Shiny App User Guide

advance Scouting for hitters

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# **Types of Filters**

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Figure , Filters

## **Type of Filters Explained**

1. **Select Team**:
   * Purpose: Allows the user to choose the team for which they want to view pitching data.
   * How to Use: Click on the dropdown menu and select the desired team (e.g., "TB" for Tampa Bay).
2. **Select Pitcher**:
   * Purpose: Filters data to a specific pitcher within the selected team.
   * How to Use: After selecting a team, use the dropdown to select a pitcher (e.g., "Littell, Zack"). The list will update based on the chosen team.
3. **Select Date Range**:
   * Purpose: Sets the time limit for which pitching data will be analyzed.
   * How to Use: Enter the start and end dates (e.g., from 2024-03-28 to 2024-09-29). Ensure the range covers the period of interest.
4. **Batter Side**:
   * Purpose: Focuses the data on batter handedness to analyze specific matchups.
   * Options:
     1. All: Includes data against both left- and right-handed batters.
     2. Right: Includes data only against right-handed batters.
     3. Left: Includes data only against left-handed batters.
   * How to Use: Select the appropriate radio button based on the analysis you want.
5. **Select Visual**:
   * Purpose: Chooses the type of chart or metric to display for the analysis.
   * Options:
     1. Pitch Metrics: Provides detailed metrics such as velocity, spin rate, and release point.
     2. Pitch Usage Chart: Displays the distribution of pitch types used.
     3. Location Heatmaps: Shows the pitch locations on a heatmap.
     4. Pitch Movement Chart: Illustrates the movement of each pitch type.
     5. Pitch Locations: Marks exact pitch placements in the strike zone.
   * How to Use: Check the box(es) for the visualization(s) you want to see.
6. **Pitch Type:**
   * Purpose: Focuses the data on specific pitch types to analyze their usage or effectiveness.
   * The pitch type is changed to present the arsenal of the selected pitcher.
   * How to Use: Check one or more boxes to filter data by the selected pitch type(s).
     1. Location Heatmaps, Movement Pitch Chart, and Pitch Locations require the pitch type to be selected.
     2. Pitch Metrics and Pitch Usage Chart will not be impacted if not selected.

