Major League Baseball Player-Skill Analysis

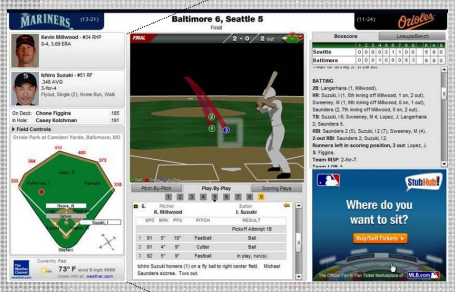
with Pitch F/x Data and ArcGIS

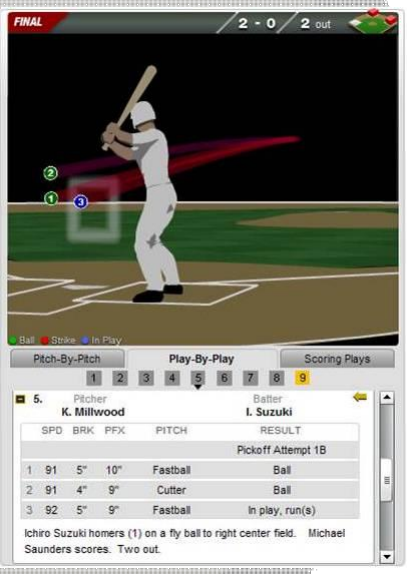
By: Grant Humphries

Gameday and Pitch F/x

Pitch F/x (a GIS)

Gameday Application

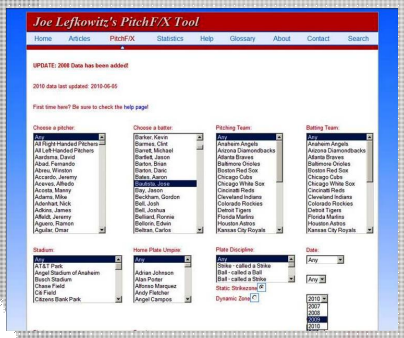




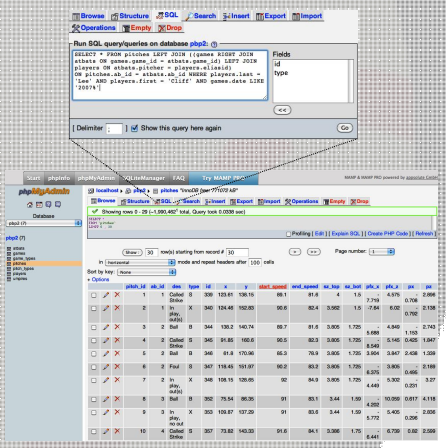
Attribute Table

Acquiring and Organizing the Data

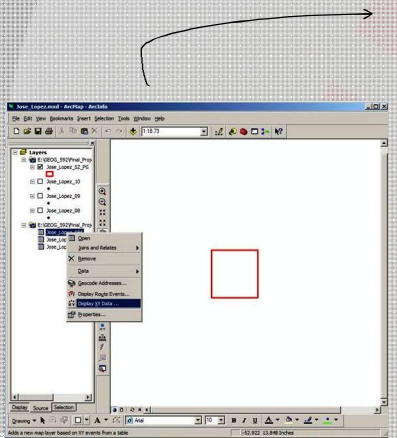
Joe Lefkowitz's Free Online Pitch F/x Tool

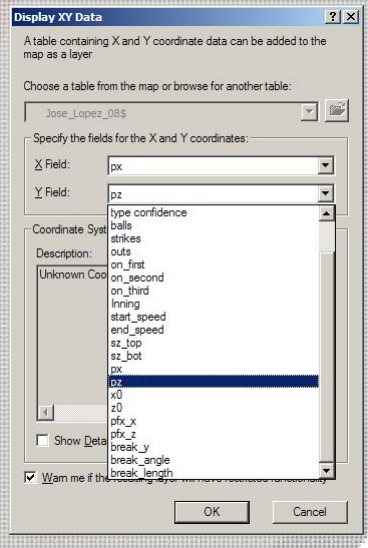


Queries in MySQL Database



Importing Data into ArcMap





Research Questions

- What is the root or underlying cause when a player has a large change in their production?
  - Is the change tied to luck or are they exhibiting new skills?
- What is the player's true talent level?
- What level of performance can be expected from a player going forward?

