Softball Pitcher Efficiency

Scott Steinberg and Gautam Goel

Client Goals

Coaches Monica Harrison and Lindsay Mapes call pitches during each game

- Our goal is to use pitch-by-pitch data from past seasons (2019/2020) to provide insight into pitcher performance during specific scenarios
- Doing so will allow for quicker in-game decisions, improving effectiveness and efficiency of pitching

Background

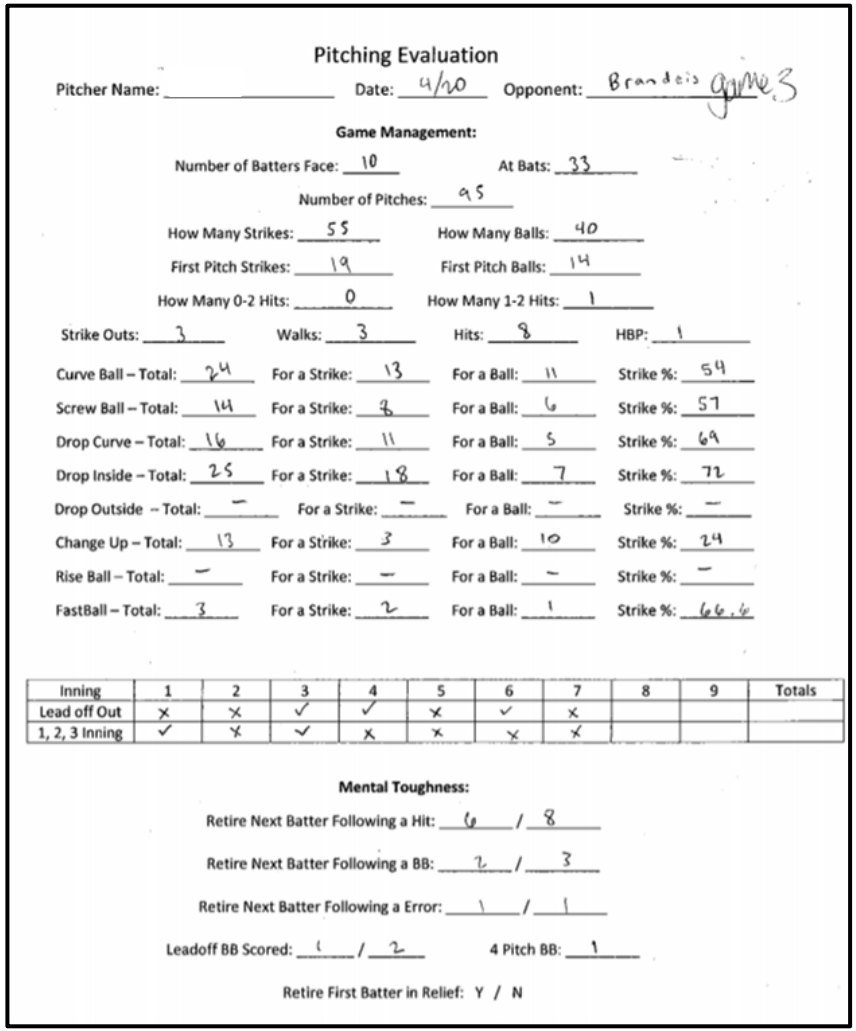
- Main Pitch Types
- Each column displays variations that are used by our pitchers
- Pitch Out - an outside pitch to prevent a possible steal attempt
- Shake Off - the pitcher ignored the coach's call and threw something else

Pitch Type	Inside	Outside	Low	High	Curve
Change	Change Inside	Change Outside			
Curve		Curve Outside			
Drop	Drop Inside	Drop Outside			Drop Curve
Fastball	Fastball Inside	Fastball Outside	Fastball Low	Fastball High	
Rise	Rise Inside	Rise Outside			
Screw		Screw Outside			
Pitch Out					
Shake Off					

Data Collection

Pitching Evaluation Charts

- Summary of pitch distribution for a pitcher during a game
- Created by pitchers postgame from pitching charts