# **Types of Visuals**

## **Pitch Metrics Chart**

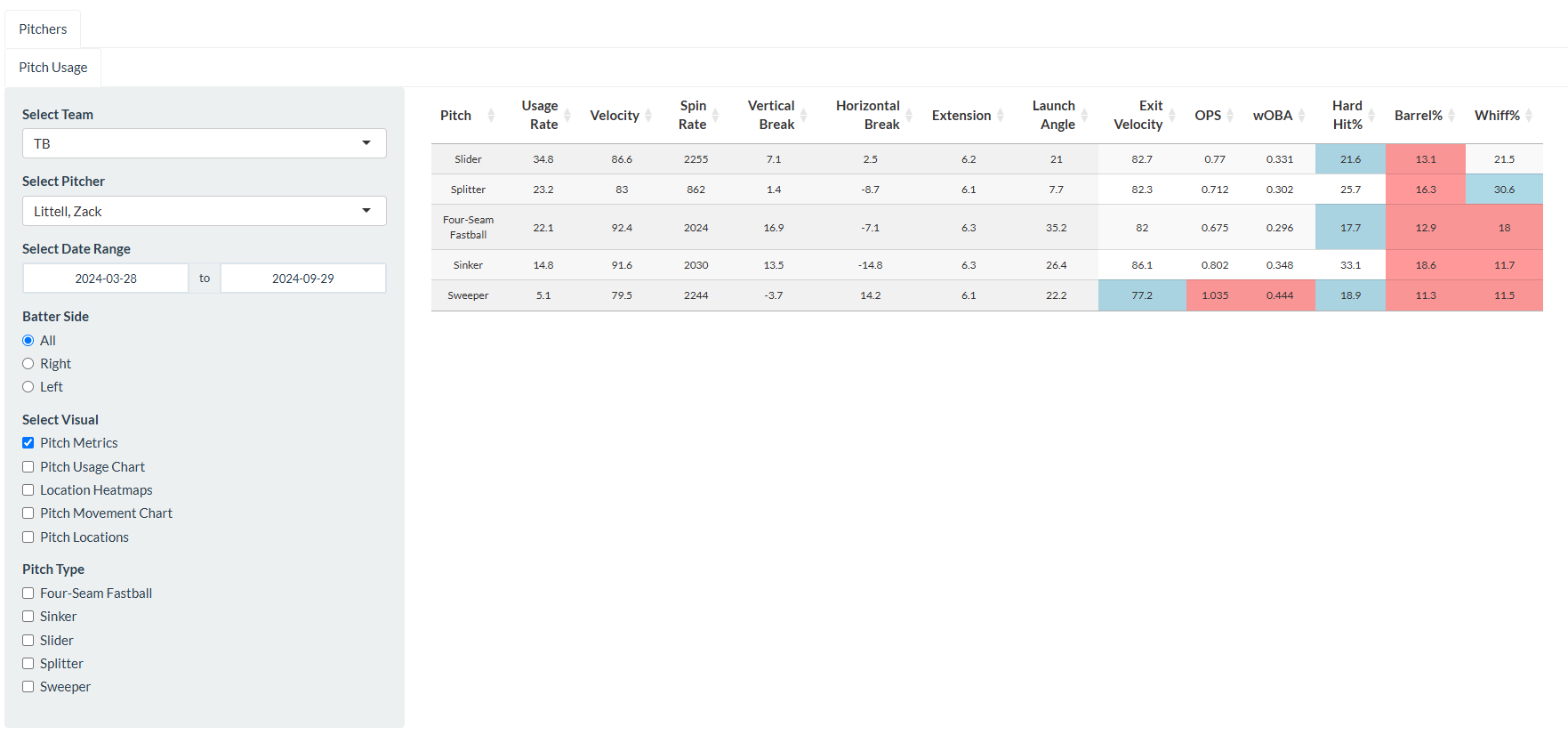


Figure Pitch Metrics Chart

### **Purpose of the Pitch Metrics Chart**

The Pitch Metrics table is designed to provide detailed insights into a pitcher's performance for various pitch types. It allows users to analyze pitch effectiveness, movement, velocity, and hitter success rates against each pitch type.

### **Components of the Chart**

1. **Rows: Pitch Types**
   * Each row corresponds to a specific pitch type (e.g., Slider, Sinker, Four-Seam Fastball, etc.).
2. **Columns: Metrics**
   * The chart includes the following key metrics:
     + **Usage Rate:** Percentage of pitches thrown of this type.
     + **Velocity:** Average pitch speed (in mph).
     + **Spin Rate:** Spin rate of the pitch (in RPM).
     + **Vertical Break:** Vertical movement of the pitch (in inches).
     + **Horizontal Break:** Horizontal movement of the pitch (in inches).
     + **Extension:** Release distance from the mound (in feet).
     + **Launch Angle:** Angle at which the ball is hit (in degrees).
     + **Exit Velocity:** Speed of the ball after contact (in mph).
     + **OPS:** On-base percentage plus slugging percentage.
     + **wOBA:** Weighted On-base Average. Advanced metric of batter success that weights each type of hit differently based on how it impacts run scoring.
     + **Hard Hit%:** Percentage of batted balls hit hard (exit velocity ≥ 95 mph).
     + **Barrel%:** Percentage of batted balls with optimal exit velocity (≥ 95 mph) and launch angle (between 5° and 35°).
     + **Whiff%:** Percentage of swings that miss.

