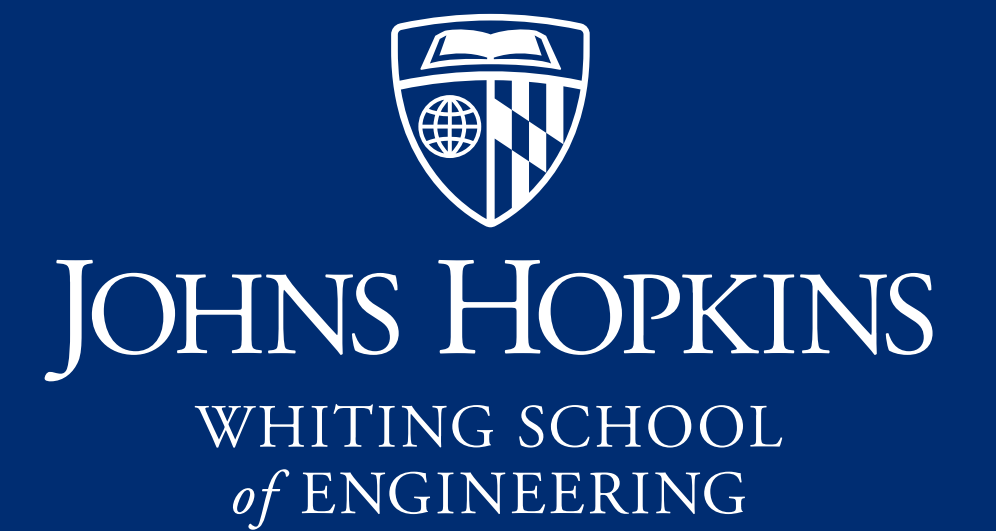




SLUGGER Batter Flashcard Widget

A Cognitively-Optimized Tactical Scouting System for the Atlantic League of Professional Baseball Powered by Trackman Data | Deployed at baseball-flashcard.vercel.app



By: Aaron Resson and Angela Appiah, as part of the Sports Analytics Research Group with the help of Dr. Anton Dahbura, developed for the Atlantic League of Professional Baseball.

Problem Statement

In professional baseball, coaches and catchers face severe cognitive overload when trying to interpret massive, static datasets (180,000+ pitches) in real-time. Traditional scouting reports are text-heavy and difficult to digest quickly in the dugout, making it nearly impossible to filter out statistical "noise" and identify a batter's true, proven vulnerabilities under intense in-game time pressure.

Our Solution

The SLUGGER Batter Flashcard Widget is a high-speed, tablet-optimized analytics dashboard that translates complex pitch data into intuitive visual "flashcards." By engineering an intelligent filtering pipeline and a tunable "Weakness Confidence" algorithm, the system cuts through the noise to surface a focused set of highly actionable Attack and Vulnerable zones per batter, scaled to the coach's desired confidence level. This cognitively optimized tool empowers ALPB coaches to instantly visualize each batter's tendencies with zero lag, equipping them for split-second strategic decisions on Opening Day.

