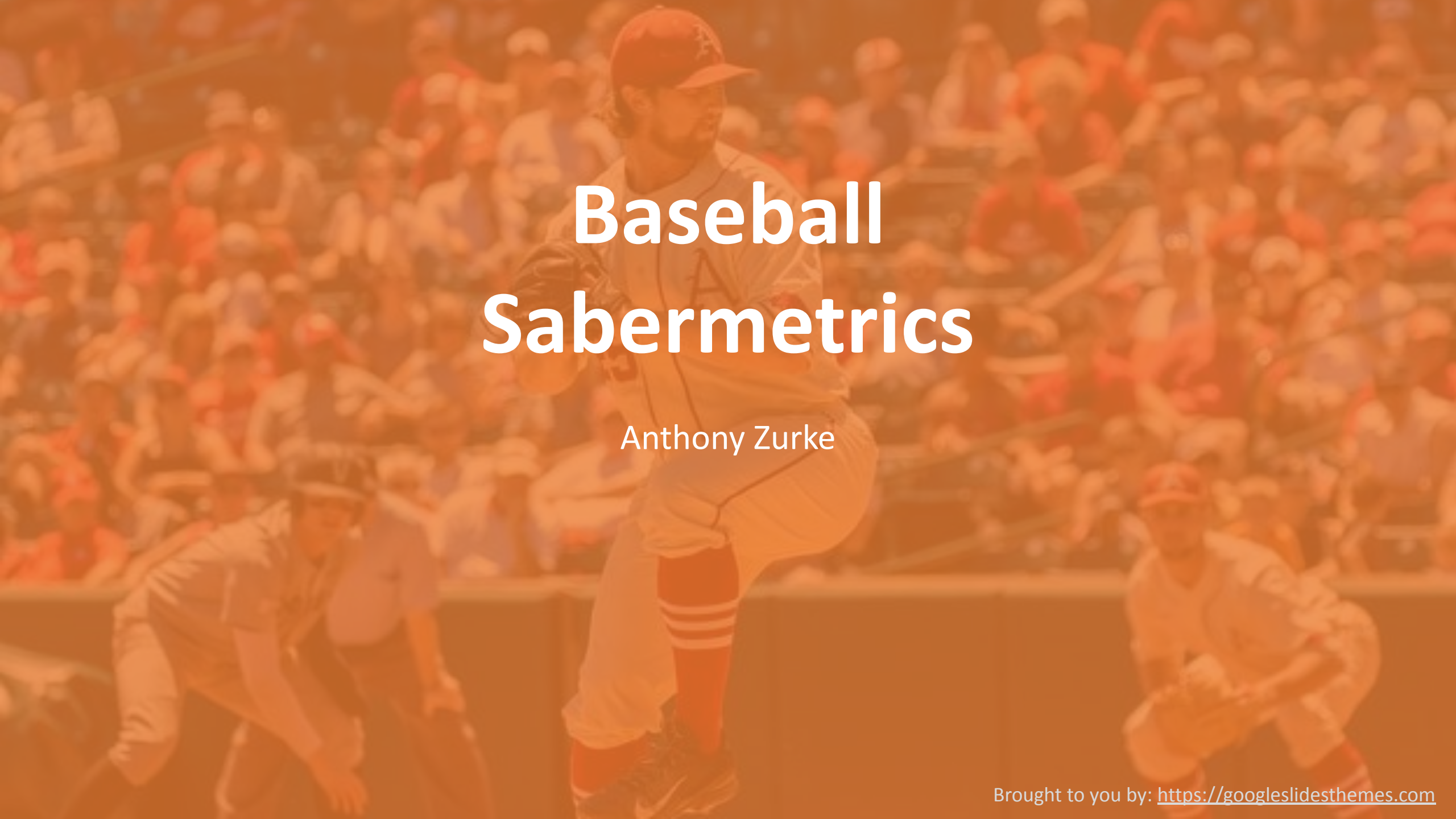
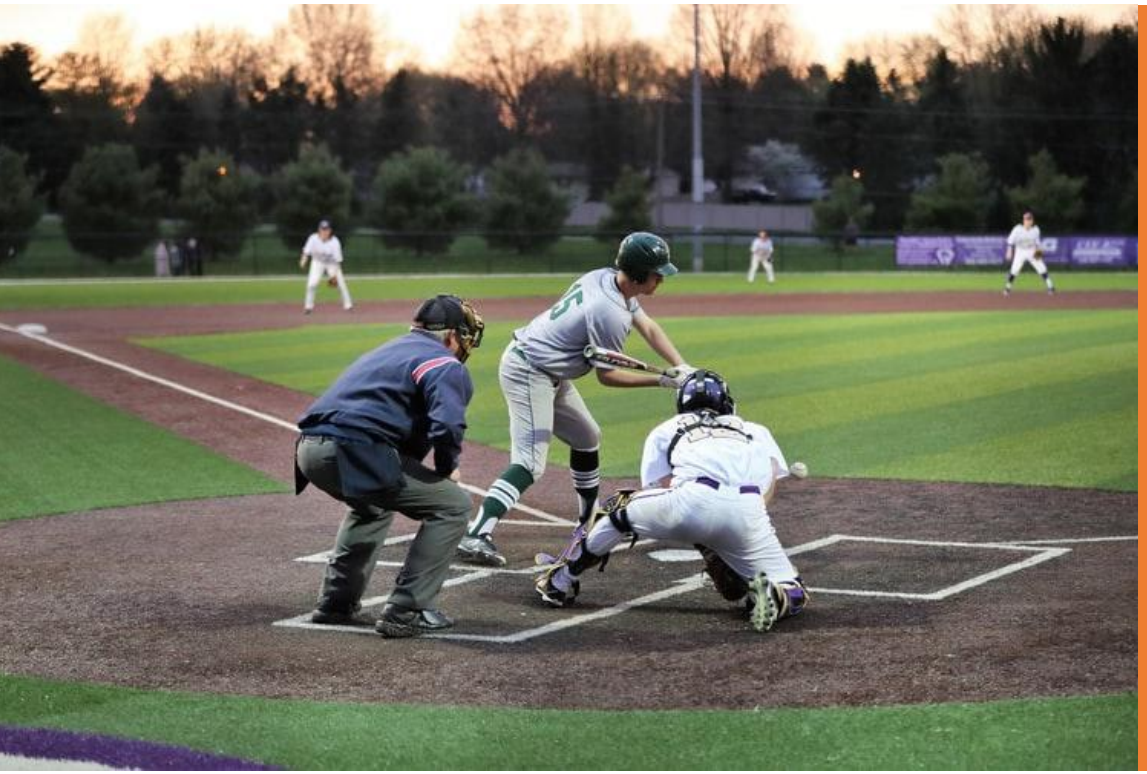