### **How to Analyze the Chart**

1. **Assess Pitch Effectiveness:**
   * Compare **OPS** and **wOBA** values across pitch types.
   * **Example:** The **Splitter** has a **wOBA of 0.302**, indicating it is more effective than the **Sweeper** (**0.444**).
2. **Identify Go-To Pitches:**
   * Look at **Usage Rate** to see which pitches are used most frequently.
   * **Example:** The **Slider** has the highest usage rate (**34.8%**), indicating it is a primary pitch for the pitcher.
3. **Evaluate Movement and Deception:**
   * Compare **Vertical Break** and **Horizontal Break** to understand how much each pitch moves.
   * **Example:** The **Sinker** has a horizontal break of **-14.8 inches**, making it effective for inducing ground balls.
4. **Analyze Hitter Outcomes:**
   * Check **Launch Angle**, **Exit Velocity**, **Hard Hit%**, and **Barrel%** to evaluate how well batters make contact.
   * **Example:** The **Sweeper** has the highest **Exit Velocity (77.2 mph)** and a high **OPS (1.035)**, suggesting it is less effective at preventing strong contact.
5. **Spot Strikeout Potential:**
   * Use **Whiff%** to identify pitches that generate swings and misses.
   * **Example:** The **Splitter** has the highest **Whiff% (30.6%)**, making it an effective strikeout pitch.

## **Pitch Usage Chart**

A screenshot of a computer screen

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Figure Pitch Usage Chart

### **Purpose of the Pitch Usage Chart**

The **Pitch Usage Chart** helps users understand the distribution of different pitches a pitcher uses across various count situations during an at-bat. It is a heatmap that provides insight into a pitcher’s decision-making and pitch tendencies. This visual can help hitters create an approach with their at-bat.

### **How to Read the Pitch Usage Chart**

1. **Rows:**
   * Represent different pitch types (e.g., Four-Seam Fastball, Sinker, Slider, Splitter, Sweeper).
2. **Columns:**
   * Represent the count situation during the at-bat (e.g., 0-0, 1-1, 2-2).
3. **Cell Values:**
   * Show the percentage of times a specific pitch is thrown in each count.
4. **Color Coding:**
   * **Red Shades:** High usage percentage.
   * **Blue Shades:** Low usage percentage.
   * Gradients help you quickly identify where certain pitches are most or least used.

## **Location Heatmaps**

A screenshot of a computer screen

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Figure Location Heatmaps

### **Purpose of the Location Heatmaps**

The **Location Heatmaps** are density plots that show pitch concentration areas using different colors to indicate frequencies. This visualization helps players and coaches understand where specific pitchers tend to locate different types of pitches.

### **Components of the Heatmap Chart**

1. **Heatmap Plots:**
   * Each plot corresponds to a selected pitch type.
2. **Strike Zone:**
   * The black box in the center represents the strike zone.
   * The area around it shows pitch locations relative to the plate.
   * The strike zone is from the pitcher’s perspective.
3. **Color Coding:**
   * **Red Areas:** High pitch density (pitches frequently located in this area).
   * **Blue Areas:** Low pitch density (pitches rarely thrown in this area).
4. **Axes:**
   * **Horizontal Axis (X):** Lateral pitch location.
   * **Vertical Axis (Y):** Vertical pitch location.

### **Key Insights to Look For**

1. **Strike Zone Targeting:**
   * Determine how often pitches are thrown inside or outside the strike zone.
2. **Pitch Placement Strategies:**
   * Identify whether the pitcher favors specific zones for certain pitch types.
3. **Adjustments for Batter Handedness:**
   * Check if pitch locations change based on batter handedness.

## **Pitch Movement Chart**

A screenshot of a computer screen

Description automatically generated

Figure Pitch Movement Chart

### **Purpose of the Pitch Movement Chart**

The **Pitch Movement Chart** is a scatter plot that includes all pitches within the dataset as well as points for the pitch averages for the selected pitchers and the league averages for comparison. This is useful for understanding how a pitcher’s different pitches move in relation to each other and compare to league averages.

### **Components of the Pitch Movement Chart**

1. **Axes:**
   * **Horizontal Axis (X):** Horizontal movement (in inches) relative to the plate.
     + Positive values indicate movement away from a right-handed hitter. (i.e., a right-handed pitcher’s slider or a left-handed pitcher’s sinker)
     + Negative values indicate movement towards a right-handed hitter (e.g., a right-handed pitcher’s sinker or a left-handed pitcher’s slider).
   * **Vertical Axis (Y):** Induced vertical movement of pitches in inches, relative to how the pitch would move with gravity alone.
     + Positive values indicate a pitch that “fights” gravity or rises compared to a theoretical pitch affected only by gravity.
     + Negative values indicate how many inches the pitch drops beyond what gravity alone would cause.
2. **Data Points:**
   * Each dot represents an individual pitch.
   * Colors correspond to different pitch types, as seen in the legend.

