DAVID'S KING Analytics LLC

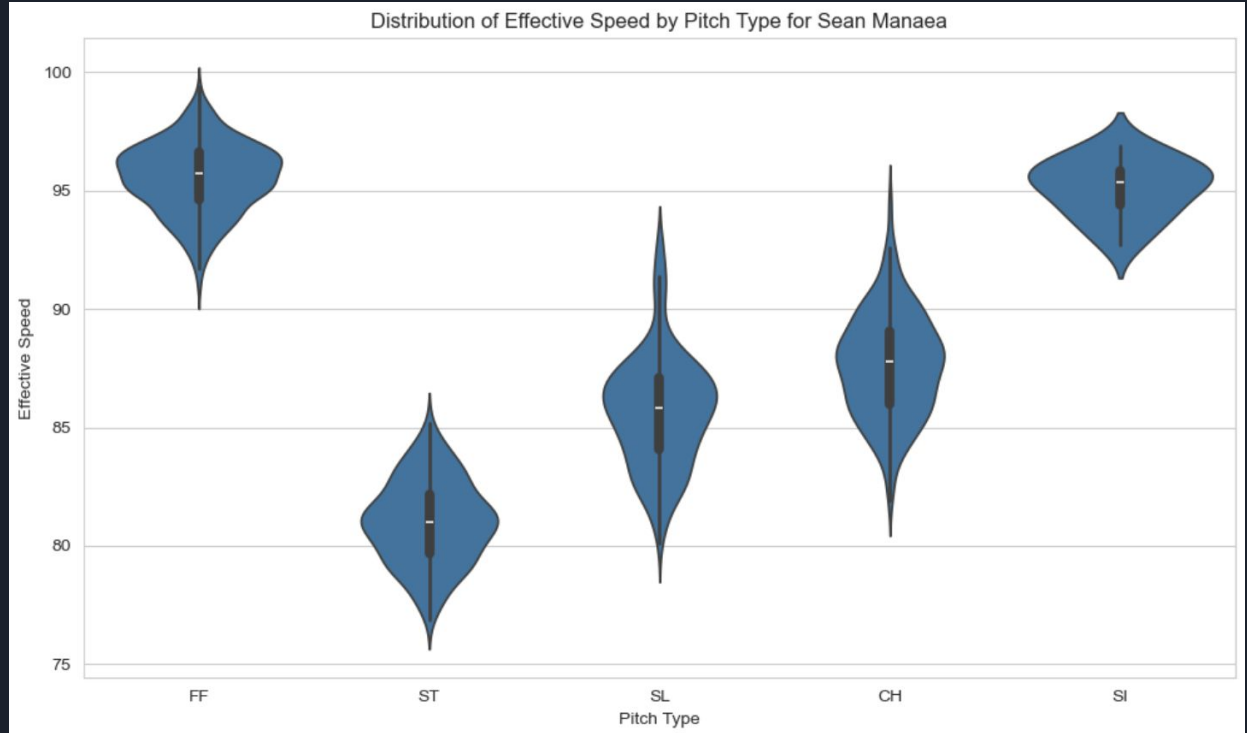## Pitch Speed Predictions

Today's Mission

1. How Accurately can our team predict pitch type and pitch speed
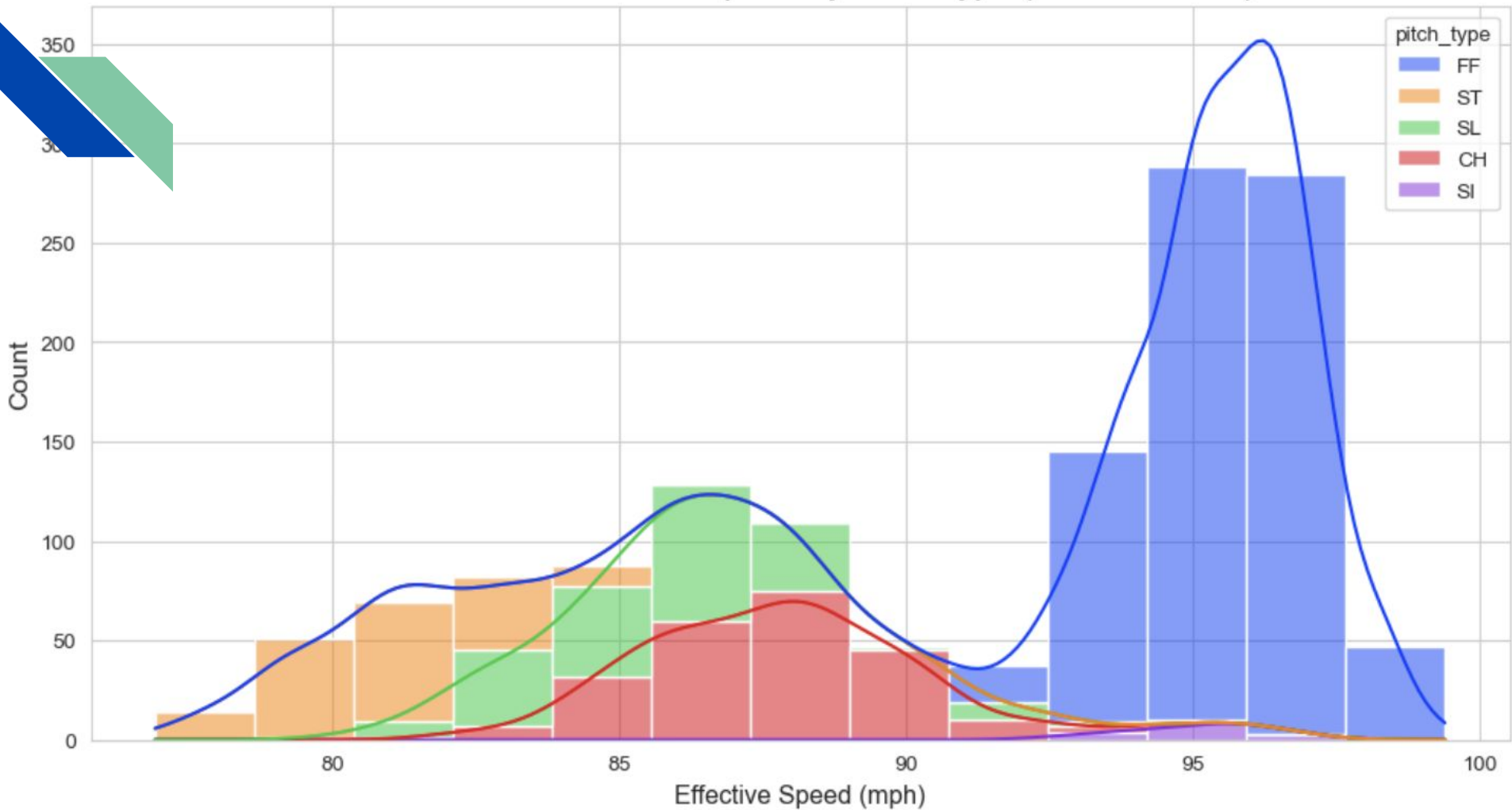
2. Can We beat DraftKings

Domain Knowledge

MLB Averages

- FF = Four Seam Fastball: 92-100 mph
- ST = Split Finger Fastball: 85 - 89 mph
- SL = Slider: 80-85 mph
- CH = Change Up: 80 - 85 mph
- SI = Sinker: 90 - 95 mph

Distribution of Effective Speed by Pitch Type for Sean Manaea

Distribution of Effective Speed by Pitch Type (Sean Manaea)