Pitching Evaluation

Pitcher Name: _____ Date: 4/20 Opponent: Brandeis game 3

Game Management:

Number of Batters Face: 10 At Bats: 33

Number of Pitches: 95

How Many Strikes: 55 How Many Balls: 40

First Pitch Strikes: 19 First Pitch Balls: 14

How Many 0-2 Hits: 0 How Many 1-2 Hits: 1

Strike Outs: 3 Walks: 3 Hits: 8 HBP: 1

Curve Ball – Total: 24	For a Strike: 13	For a Ball: 11	Strike %: 54
Screw Ball – Total: 14	For a Strike: 8	For a Ball: 6	Strike %: 57
Drop Curve – Total: 16	For a Strike: 11	For a Ball: 5	Strike %: 69
Drop Inside – Total: 25	For a Strike: 18	For a Ball: 7	Strike %: 72
Drop Outside – Total: –	For a Strike: –	For a Ball: –	Strike %: –
Change Up – Total: 13	For a Strike: 3	For a Ball: 10	Strike %: 24
Rise Ball – Total: –	For a Strike: –	For a Ball: –	Strike %: –
FastBall – Total: 3	For a Strike: 2	For a Ball: 1	Strike %: 66.6

Inning	1	2	3	4	5	6	7	8	9	Totals
Lead off Out	x	x	✓	✓	x	✓	x			
1, 2, 3 Inning	✓	x	✓	x	x	x	x			

Mental Toughness:

Retire Next Batter Following a Hit: 6 / 8

Retire Next Batter Following a BB: 2 / 3

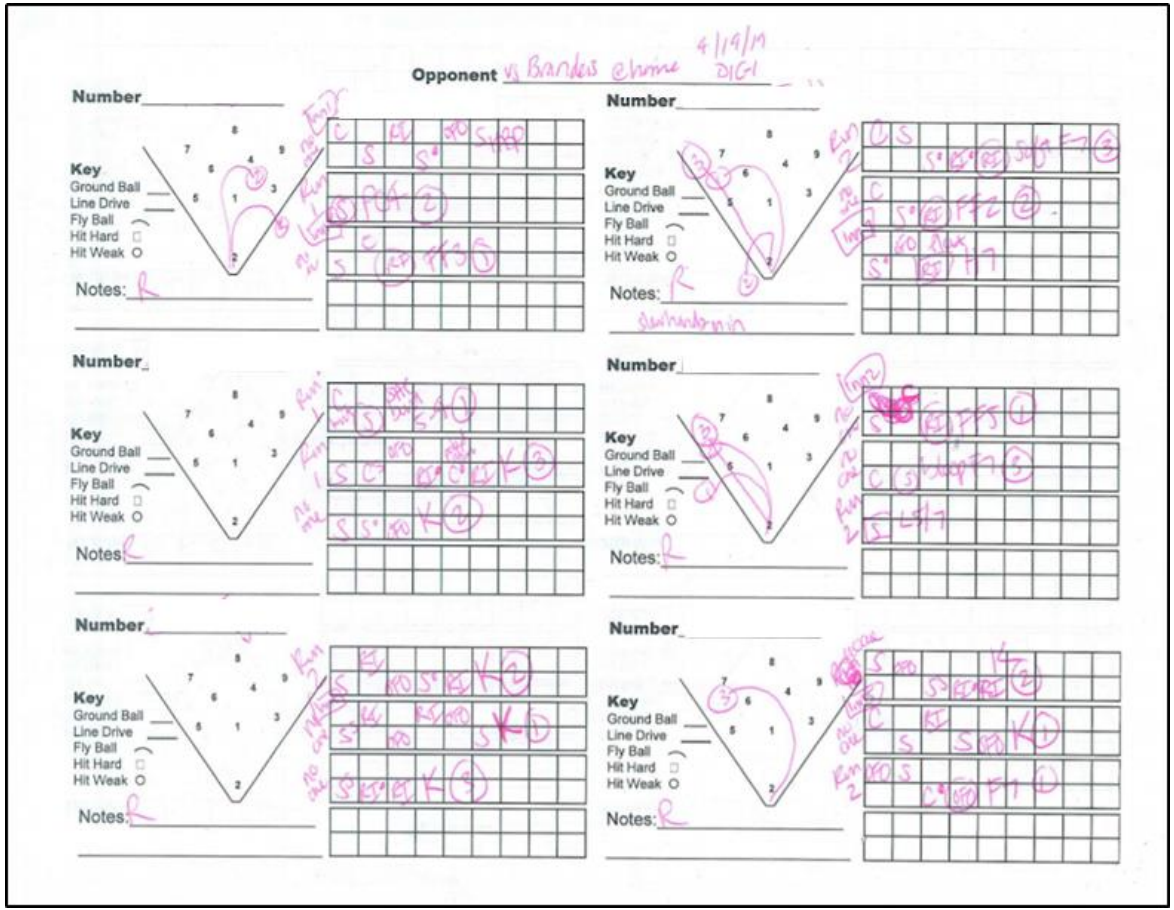
Retire Next Batter Following a Error: 1 / 1