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Description automatically generated

Figure Pitch Movement Chart Legend

* + Hovering over a data point will display pitch data

A screen shot of a graph

Description automatically generated

Figure Hover Data

1. **A graph with many dots

   Description automatically generated with medium confidencePitcher and League Averages:**

Figure 8 Pitcher and League Averages

* **Pitcher Avg (Diamond markers):** Represents the average movement for each pitch type for the selected pitcher.

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Description automatically generated

Figure Pitcher Average Legend

* + A list of words on a white background

    Description automatically generated**League Avg (Star markers):** Represents the average movement for each pitch type across the league.

Figure 10 League Average Leagend

1. **A close-up of a computer screen

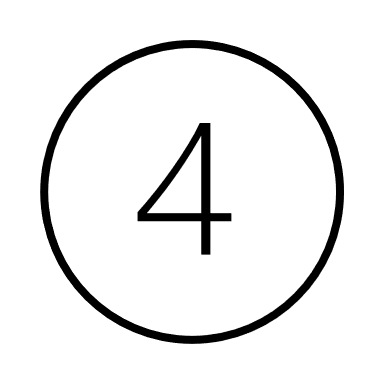
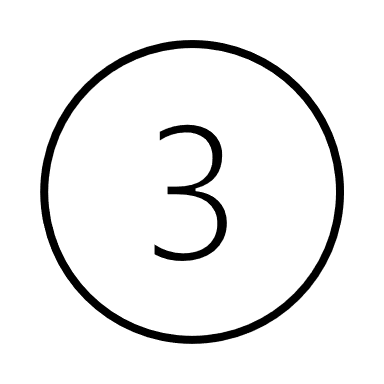
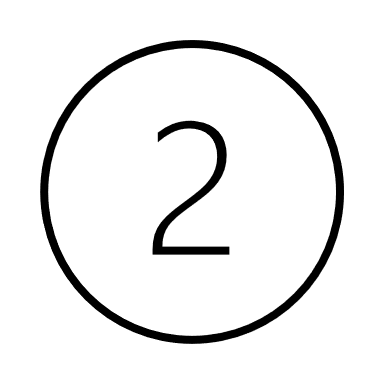
   Description automatically generatedPlotly Functionality (Hover over top right):**

Figure 11 Plotly Functionality

1. Download Plot as a PNG
2. Selection Panels
   * Zoom
   * Pan
   * Square Select
   * Lasso Select
3. Zoom Panels
   1. Zoom In
   2. Zoom Out
   3. Autoscale
   4. Reset Axes
4. Hover Text Features
   1. Show Closest Data on Hover
   2. Compare Data on Hover

## **Pitch Locations Chart**

A screen shot of a computer screen

Description automatically generated

Figure Pitch Locations Chart

### **Purpose of the Pitch Locations Chart**

The **Pitch Locations Chart** is an interactive visualization that shows where pitches cross home plate. This visualization helps users analyze exactly where pitches are crossing the plate, making it useful for understanding a pitcher's command and location tendencies with different pitch types. Unlike the heatmaps which show general patterns, this chart allows for more detailed pitch-by-pitch analysis.

### **Components of the Chart**

1. **Strike Zone (Black Box):**
   * Represents the official strike zone from the pitcher’s perspective.
   * Located centrally within the plot, with a home plate graphic at the bottom.
2. **Dots (Pitch Locations):**
   * Each dot represents an individual pitch’s location at the plate.
   * Color coding distinguishes pitch types.
3. **Legend:**

A list of different types of objects

Description automatically generated with medium confidence

Figure Pitch Locations Legend

1. **Plotly Functionality:**
   * As shown **above**.