Tech Stack

Frontend



Backend



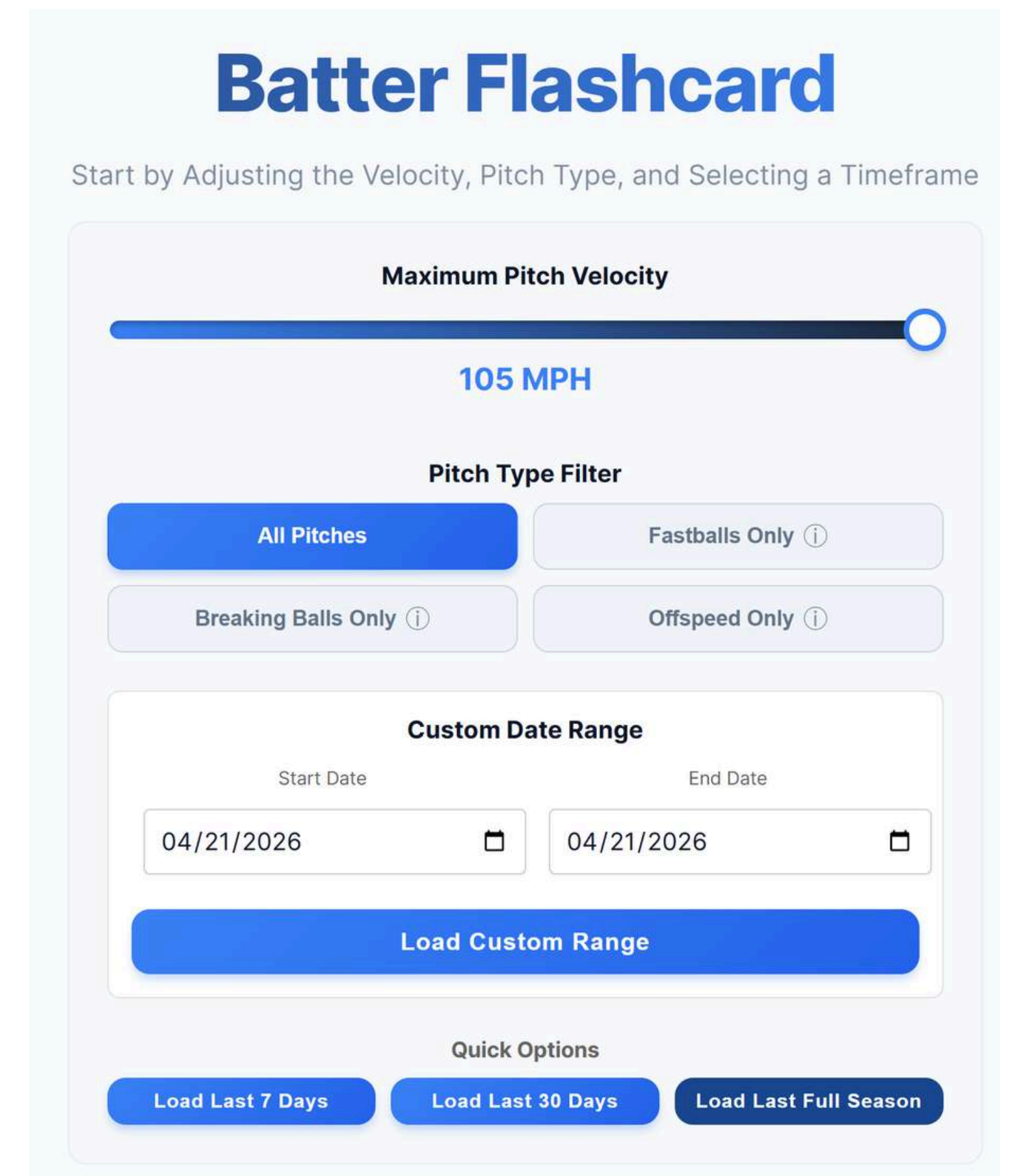
Infrastructure



Features & Implementation

1 Intelligent Filtering System

- The Problem:** In-game decisions happen in seconds. Generic, unfiltered batter data overwhelms coaches and pitcher rather than helping them
- What we built:** Three filters work together to scope data to what's relevant.
 - Velocity slider - matching the pitcher's own arsenal
 - Time period selector - display recent seasons statistics
 - Confidence threshold - the severity of weakness presented
- The result:** Filtering reduces visual noise and surfaces only the patterns that matter for *this* pitcher, facing *this* batter, *tonight!* Coaches get sharper insights without digging through irrelevant data.