Leadoff BB Scored: 1 / 2 4 Pitch BB: 1

Retire First Batter in Relief: Y / N

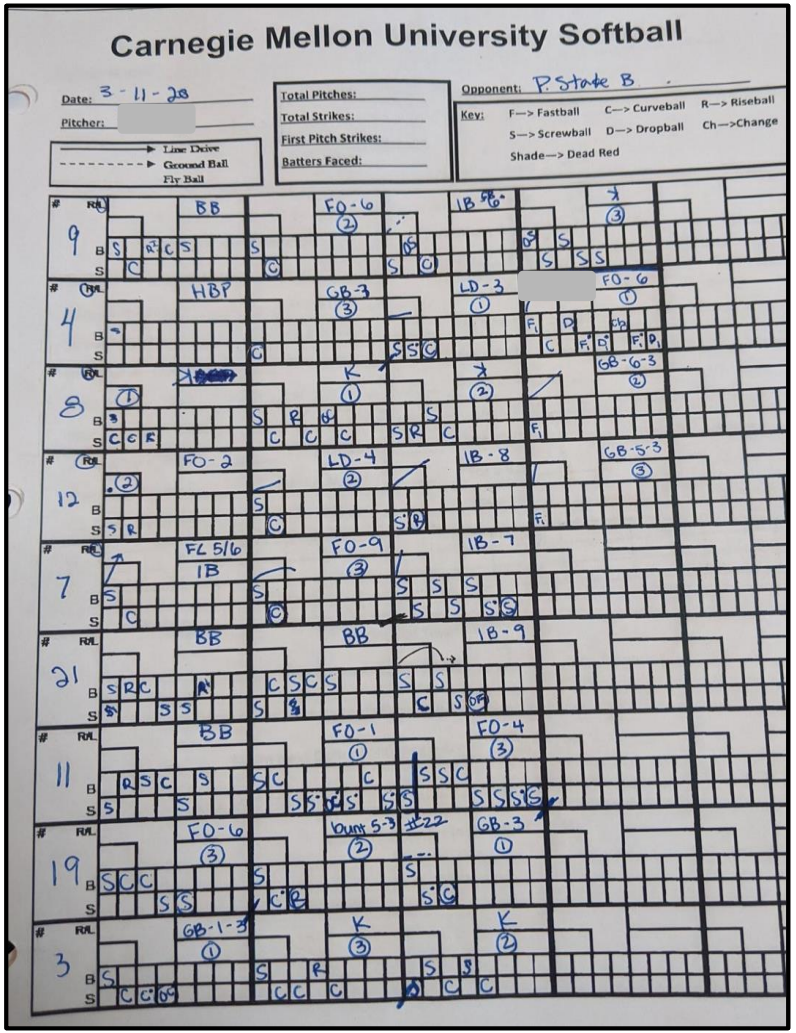
Pitching Charts (2019)

- Created in real-time during each game
- Track each pitch thrown to each batter and subsequent outcomes of each at-bat



