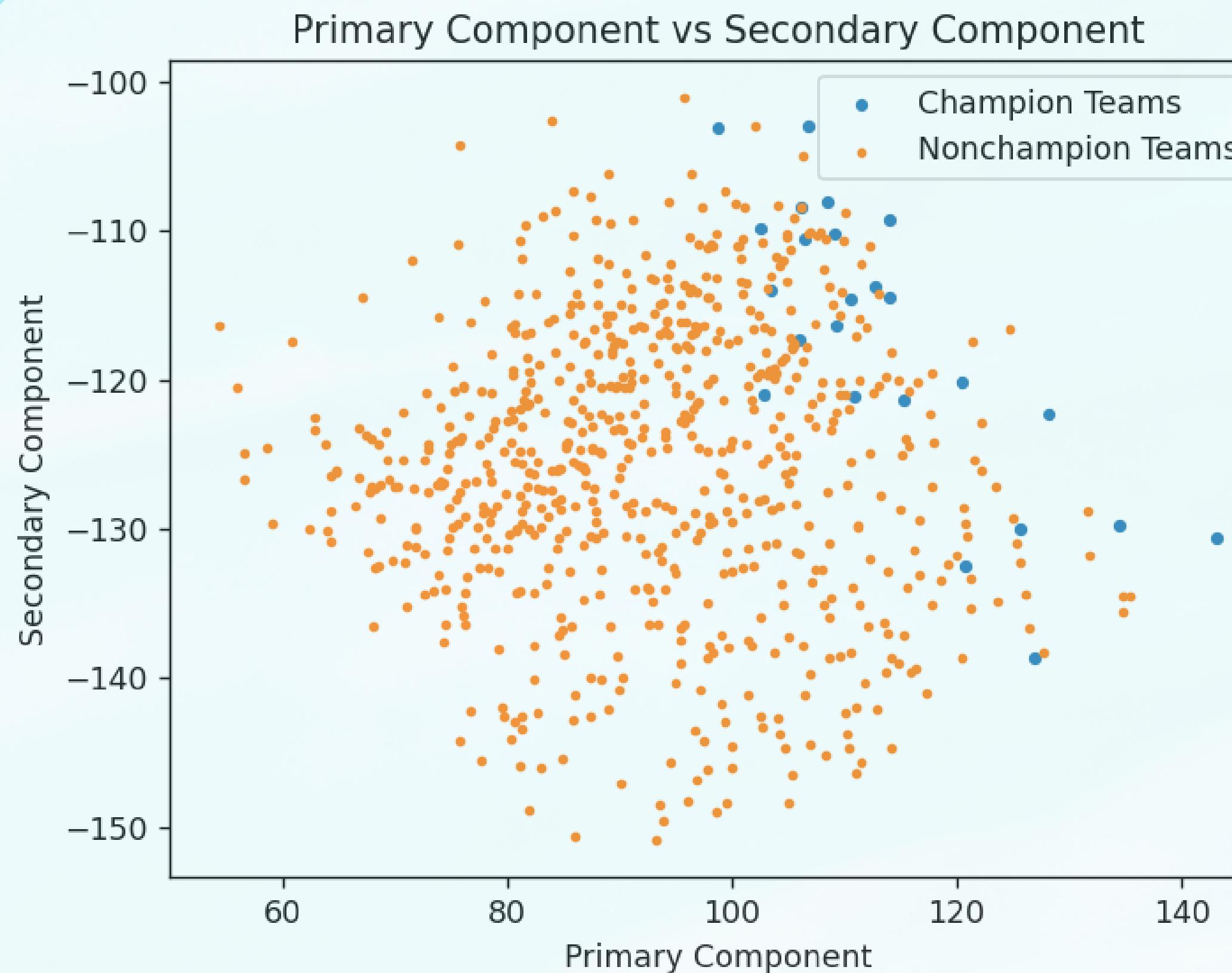
Use PCA and SVM to predict NBA champions

Introduction:

Over time, many have tried to predict the NBA champions through numerical methods. We want to find a new way to predict NBA champions using Principal Component Analysis to reduce dimensionality and SVMs to classify champions.

Principal Component Analysis:

- We used PCA to reduce our raw data's dimensionality to "Eigenstats"
- We then projected team data onto the "Eigenstats" components, thus creating "Eigenteams"