# **Error Handling**

## **Date Range Error**

1.  Start date selected is later than the end date:

Figure 14 Date Range Error 1

How to fix: Select a start date that is earlier than the end date.

1. No data available for selected Date Range:

Figure 15 Date Range Error 2

How to fix: Choose dates when the pitcher was active/playing.

* Check if pitcher was injured or not on roster during selected period.

## **Pitch Type Error**

1. No pitch type is selected when trying to view location heat maps, pitch movement charts, or pitch location visuals.



Figure Pitch Type Error

How to fix: To view heatmaps, movement charts, or location plots, you must select at least one pitch type using the checkboxes. The pitch type options update dynamically based on the selected pitcher's repertoire. Simply check one or more pitch types to generate these visualizations.

## **Lack of Data Error**

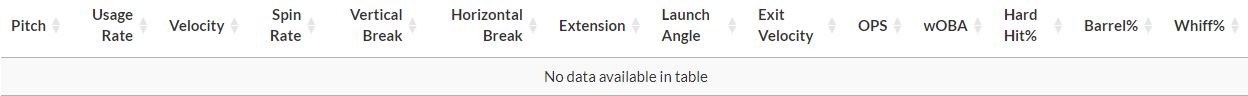
1. Pitch Metrics Table

Figure 17 Pitch Metrics Table Error

The Pitch Metrics Table requires a minimum of 5 pitches to generate metrics for each pitch type. If no data appears, it means the current filter combination (pitcher, date range, and batter handedness) results in fewer than 5 pitches thrown.

To fix:

1. Expand the date range.
2. Change batter handedness filter to "Both".
3. Verify the pitcher was active during selected dates.

This minimum pitch requirement ensures statistical significance and prevents conclusions from being drawn from insufficient sample sizes.

1. Location Heatmaps

Figure 18 Location Heatmaps Error

How to Fix:

* Select pitch types with at least 5 pitches thrown during the selected period.
* Expand date range to include more pitches.
* Adjust batter handedness filter if needed.
* Verify pitcher was active during selected dates.

Note: Each pitch type requires 5+ pitches to appear in heatmap grid. If one pitch type has insufficient data, others will still display if they meet minimum threshold.

# **Example Scenarios**

For the first use case, screenshots of the app will be included. For the remaining scenarios, there will be a step-by-step guide along with an analysis at the end.

### **Scenario 1: LHH Game Prep**

Left-handed Hitter wants to prepare for the starting pitcher for the next game (Zack Littell). He wants to gather data from the last month (September) to understand how he might be attacked.

**A screenshot of a computer

Description automatically generatedStep 1: Filter**

Figure 19 Scenario 1 Filters

* Filters:
  + Select Team: TB
  + Select Pitcher: Littell, Zack
  + Select Date Range:“2024-09-01” to “2024-09-29”
  + Batter Side: Left

**Step 2: Visuals**

**A screenshot of a computer

Description automatically generated**Analyze the Pitch Metrics Chart.

Figure 20 Scenario 1 Pitch Metrics Chart

**Key Metrics**

* Balanced pitch mix:
  + Slider (33%).
  + Four-Seam (30%).
  + Splitter (29 %).
  + Sinker (7%)

**Pitch Performance**

* Slider: High damage (.392 wOBA, 19.4% Barrel Rate).
* Four-Seam: Good results (.182 wOBA) but low whiff (15.2%) and high Barrel% (17.9%).
* Splitter: Best whiff rate (31%) with moderate damage.

**Takeaways**

1. Look for slider, especially in hitter's counts.
2. Splitter is main swing and miss pitch.
3. High barrel rates suggest that an aggressive approach could be effective.

**A screenshot of a computer

Description automatically generated**Analyze the Pitch Usage Chart.

Figure Scenario 1 Pitch Usage Chart

**Key Patterns**

* First pitch mix:
  + Fastball (40%).
  + Slider (33%).
  + Splitter (22%).

**Count-Based Tendencies**

* Two strikes:
  + Splitter dominant (> 40% in 0-2/1-2 counts).
  + Limited slider usage.
* Hitter's counts:
  + Slider heavy (> 40% when behind in the count).
  + Fastball and Slider only in 3-0 and 3-1 counts.