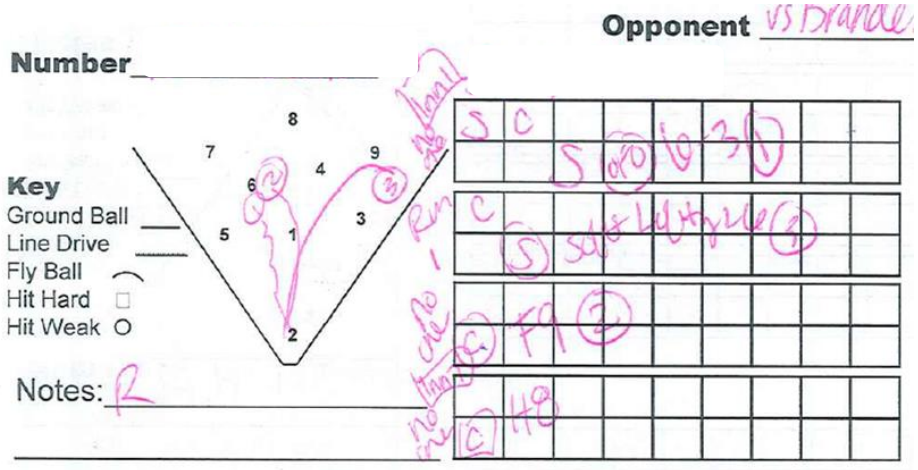
Pitching Charts (2020)

- Same purpose as 2019 charts
- Tracked slightly differently



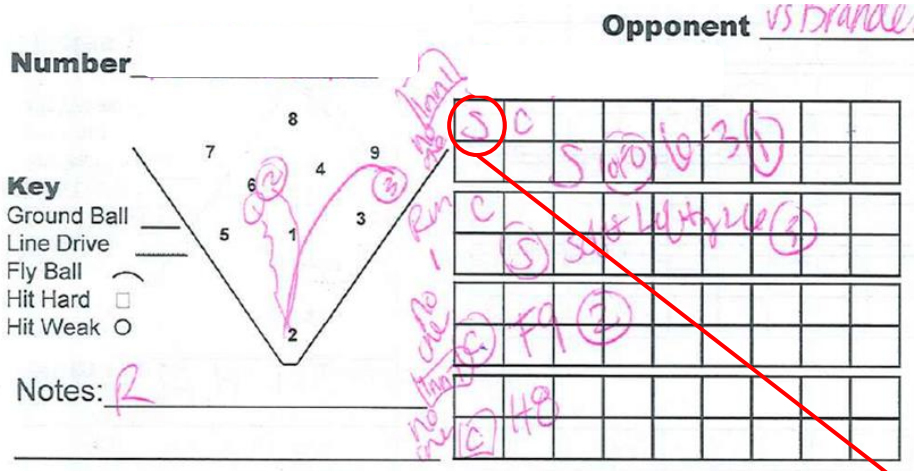
Data Entry

Entry of Pitching Charts



Pitch #	Batter	Pitcher	Bats	Inning	Runs	Outs	Balls	Strikes	1st	2nd	3rd	Pitch	Result
1	Name	Name	R	1	0	0	0	0	0	0	0	Screw	Ball
2	Name	Name	R	1	0	0	1	0	0	0	0	Curve	Ball
3	Name	Name	R	1	0	0	2	0	0	0	0	Screw	Strike
4	Name	Name	R	1	0	0	2	1	0	0	0	Change	Ground Out