Baseball Sabermetrics

Anthony Zurke

Introduction and Problem Statement



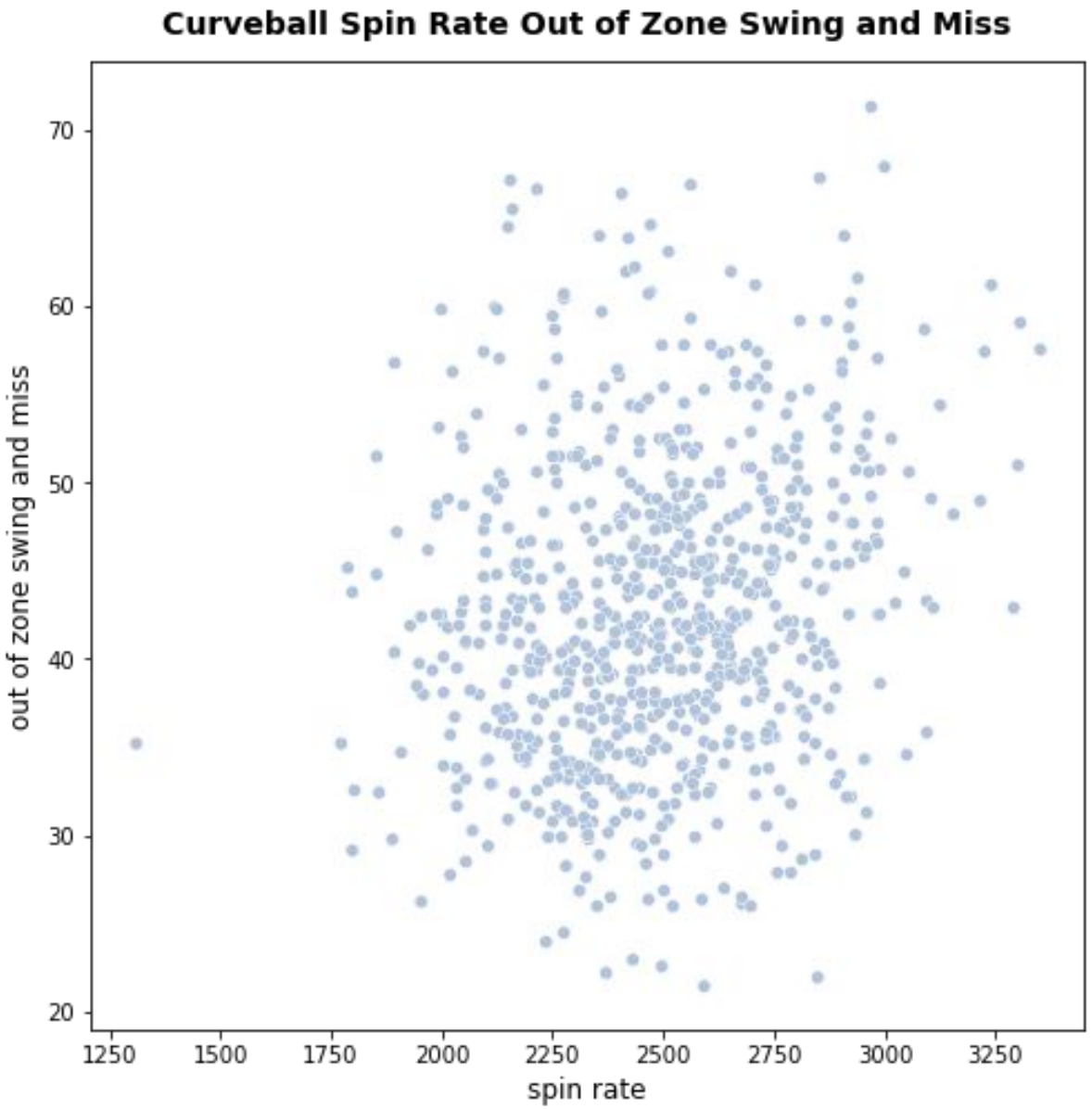
In baseball, a pitcher's success is heavily determined on the outcomes of a batted ball, and a swing and miss. Finding ways to increase success can come in many forms, velocity, spin rate, horizontal, and vertical break all play a key role.

I’ve used advanced sabermetrics from pitcher’s from the past three seasons (2019-2021) to be able to asses how to use this data to find in-game success.