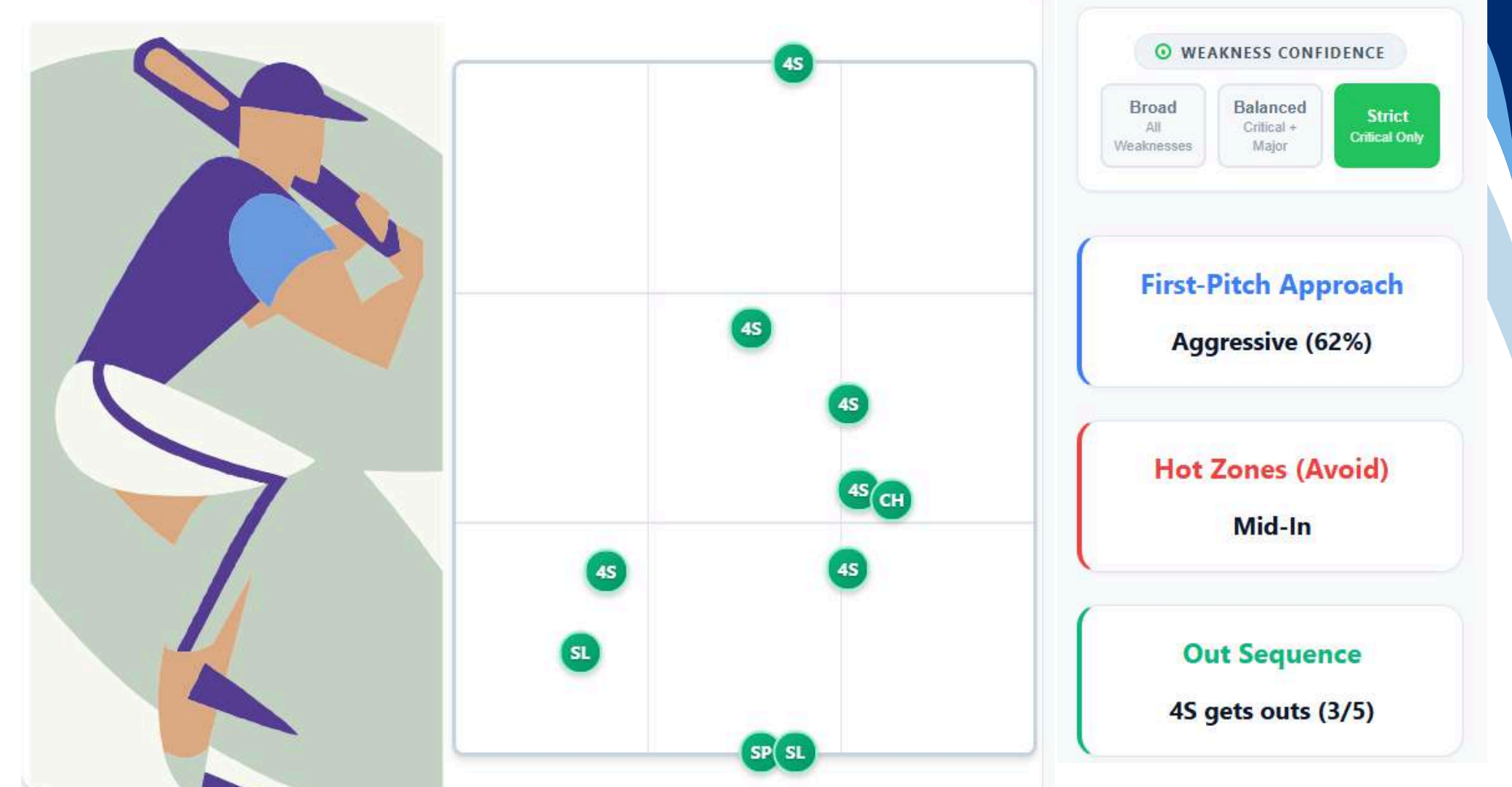
Insight Selection & Switch Hitter Separation

- Switch hitter handling** is accomplished by splitting into two fully independent profiles—one left-handed stance, one right-handed stance. For **cognitive distillation** the insight selection algorithm ranks all weakness zone and chooses the top insights.

3 Weakness Bucket Algorithm

- What it measures** Each zone on the strike grid is scored by bad outcomes-- whiffs plus weak contact, then divided by total pitches seen in that zone.
- How zones are ranked** The algorithm scores all 9 zones [(high / mid / low) x (in / mid / out)], then surfaces only the top 4 to 12 depending on the confidence threshold set by user.
- Confidence gating** A zone only qualifies if it has enough pitch sample behind it. At high confidence (<75%), a zone needs 10+ pitches to appear. At low confidence, 3+ pitches suffice. This prevents small-sample noise from misleading coaches.

Sedio, Chad LHB • 140 pitches



4 Backend Weakness Detection Algorithm

- What it measures:** Each zone is scored using a weighted composite of whiff rate (45%), weak contact rate (35%), and foul/chase rate (20%), ranked percentile-style against all other zones for that batter. Score of 0 = worst zone for the batter.
- How zones are ranked:** Zones are filtered by severity: ≤ 20 = Critical, ≤ 35 = Major, ≤ 60 = Moderate. Only zones below the active confidence threshold surface. Broad shows all qualifying zones, Balanced caps at 8, Strict caps at 4.
- Confidence gating:** A zone only qualifies with enough pitch sample. Strict requires 10+ pitches, Balanced 7+, Broad 3+. This prevents small-sample noise from misleading coaches.

5 Expert Validation

- Consulted with **Ryan Dull**, bench coach and director of player personnel for the **High Point Rockers of the ALPB**
- Most actionable feedback** pertained to vague labels for first-pitch. Dull urged for actual hard swing percentages, to quantify hitter aggression and/or weakness.
 - Logic pushback** came from our spray chart pipeline. Rejecting the former mechanism, Dull pushed for a total revamp. This marks our systems reliability.
 - Dull commended us on our **1-page printable format**, highlighting its accessibility.
 - A new feature, pitch-family, was developed from Dull's suggestion. This is incorporated to the loading data criterium.

Try It Out!

Explore the ALPB batter's attack zones, vulnerable zones, and tendencies right from your phone!