Entry of Pitching Charts



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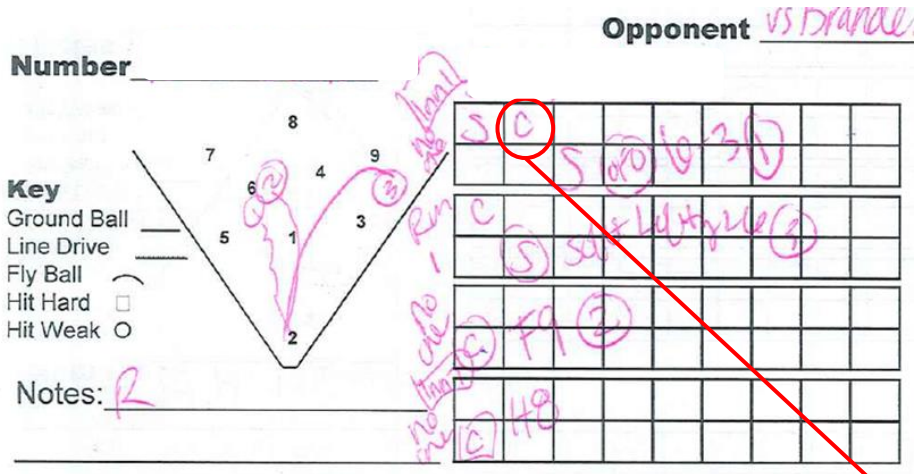
1	Name	Name	R	1	0	0	0	0	0	0	0	Screw	Ball
2	Name	Name	R	1	0	0							
3	Name	Name	R	1	0	0							
4	Name	Name	R	1	0	0							

Entry of Pitching Charts



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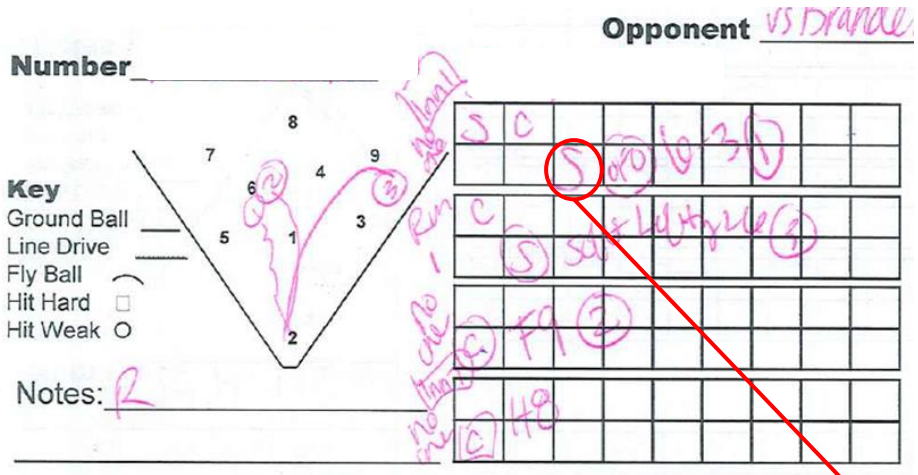
1	Name	Name	R	1	0	0	0	0	0	0	0	Screw	Ball
2	Name	Name	R	1	0	0	1	0	0	0	0	Curve	Ball
3	Name	Name	R	1	0	0							
4	Name	Name	R	1	0	0							

Entry of Pitching Charts



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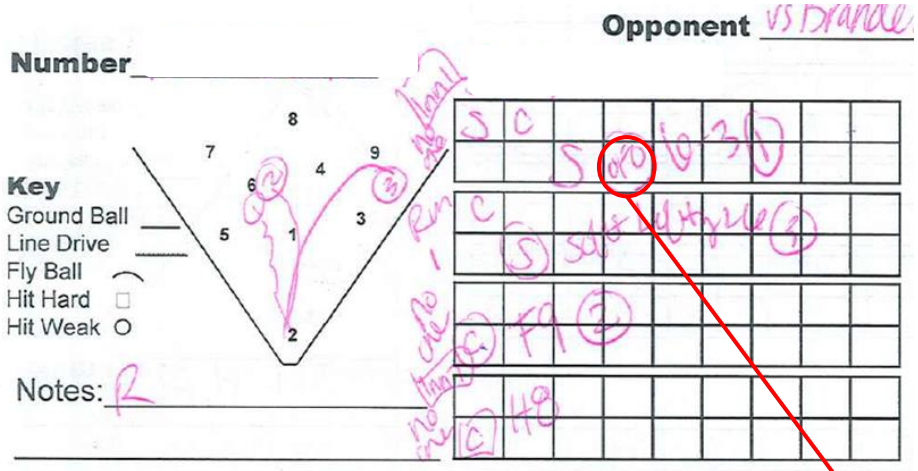
1	Name	Name	R	1	0	0	0	0	0	0	0	Screw	Ball
2	Name	Name	R	1	0	0	1	0	0	0	0	Curve	Ball
3	Name	Name	R	1	0	0	2	0	0	0	0	Screw	Strike
4	Name	Name	R	1	0	0							