**Takeaways**

1. Look slider in hitter's counts
2. Be ready for 0-2, 1-2 splitters.
3. Hunt a first-pitch slider since it results in the most damage.

A collage of images of a location

Description automatically generatedAnalyze the Location Heatmaps

Figure 22 Scenario 1 Location Heatmaps

**Pitch Locations**

* Slider: Throws inside to lefties.
* Splitter: Tunnels it down in the strike zone to generate swings and misses.
* Fastball: Middle-up tendency.
* Sinker: Middle/middle-up focus (Not a great location for a sinker).

**Control Assessment**

* Shows a strong command of primary pitches.
* Consistent locations match pitch characteristics.
* Sinker placement needs refinement.

**Takeaways**

1. Look up in zone for fastball.
2. Prepare for inside slider.
3. Recognize that the splitter starts low in the zone and drops below.

**A screen shot of a graph

Description automatically generated**Analyze Pitcher v League Average in Pitch Movement Chart

Figure 23 Scenario 1 Pitch Movement Chart

**Pitch Comparison**

* Slider: Less horizontal break than league average, but more induced rise.
* Splitter: Slightly more vertical drop and arm-side run.
* Fastball: Less rise than league average.
* Sinker: Significantly less drop than league average. Does not have a significant gap from his fastball.

**Takeaways**

1. Slider profiles more of a gyro/bullet slider.
2. Splitter plays well off fastball due to movement differential.
3. Fastball effectiveness relies more on location than movement.

### **Scenario 2: RHH Game Prep**

Right-Handed Hitter wants to prepare for the starting pitcher (Taj Bradley) for the next game on September 1st. He wants to gather data from August.

**Step 1: Filter**

* Filters:
  + Select Team: TB
  + Select Pitcher: Bradley, Taj
  + Select Date Range: “2024-08-01” to “2024-08-31”
  + Batter Side: Right

**Step 2: Visuals**

Analyze the Pitch Metrics Chart.

**Key Metrics**

* Fastball Heavy:
  + Four-Seam (41%)
  + Cutter (25%)
  + Curveball (17%)
  + Splitter(17%)

**Pitch Performance**

* Four-Seam: Poor results (.447 wOBA) with low whiff (20%) and high Barrel% (20.6%).
* Cutter: Limits hard contact (78.5 EV and 18.5% Hard Hit%), with poor results (0.423 wOBA)
* Curveball: Average batted ball metrics (85 EV, .322 wOBA) and average whiff rate (25%)
* Splitter: Very poor results (0.807 wOBA and 2.068 OPS), with a low whiff rate (16.7) and extremely high Hard Hit rate (57.1%)

**Takeaways**

1. Expect a large percentage of Fastballs, either Four-Seam or Cutter.
2. Cutter and Curveballs are his main swing-and-miss pitches.
3. Should have an aggressive approach due to high batted ball metrics and resulting numbers.

Analyze the Pitch Usage Chart.

**Key Patterns**

* First pitch mix:
  + Fastball (50%).
  + Cutter (30%).
  + Curveball (10%)
  + Splitter (10%).

**Count-Based Tendencies**

* Two strikes:
  + Curveball (30%) and Splitter (26%) dominant.
  + Fastball (50%) likely on 3-2 count. Could also go Splitter (38%).
  + Limited cutter usage, except on 2-2 (31%).
* Hitter's counts:
  + Fastball dominant (>= 50 when behind in count)
  + Only Fastball (100%) in 3-0 and 3-1 counts.

**Takeaways**

1. Look Fastball in hitter's counts
2. Be ready for 0-2, 1-2 Curveball or Splitter.
3. Hunt first-pitch Fastball.
4. 3-0 or 3-1 count expect a Fastball.

Analyze the Location Heatmaps.

**Pitch Locations**

* Fastball: Throws mostly in strike zone, middle/middle up/up away.
* Cutter: Throws low and away in the strike zone. Sometimes will tunnel strike to ball to get a swing and miss.
* Curveball: High concentration in the middle of the plate. Mostly thrown ball to strike.
* Splitter: No high concentration area. Tendency to throw low and in, but large variability in location.