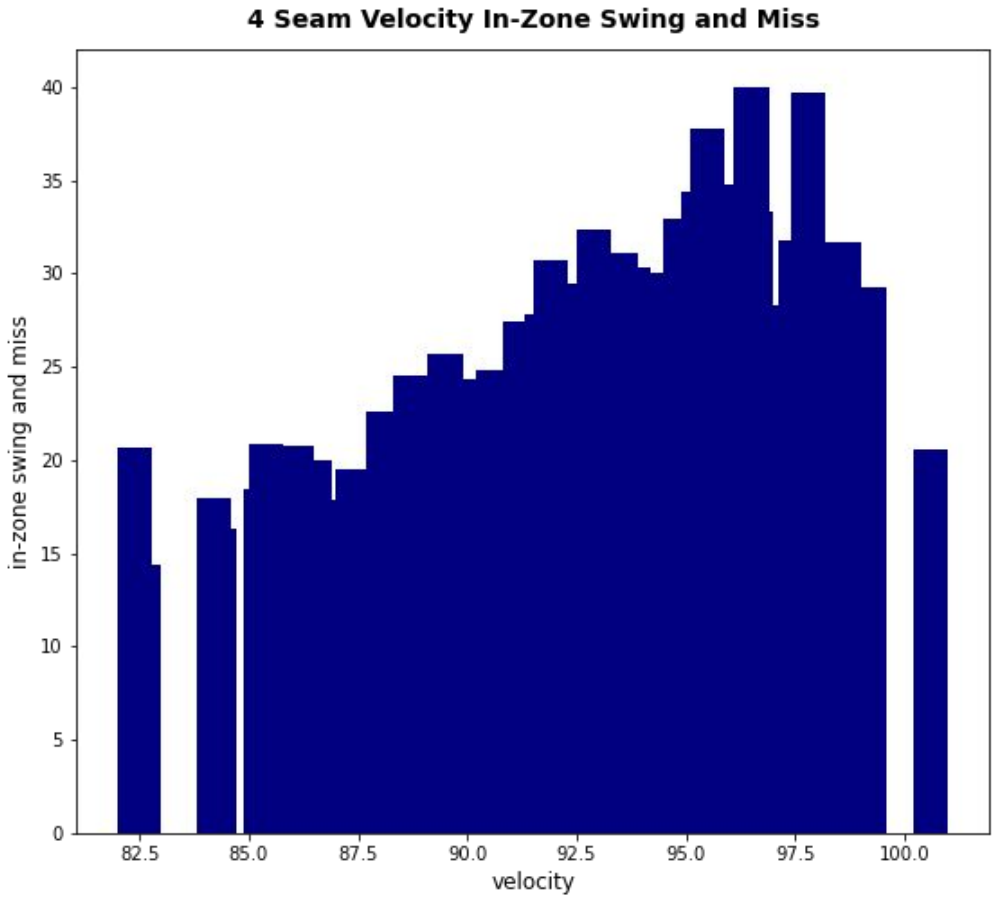
Data Gathering and Cleaning

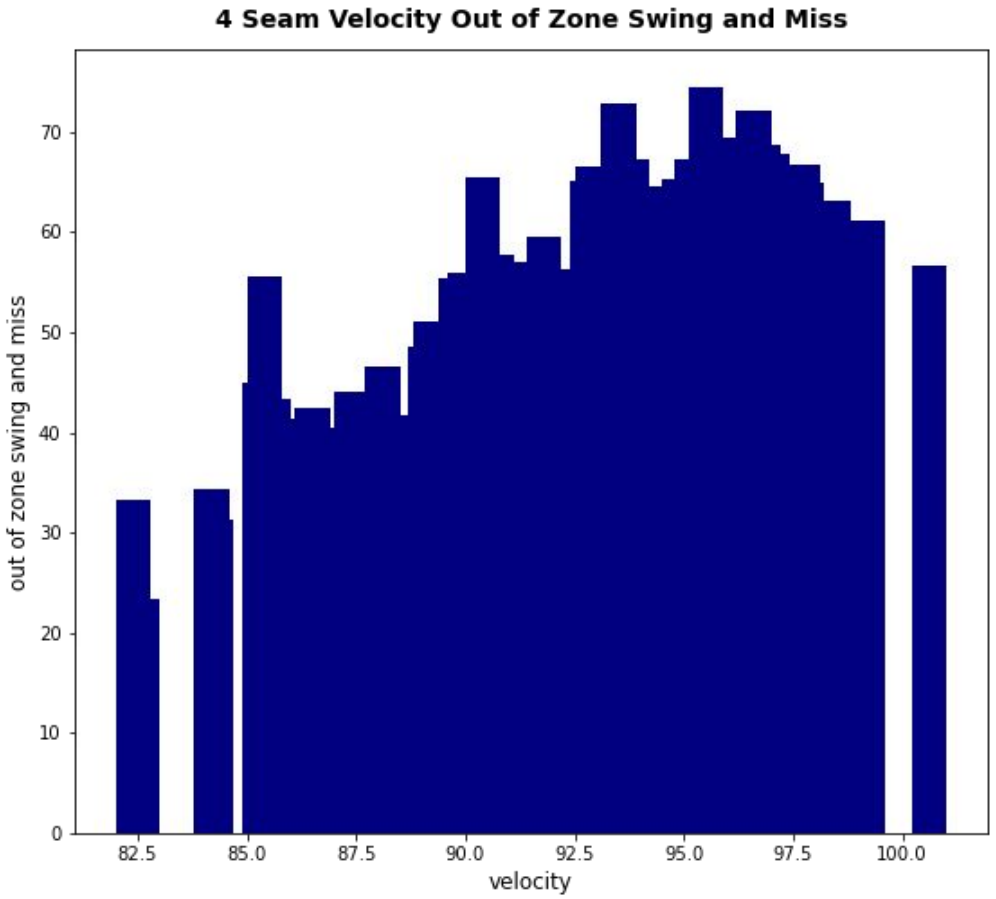
- All pitchers used had a minimum batters faced of 200 for the 2019 and 2021 data and in the 2020 data minimum of 75 batters faced due to a shortened season,
- pitch types: 4 seam fastball, slider, curveball, changeup, and cutter.
- Imputed nulls with 0