Entry of Pitching Charts



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1	Name	Name	R	1	0	0	0	0	0	0	0	Screw	Ball
2	Name	Name	R	1	0	0	1	0	0	0	0	Curve	Ball
3	Name	Name	R	1	0	0	2	0	0	0	0	Screw	Strike
4	Name	Name	R	1	0	0	2	1	0	0	0	Change	Ground Out

Pitch #	Bats	Inning	Runs	Outs	Balls	Strikes	1st	2nd	3rd	Pitch	Result
1	R	1	0	0	0	0	0	0	0	Curve	Ball
2	R	1	0	0	1	0	0	0	0	Screw	Strike
3	R	1	0	0	1	1	0	0	0	Rise	Ball
4	R	1	0	0	2	1	0	0	0	Screw	Foul
5	R	1	0	0	2	2	0	0	0	Change	Ball
6	R	1	0	0	3	2	0	0	0	Screw	HBP
7	R	1	0	0	0	0	1	0	0	Curve	Ball
8	R	1	0	0	1	0	1	0	0	Screw	Sac Bunt
9	R	1	0	1	0	0	0	1	0	Screw	Strike
10	R	1	0	1	0	1	0	1	0	Rise	Ball
11	R	1	0	1	1	1	0	1	0	Change	Strike
12	R	1	0	1	1	2	0	1	0	Screw	Foul
13	R	1	0	1	1	2	0	1	0	Rise	Swinging K
14	R	1	0	2	0	0	0	1	0	Curve	Ball
15	R	1	0	2	1	0	0	1	0	Screw	Ball
16	R	1	0	2	2	0	0	1	0	Screw	Foul
17	R	1	0	2	2	1	0	1	0	Rise	Foul
18	R	1	0	2	2	2	0	1	0	Rise	Fly Out
19	R	2	0	0	0	0	0	0	0	Screw	Strike
20	R	2	0	0	0	1	0	0	0	Curve	Ball
21	R	2	0	0	1	1	0	0	0	Rise	Pop Out
22	R	2	0	1	0	0	0	0	0	Screw	Ball
23	R	2	0	1	1	0	0	0	0	Change	Ball
24	R	2	0	1	2	0	0	0	0	Screw	Strike

Data Analysis

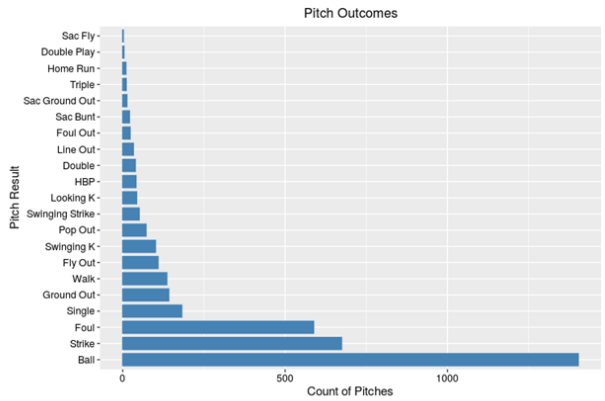
Data Product

- Created formula driven spreadsheet to allow for easy data entry and continuous integration into larger data set
- Created R Shiny App to allow for customizable visualizations of data