**Control Assessment**

* Control over command. He throws a lot of strikes, but most of his pitches are concentrated over the middle of the zone.

**Takeaways**

1. Expect a lot of strikes in the middle of the zone.
2. Prepare for cutter low and away off of the same tunnel as his fastball.
3. All pitches can be hit for damage.

Analyze Pitcher v League Average in Pitch Movement Chart.

**Pitch Comparison**

* Fastball: More rise than league average, and is 1 mph harder.
* Cutter: Less depth than league average, but is 1 mph harder.
* Curveball: More induced drop than average curveballs. Thrown 2 mph slower as well.
* Splitter: Less depth than league average, but more run, and thrown 4 mph harder.

**Takeaways**

1. High-velocity arsenal except for Curveball.
2. Fastball is an elite pitch.
3. Splitter plays well off fastball due to movement differential.
4. Curveball effectiveness relies on the ability to locate.
5. Cutter plays well off his fastball.

### **Scenario 3: Relief Pitcher Scouting**

Advance Scout wants to prepare a game plan for Garrett Cleavinger. To have a significant enough data set, he wants to analyze trends from the entire 2024 season.

**Step 1: Filter**

* Filters:
  + Select Team: TB
  + Select Pitcher: Cleavinger, Garrett
  + Select Date Range: “2024-03-28” to “2024-09-29”
  + Batter Side: All (Can adjust Left or Right to create reports for an individual batter)

**Step 2: Visuals**

Analyze the Pitch Metrics Chart.

**Key Metrics**

* Balanced Pitch Mix:
  + Cutter (26%)
  + Four-Seam (25%)
  + Slider (22%)
  + Sweeper (17%)
  + Sinker (10%)

**Pitch Performance**

* Four-Seam: Poor results (.377 wOBA) with high Barrel% (21.3%).
* Cutter: Limits hard contact (79.4 EV and 8.2% Hard Hit%) with excellent results (0.244 wOBA) and a high whiff rate (31.2).
* Slider: Average batted ball metrics (83.2 EV, .285 wOBA) and a high whiff rate (34%).
* Sweeper: Good batted ball metrics (76.6 EV, 18% Hard Hit%) and a high whiff rate (31.6%).
* Sinker: Good batted ball metrics (79 EV, 20 Hard Hit%), but bad results (0.519 wOBA) and low whiff rate (12%).

**Takeaways**

1. Cutter, Slider, and Sweeper all have above average whiff rates.
2. Four-seam fastball, slider, and sweeper are all effective at limiting damage.
3. More sinkers against lefties, more four-seam fastballs against righties.
4. Batted balls are mostly line drives or fly balls.

Analyze the Pitch Usage Chart.

**Key Patterns**

* First pitch mix:
  + Fastball (25%)
  + Cutter (39%)
  + Sinker (14%)
  + Slider (15%)
  + Sweeper (7%)

**Count-Based Tendencies**

* Two strikes:
  + Fastball (32%), Slider (30%), Sweeper (32%) with 0-2 or 1-2.
  + Cutter heavy (41%) in 3-2 counts.
* Hitter's counts:
  + Fastball dominant (50%) in 3-0 and 3-1 counts.
  + Cutter dominant (36%, 51%, 37%) in 1-0, 2-0, and 2-1 counts.

**Takeaways**

1. Look for Fastball or Cutter in hitter counts.
2. No notable trends with 2 strikes.
3. Hunt first-pitch Cutter.
4. 3-0 or 3-1 count expect a Four-Seam Fastball.

Analyze the Location Heatmaps.

**Pitch Locations**

* Fastball: Throws mostly in the strike zone, arm-side, and up.
* Cutter: Throws glove-side and low. Low concentration.
* Sinker: Thrown mostly arm-side middle. High concentration in the middle of the plate.
* Splitter: No high concentration area. Tendency to throw low and in, but large variability in location.
* Sweeper: High concentration low in the zone.