Fastball Velocity and Spin Rate

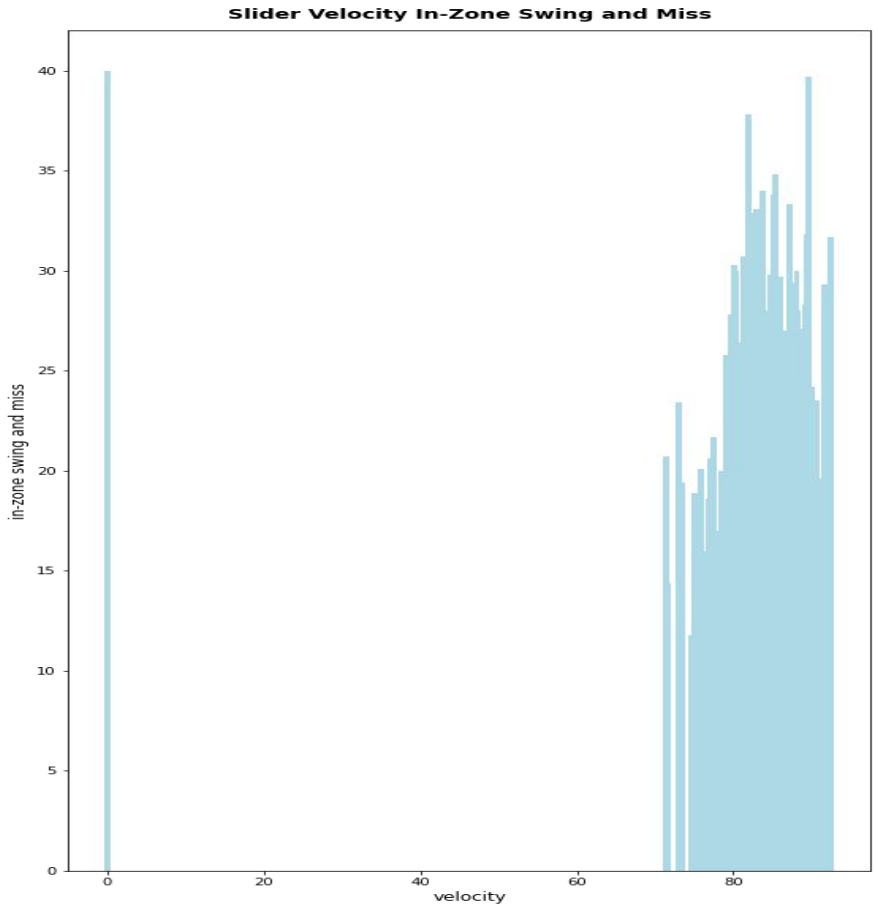


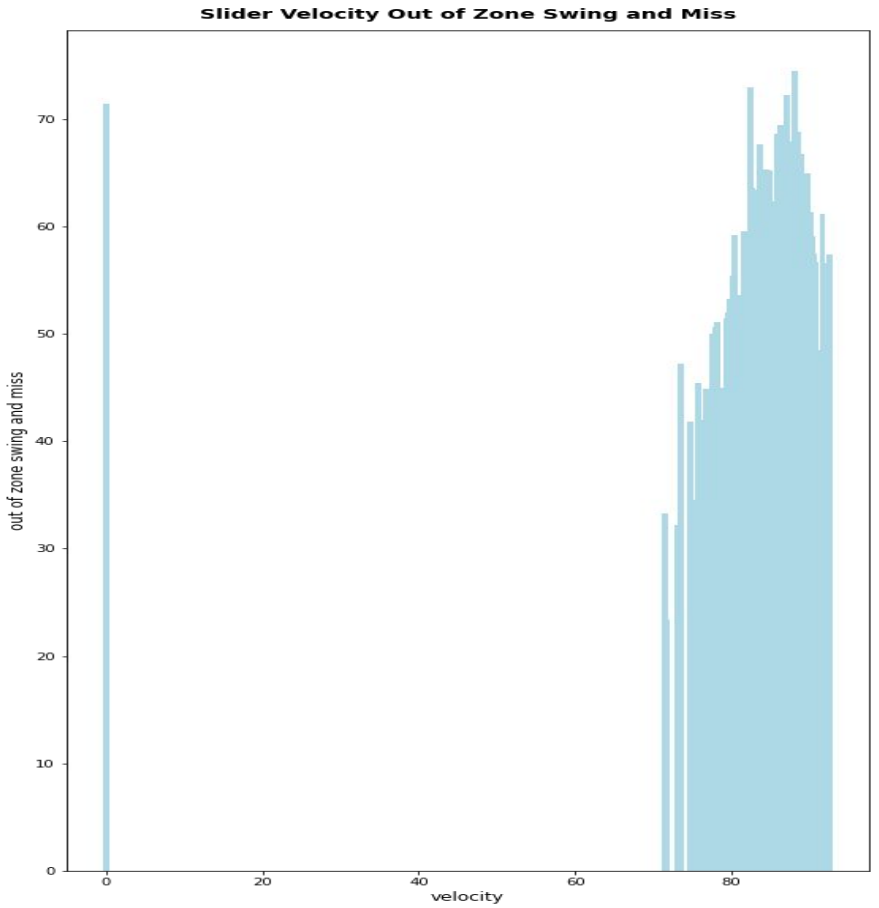
Fastball Velocity and Spin Rate



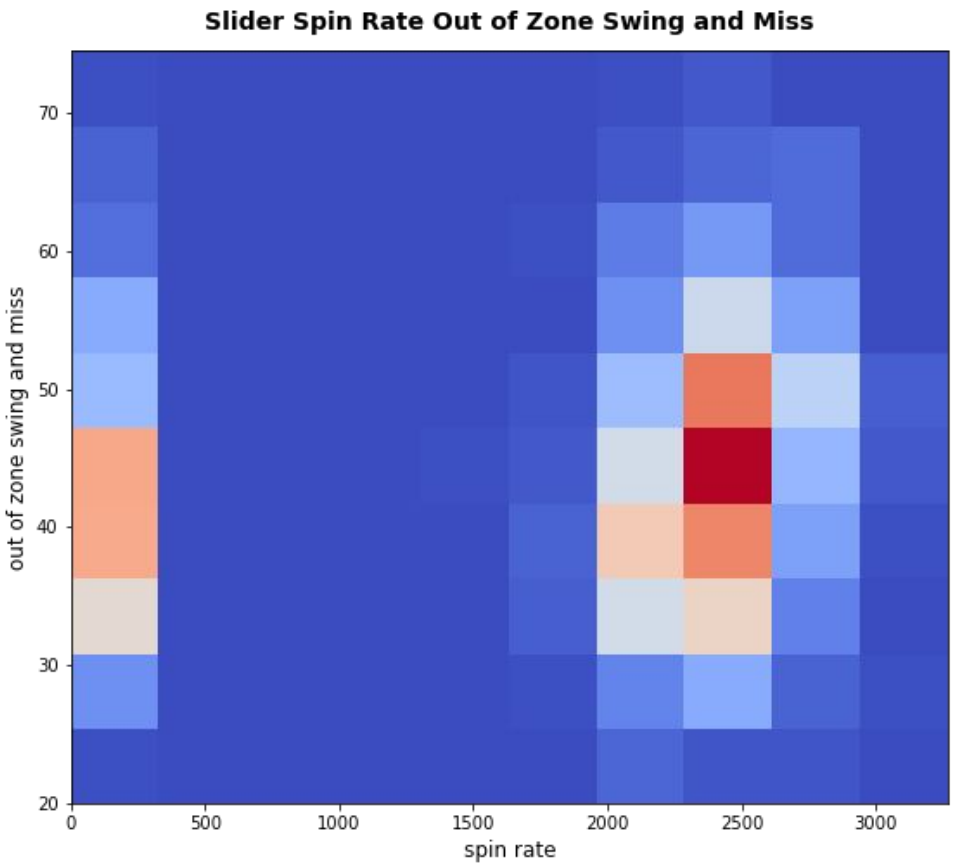


Slider Velocity and Spin Rate