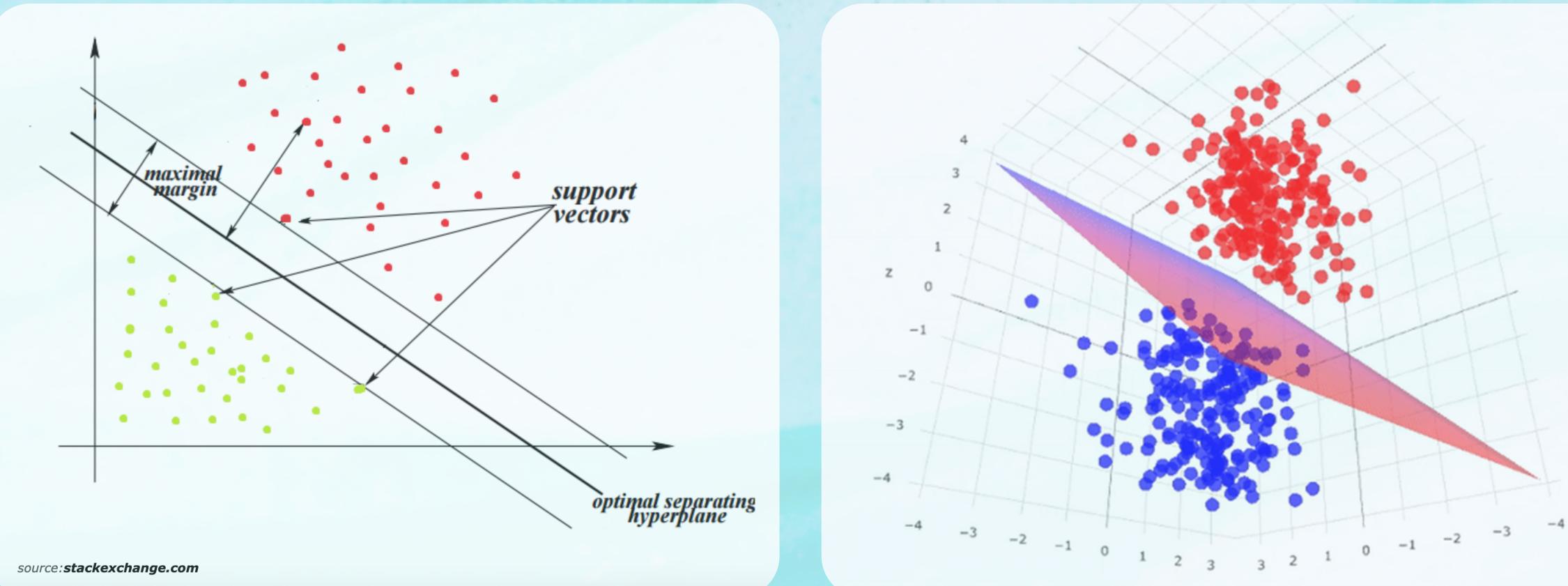


Design Process:

1. Gather and process NBA Team Statistics
2. Apply PCA on Team Stats
3. Project PCA components onto Team Stats
4. Apply SVM model to classify NBA champions
5. Tune hyperparameters to improve accuracy, precision, and f-score
6. Predict 2024 NBA Champion

Support Vector Machines (SVM):

- SVMs use machine learning to classify data
- SVMs project the data into a hyperplane (higher dimensional plane) to classify data
- To reduce computational load, an SVM uses a kernel function to simulate hyperplanes



Optimizing SVMs:

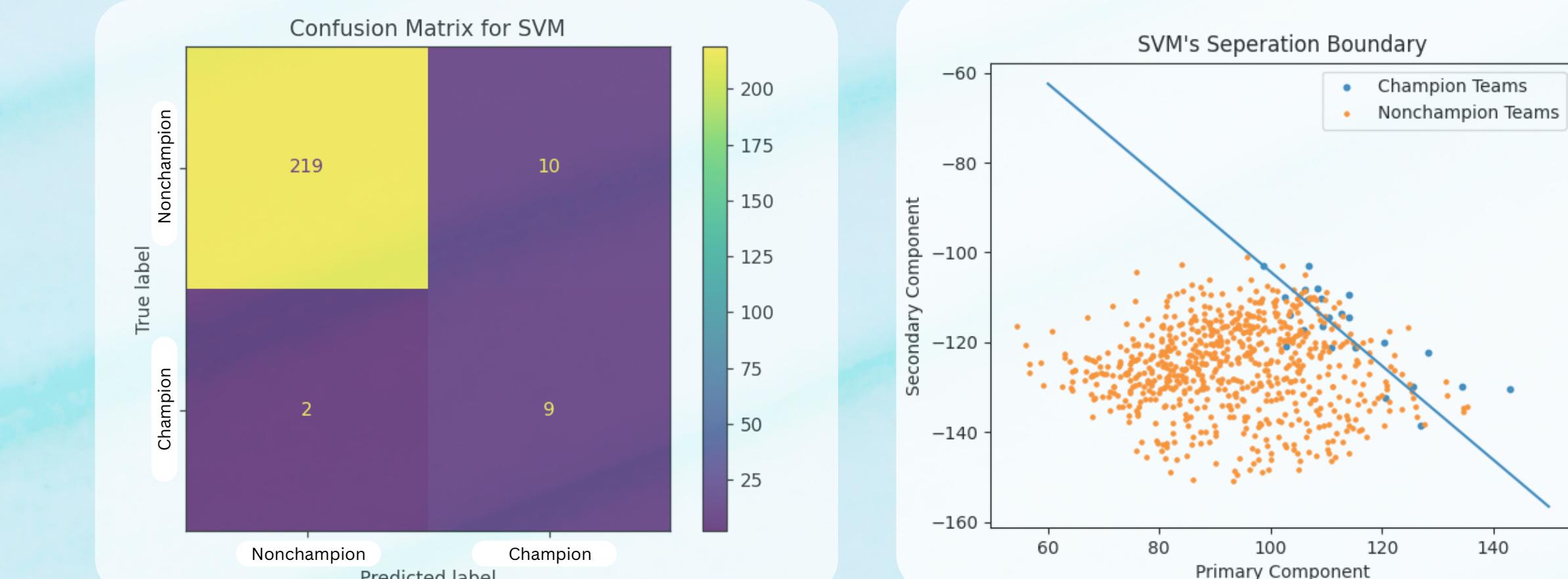
- We can tune the accuracy of an SVM by modifying the C hyperparameter
- We reduced data imbalance by oversampling and upweighting champion results

QEA Final Project

Rohan, Sam, Bill

Applying Support Vector Machines:

- To analyze results, we generated a confusion matrix and a separation boundary
- Conf. matrix sorts results into four categories, comparing predictions to actual data
- Our separation boundary splits teams as champion or non-champion



- Our algorithm correctly predicted ~80% of all NBA champions in test set
- 50% of our SVM's champion predictions were not champions

SO WHO'S THE NEXT 2024 NBA CHAMPION?

When inputting the 2023-24 stats into our algorithm, Champlt predicts that the 2024 champion will be....