**Control Assessment**

* He is effectively wild.
* Has some areas of concentration, but the heat maps are very spread out.

**Takeaways**

1. Be patient and wait to get a pitch out over the plate. He will try to hit the corners.
2. Prepare for low and glove-side cutters and sliders from the same tunnel as his fastball.
3. He will try to make you chase out of the zone.

Analyze Pitcher v League Average in Pitch Movement Chart.

**Pitch Comparison**

* Fastball: Similar rise to league average, but runs arm-side more and is thrown 4 mph harder.
* Cutter: Similar to league average, but is 4 mph harder.
* Slider: Thrown harder and generates more drop and glove-side sweep than average.
* Sweeper: Thrown 2 mph harder and generates slightly more sweep and significantly more induced drop than average.
* Sinker: Has slightly more rise than average and is thrown 4 mph harder.

**Takeaways**

1. High-velocity arsenal, with every pitch around 4-5 mph harder than league average.
2. Has several above-average pitches, including fastball, cutter, and sweeper.
3. Several pitches that move glove-side but all with distinct movement profiles.

### **Scenario 4: Run Game**

3rd base coach wants to determine the best counts to steal against Zack Littell.

**Step 1: Filter**

* Filters:
  + Select Team: TB
  + Select Pitcher: Littell, Zack
  + Select Date Range: “2024-03-28” to “2024-09-29”
  + Batter Side: All

**Step 2: Visuals**

Analyze Pitch Locations Chart:

**Location Analysis**

* Splitter: Below zone, longer for catcher to catch/transfer.
* Slider and Sweeper: Inside to LHH, requires catcher body adjustment.
* Fastball: Thrown up in the zone, where the catcher can quickly transfer.

Analyze Pitch Usage Chart:

**Key Times to Run**

1. First pitch (46% Slider)
2. Two-strike counts (35-40% Splitter)
3. 2-0 and 3-1 (>50% Slider)

**Key Times to Avoid**

1. 3-0 is the highest percent for Fastball (62%)

### **Scenario 5: Pitcher Development**

For the past few weeks, Drew Rasmussen has decided to throw more four-seam fastballs against left-handed hitters. He has worked to get more rise on the ball, and he wants to analyze his performance over the past two weeks. While this app was built for hitters to analyze pitching matchups, it can also be used by pitchers to understand how they’re performing and ways to improve.

**Step 1: Filter**

* Filters:
  + Select Team: TB
  + Select Pitcher: Rasmussen, Drew
  + Select Date Range: “2024-09-16” to “2024-09-29”
  + Batter Side: Left

**Step 2: Visuals**

Analyze Pitch Metrics Chart

Fastball Analysis:

* Dropped 0.9 inches of Vertical Break (18.4 to 17.5), and decreased Horizontal Break by 1.8 inches (-5.5 to -3.7).
* Average Exit Velocity decreased by 1.7 mph (82.7 to 81).
* Lowered the OPS, wOBA, and Hard Hit rate against the fastball.
* Decreased the Whiff rate of the pitch by 7% (31.1 to 24.1).

It does not appear that the changes to increase induced vertical break were successful, but Rasmussen’s fastball results have improved.

Analyze Pitch Usage Chart

Fastball Analysis:

* Threw 100% fastballs when behind in the count.
* Fastball would generate more swings and misses if it was less predictable.
* To improve the whiff rate on the fastball, throw less when behind in the count and throw more in 1-1 and 1-2 counts.

Analyze Pitch Movement Chart

Fastball Analysis:

* Fastball cuts more than league average, but has less rise.
* The fastballs that have the highest rise, tend to run more than his average.
* Would recommend working on getting through the ball more to generate greater rise on the fastball.

# **Questions or Suggestions?**

Please email Greg Halperin ([gregoryhalperin2024@u.northwestern.edu](mailto:gregoryhalperin2024@u.northwestern.edu)) or Javaris Hall ([javarishall2024@u.northwestern.edu](mailto:javarishall2024@u.northwestern.edu)) if you have any additional questions or suggestions for improving the app.