CMU Softball Pitcher

Pitch Outcomes

Pitch Types



Select a Pitcher +

Game Selection +

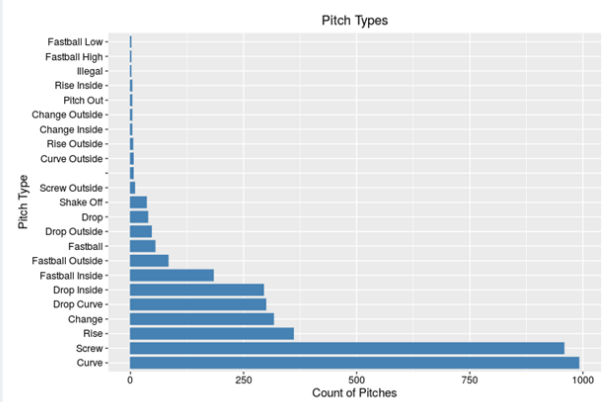
Graph Conditions +

Game Situations +

Base Runners +

Pitch Outcomes

Pitch Types



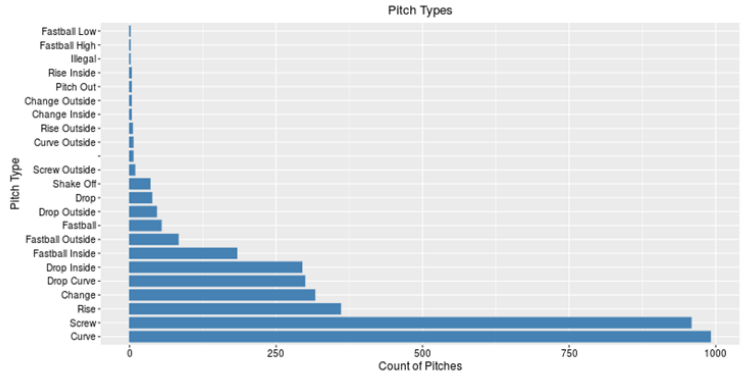
Select a Pitcher +

Game Selection +

Graph Conditions +

Game Situations +

Base Runners +



Select a Pitcher +

Game Selection −

Select an opponent:

All

Year:

Games:

Graph Conditions −

Condition on:

None

Game Situations −

Count:

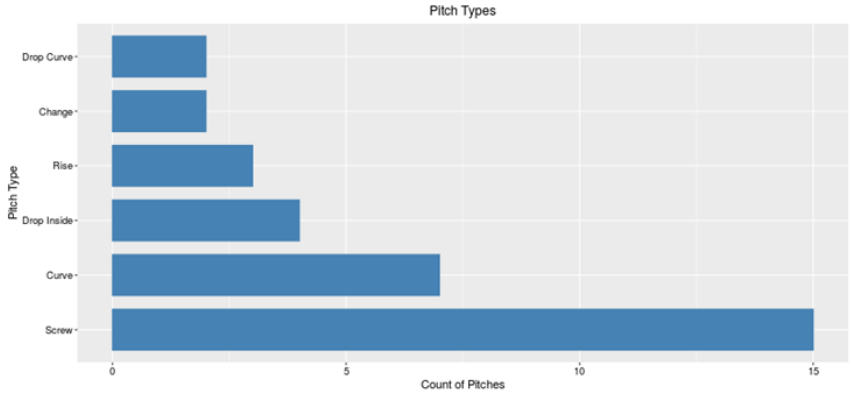
Outs:

Inning:

Base Runners −

Runners on:

- [ ] No Runners
- [ ] RISP
- [ ] Runner On Base
- [ ] Runner On 1st
- [ ] Runner On 2nd
- [ ] Runner On 3rd
- [ ] Runner Not On 1st
- [ ] Runner Not On 2nd
- [ ] Runner Not On 3rd



Game Situations

Count:

3-2

Outs:

Inning:

Select a Pitcher

Game Selection

Select an opponent:

Brandeis

Year:

2019

Games:

Graph Conditions

Base Runners

Runners on:

- No Runners
- RISP
- Runner On Base
- Runner On 1st
- Runner On 2nd
- Runner On 3rd
- Runner Not On 1st
- Runner Not On 2nd
- Runner Not On 3rd