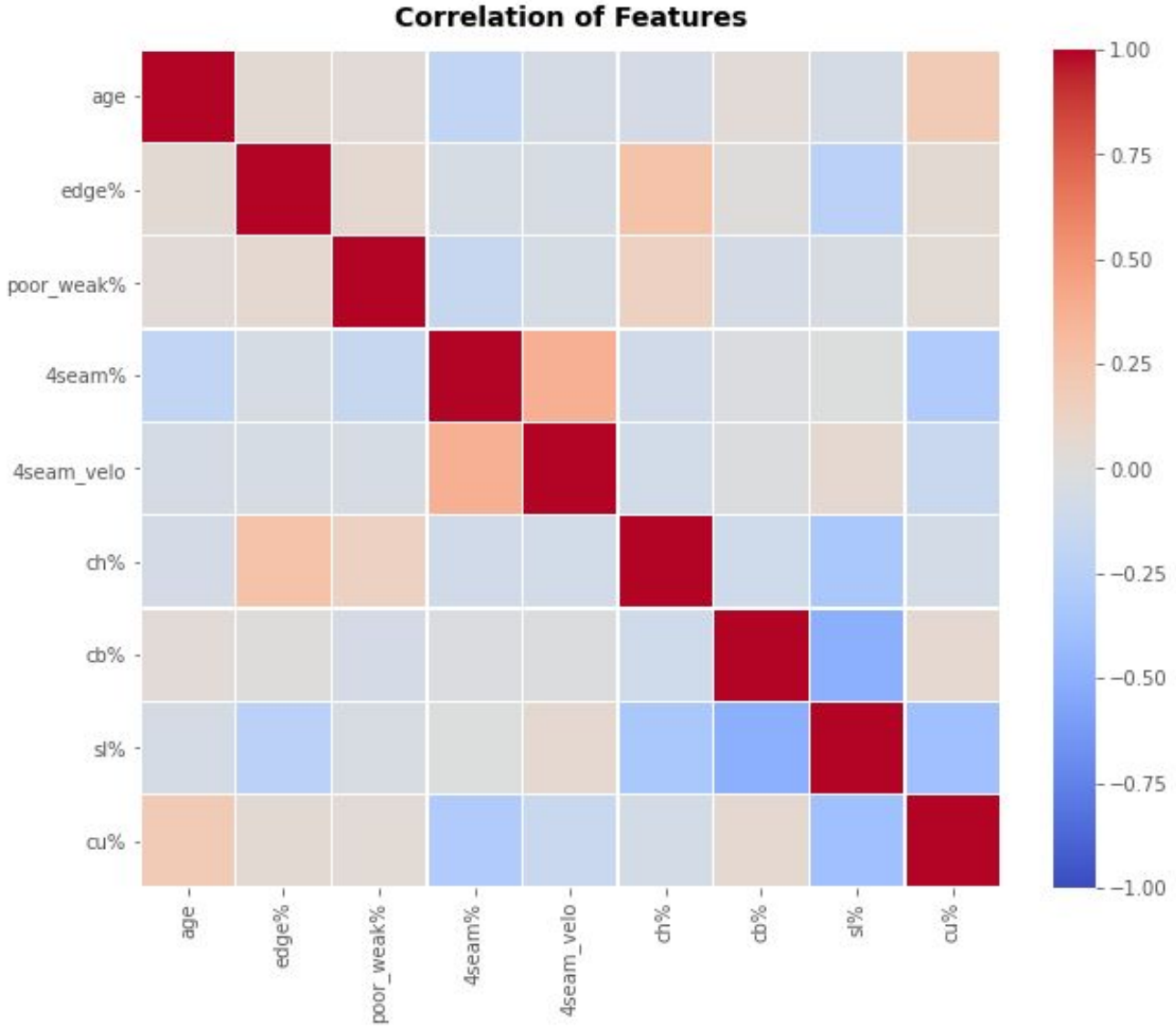




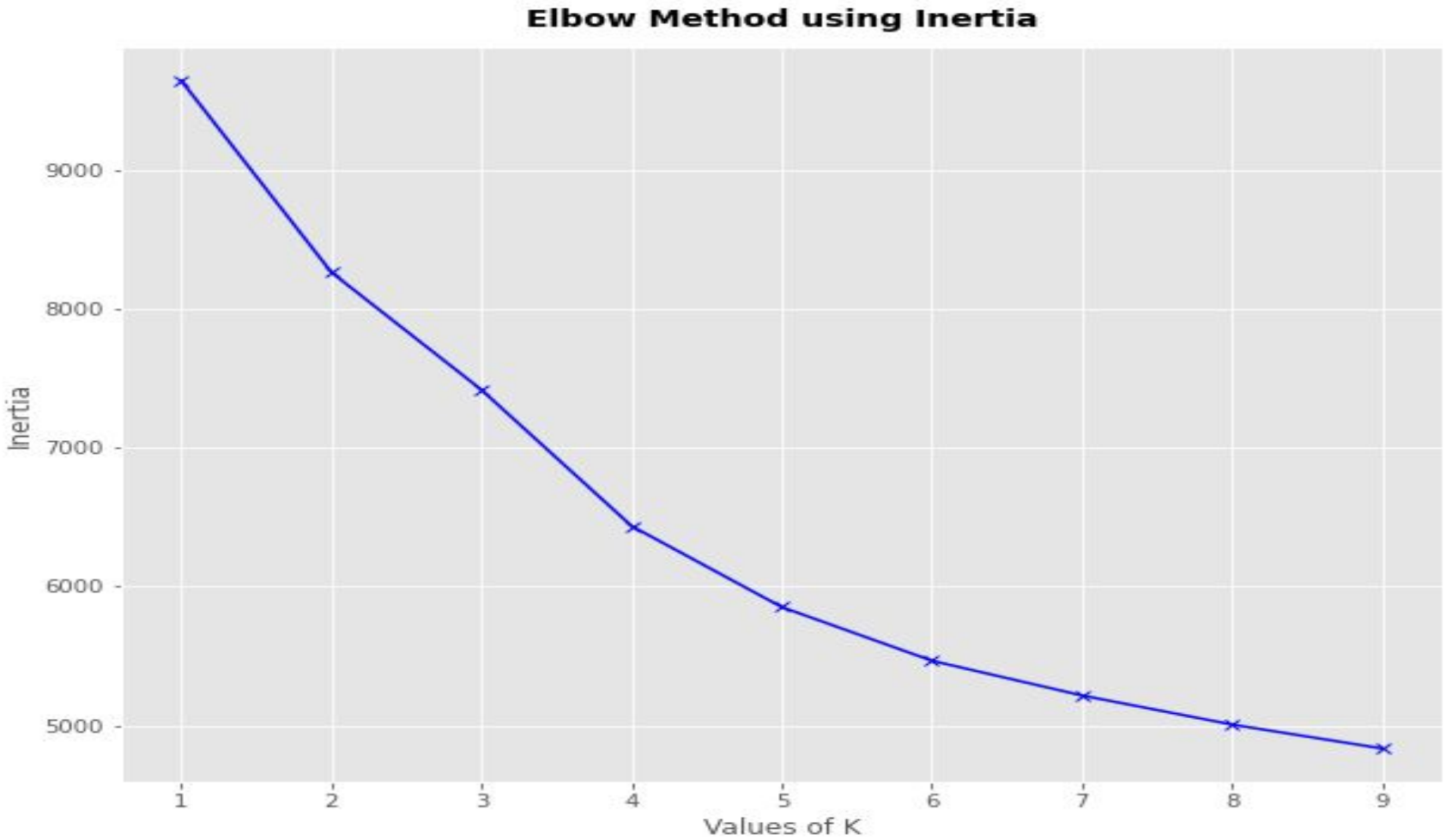
Slider Velocity and Spin Rate



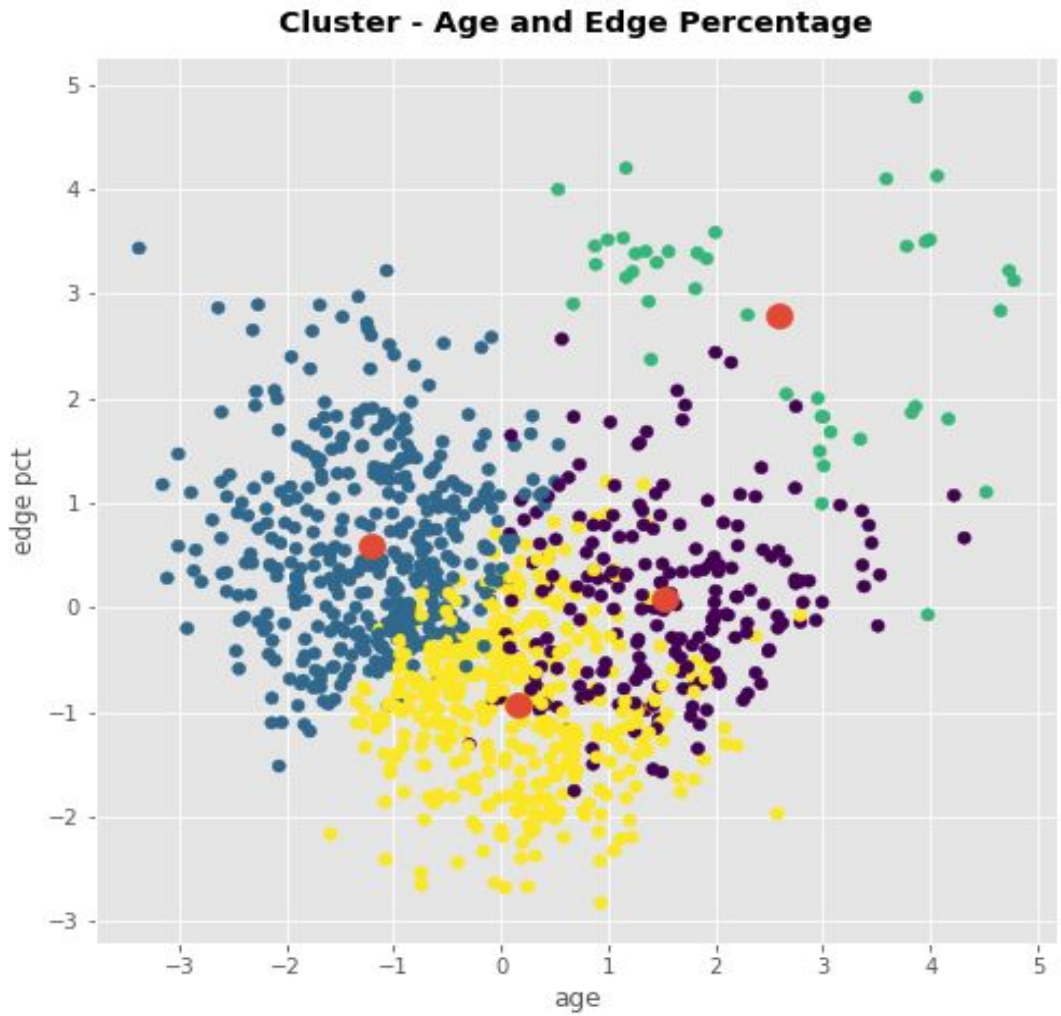
Heatmap of Features

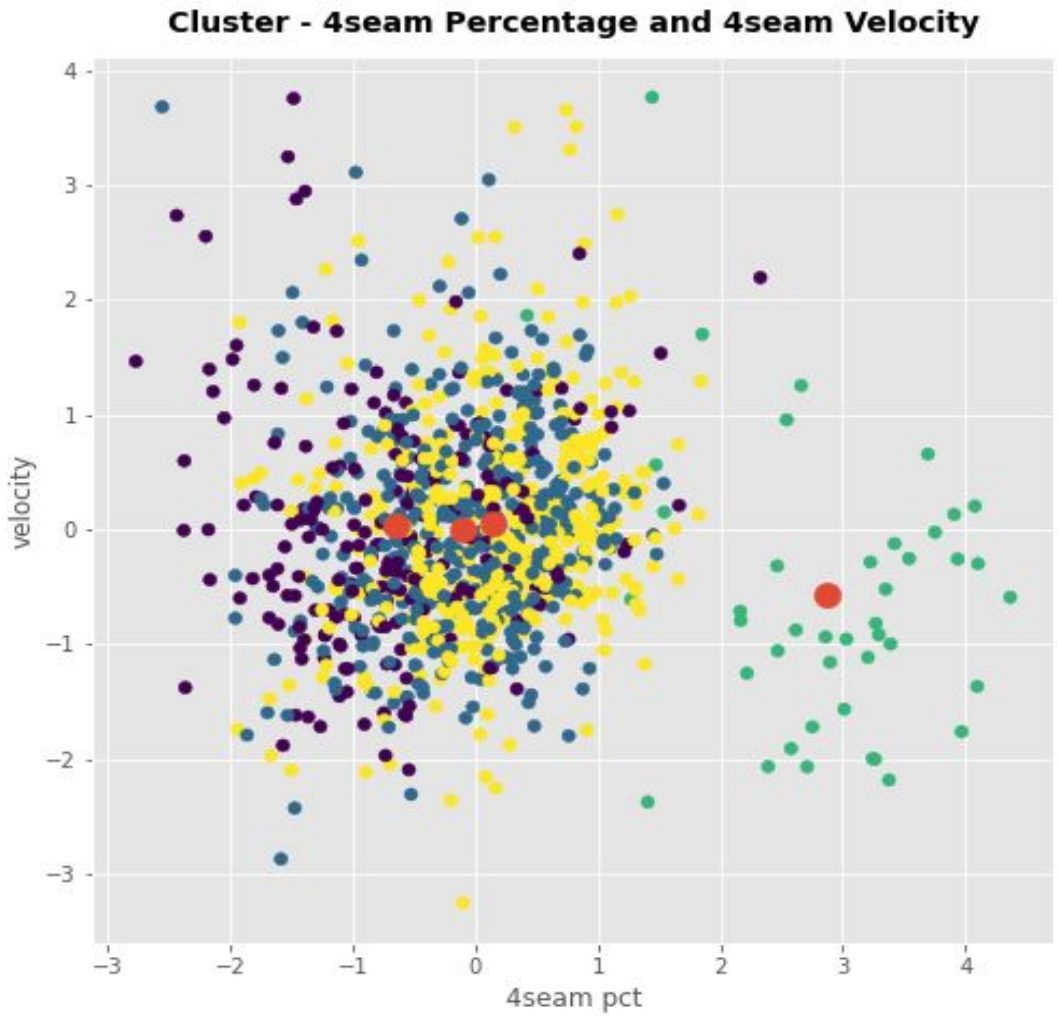