Case 1:

Adrian Gonzalez's

Improved Walk Rate in 2009

Plate Discipline Statistics

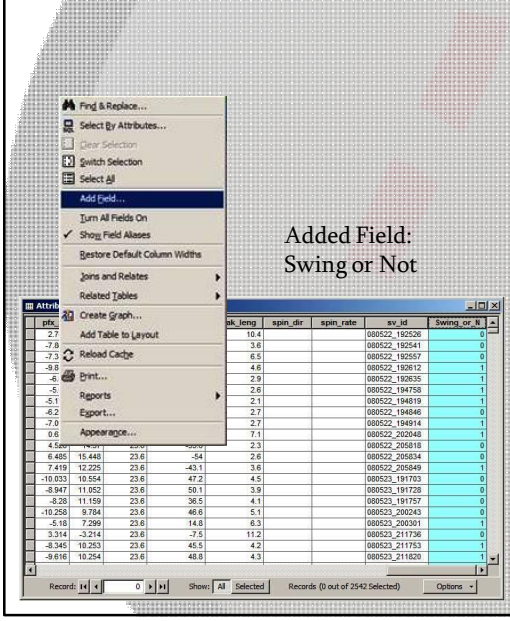
Season	Team	PA	BB	BB%
2008	Padres	700	74	10.60%
2009	Padres	681	119	17.50%

General Offense Statistics

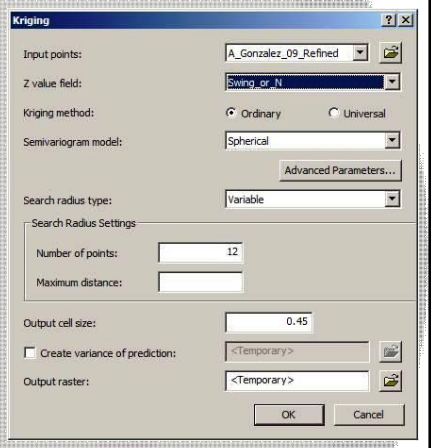
2B	3B	HR	OBP	SLG	ISO	OPS	wOBA	WAR
32	1	36	0.361	0.510	0.231	0.871	0.368	3.9
27	2	40	0.407	0.551	0.274	0.958	0.402	6.6

Stats via FANGRAPHS

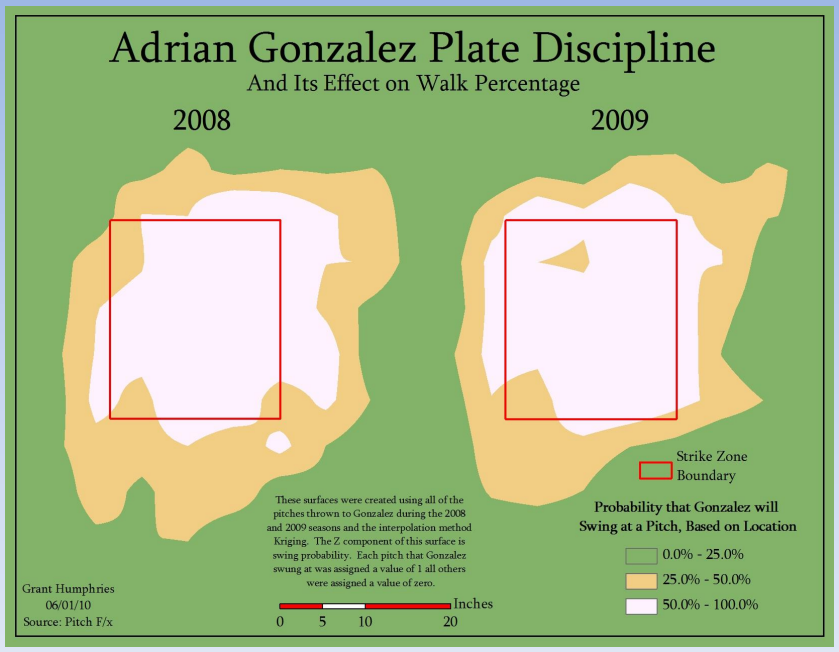
Case 1: Techniques



Added Field:
Swing or Not



Kriging Specifications



Case 1: Conclusions

- Has Approach Changed

  Yes
- New Skills Displayed?

  Yes
- Sustainable?