Feature Importance

Feature Importance for Predicting Pitch Type Including Interaction Terms
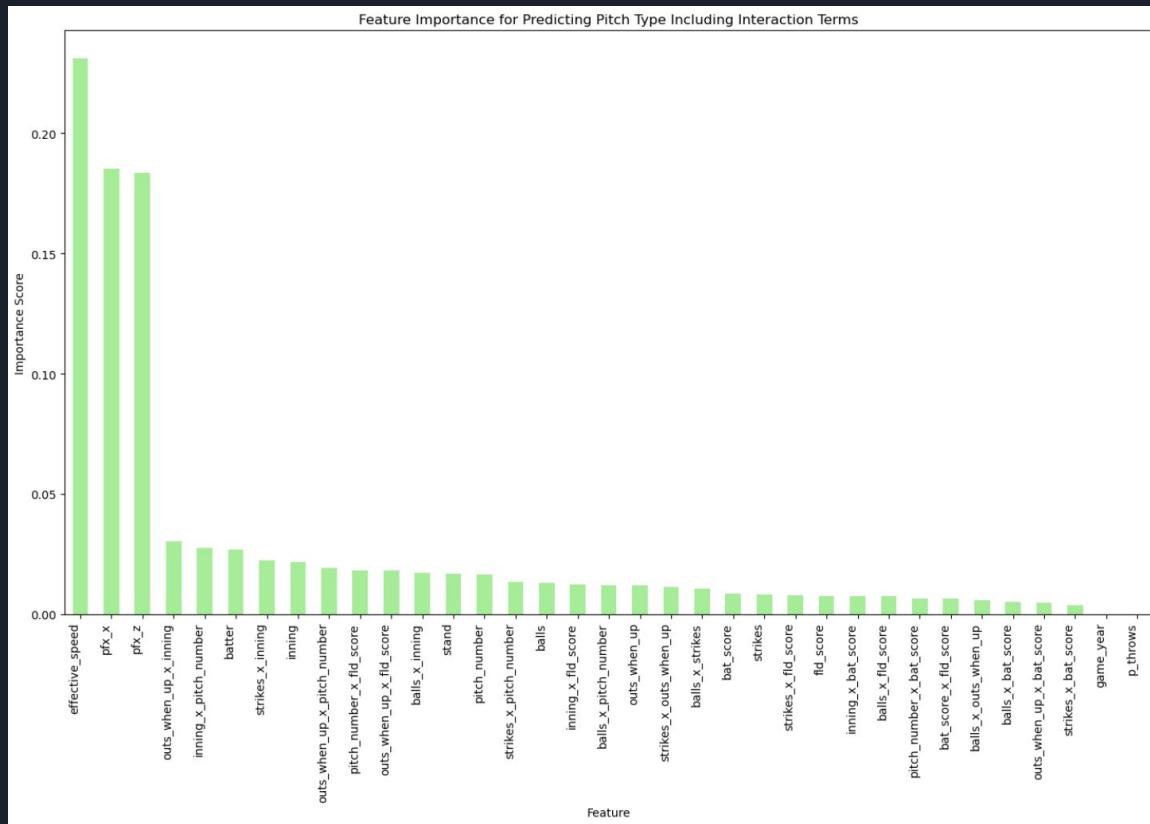
Algorithms Ability

```python
input_data = pd.DataFrame([{
    'stand': le_stand.transform(['R'])[0] if 'R' in le_stand.classes_ else -1,
    'p_throws': le_p_throws.transform(['L'])[0] if 'L' in le_p_throws.classes_ else -1,
    'balls': 0,
    'strikes': 0,
    'game_year': 2023,
    'outs_when_up': 2,
    'inning': 9,
    'pitch_number': 0,
    'bat_score': 3,
    'fld_score': 3,
    'pfx_x': 0.2,
    'pfx_z': 0.2,
    'batter': 621566
}])
```

Algorithms Ability

	Pitch Type	Probability	Predicted Effective Speed
0	pitch_type_CH	0.25	86.031
1	pitch_type_FF	0.17	92.930
2	pitch_type_SI	0.04	94.328
3	pitch_type_SL	0.54	85.450

Iterations and Findings

Model 1:

- R²: 0.99442606769338391
- RMSE: 1.760702848790543
- MAE: 1.548531049324302
- F - score: 1.00

Model 2:

- R²: −0.44336510930577977
- RMSE: 1.7254936109046068
- MAE: 1.4557339371155165
- F - score: 1.00

Recommendations

1. Tune parameters to reduce overfitting

2. Include more relevant Features
   a. Image Training models

3. Restart from scratch

The Test

Yankees vs Dodgers