Determining Clusters

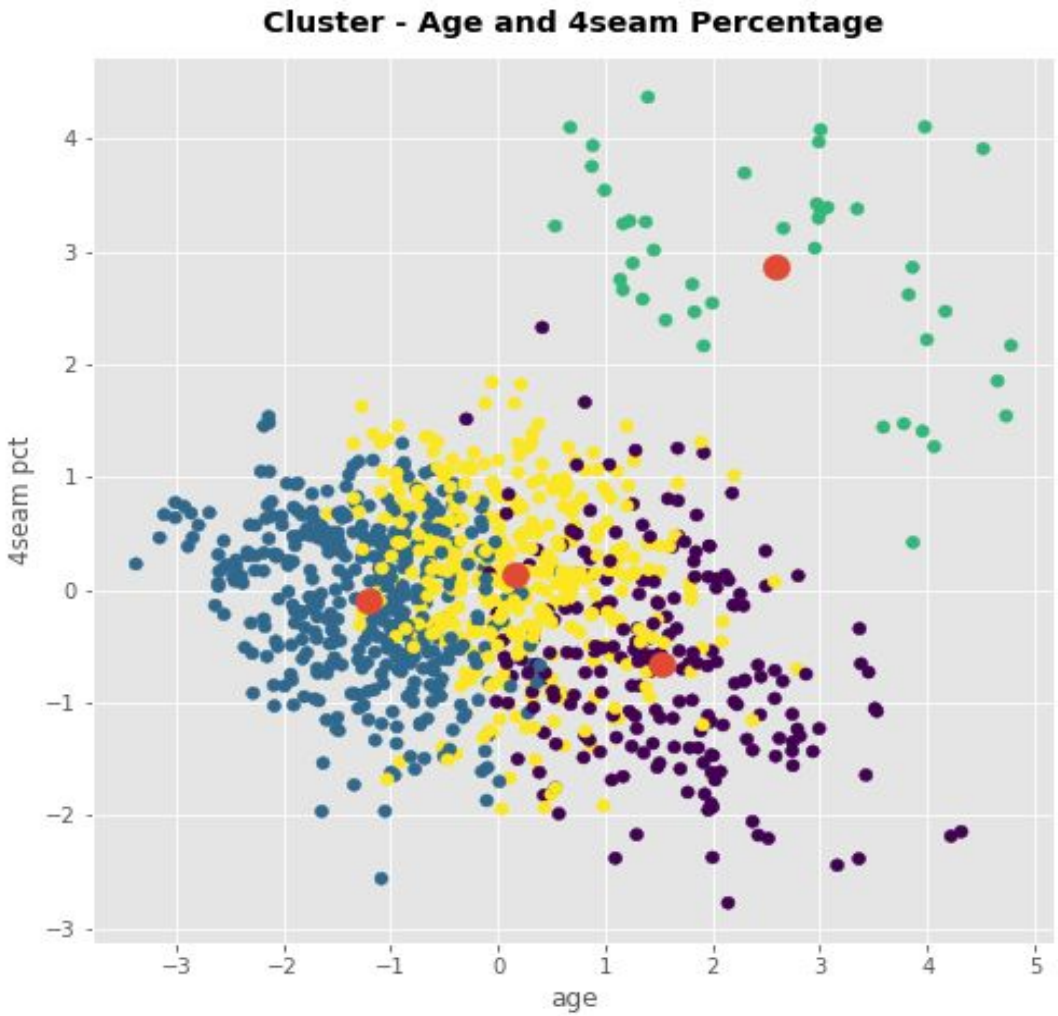


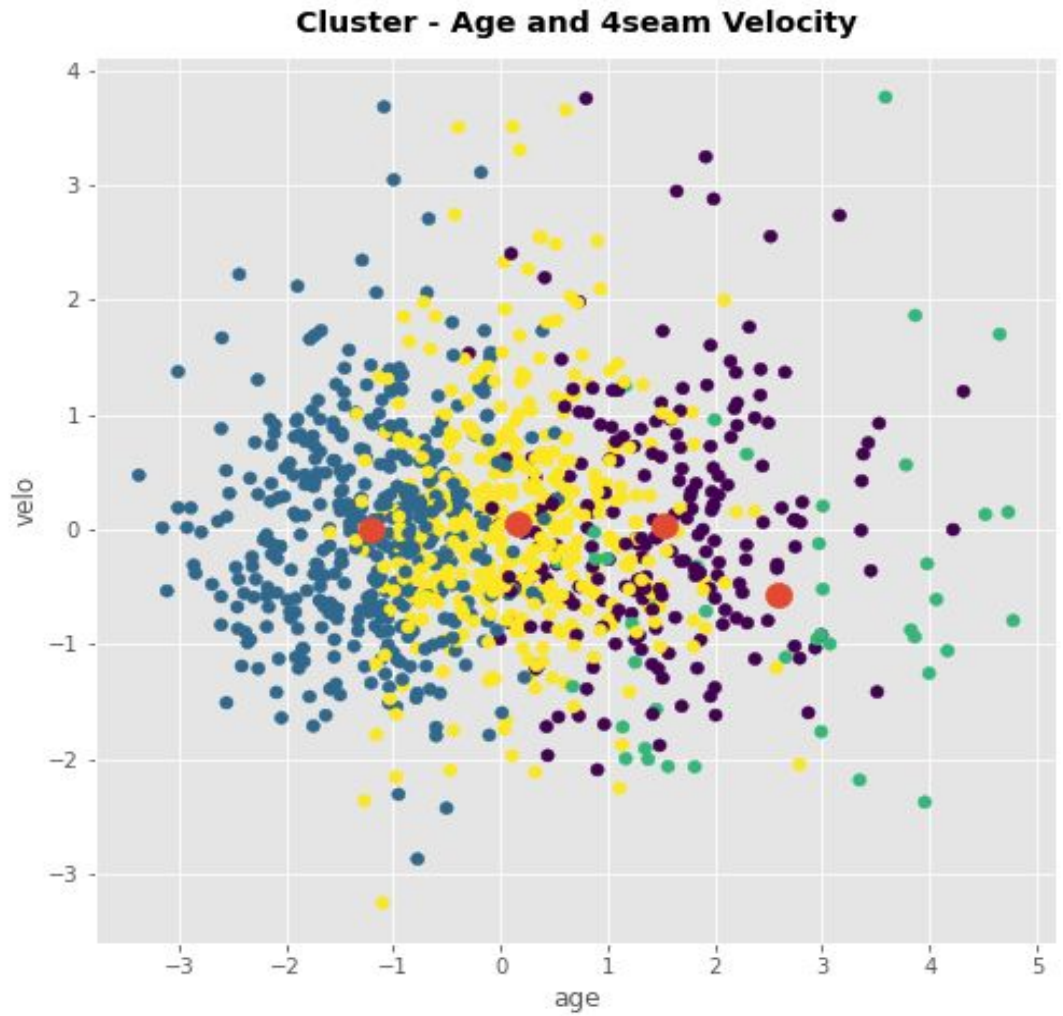
Model Performance





Model Performance





Model Evaluation

label	Cluster 1	Cluster 2	Cluster 3	Cluster 4
age	31.64	28.8	29.33	27.81
edge %	42.74	41.52	42.68	43.2
poor/weak %	4.42	4.07	4.67	4.27
4seam %	22.34	37	0	43.78
4seam velo	92.32	94.02	0	93.18
ch %	9.4	5.73	13.37	16.63
sl %	4.82	33.2	14.76	10.72
cu %	26.4	0.93	15.27	2.62
cb %	14.95	4.34	10.13	14.64
throws	0.68	0.79	0.53	0.7

Conclusion & Recommendations

The generalizations I made were control what you can control. Instead of attacking hitters with their weaknesses, attack with your strengths.