  Yes

Case 2:

Joel Piniero's

Increase in Groundballs in the 2009 Season

Batted Ball Statistics

Season	Team	IP	GB	LD%	FB%	GB%	GB/FB	HR/9	HR/FB
2008	Cardinals	148.2	250	21.7%	29.7%	48.5%	1.63	1.33	14.4%
2009	Cardinals	214.0	427	15.7%	23.8%	60.5%	2.54	0.46	6.5%

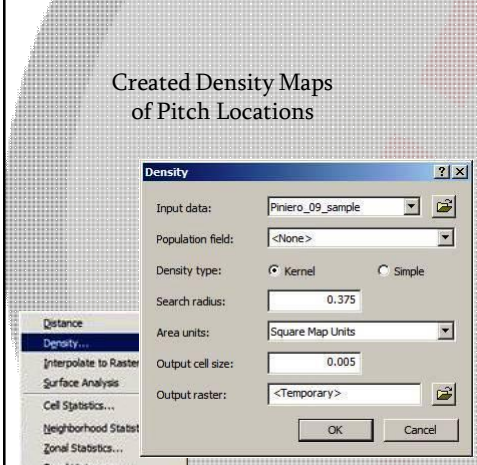
General Pitching Statistics

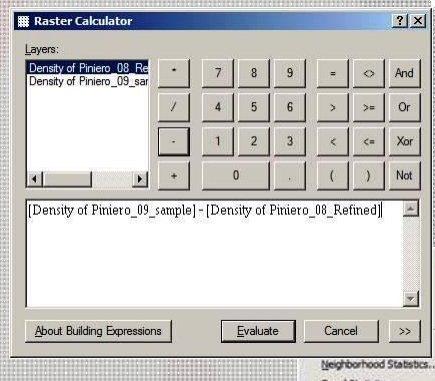
K/9	BB/9	ERA	FIP	xFIP	WAR
4.9	2.1	5.15	4.71	4.19	0.9
4.4	1.1	3.49	3.27	3.68	4.8

Stats via FANGRAPHS

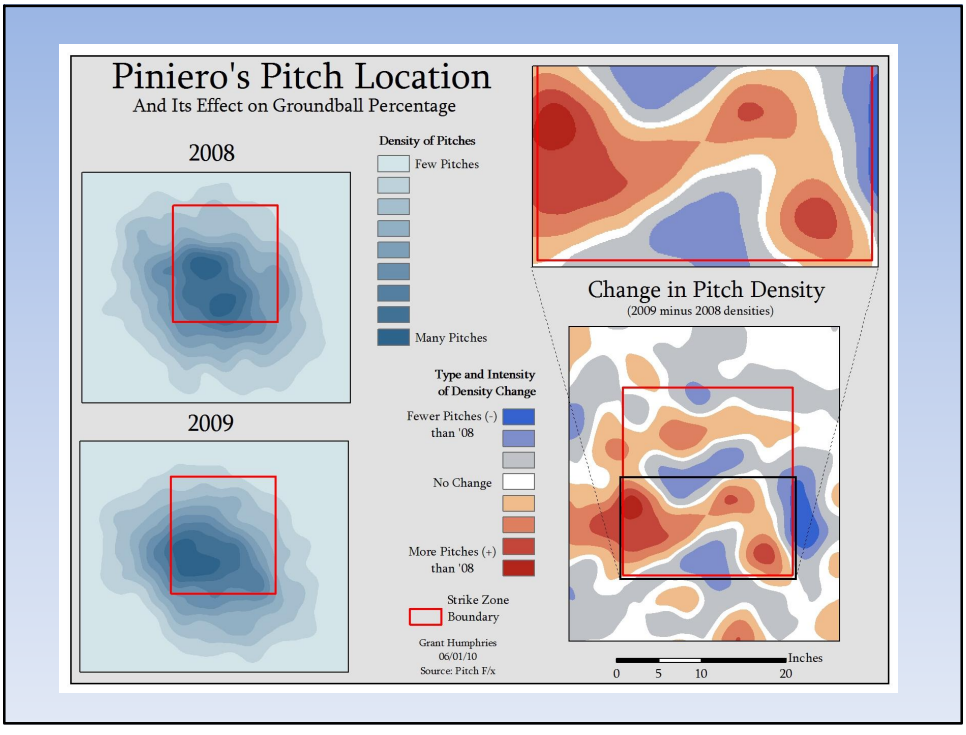
Case 2: Techniques

Created Density Maps of Pitch Locations





Used Raster Calculator to Determine Change in Density from '08 to '09



Case 2: Conclusions

- Has Approach Changed?

  Yes
- New Skills Displayed?

  ???
- Sustainable?

  Yes

Case 3:

John Danks Collapse

In the Second Half of the 2009 Season

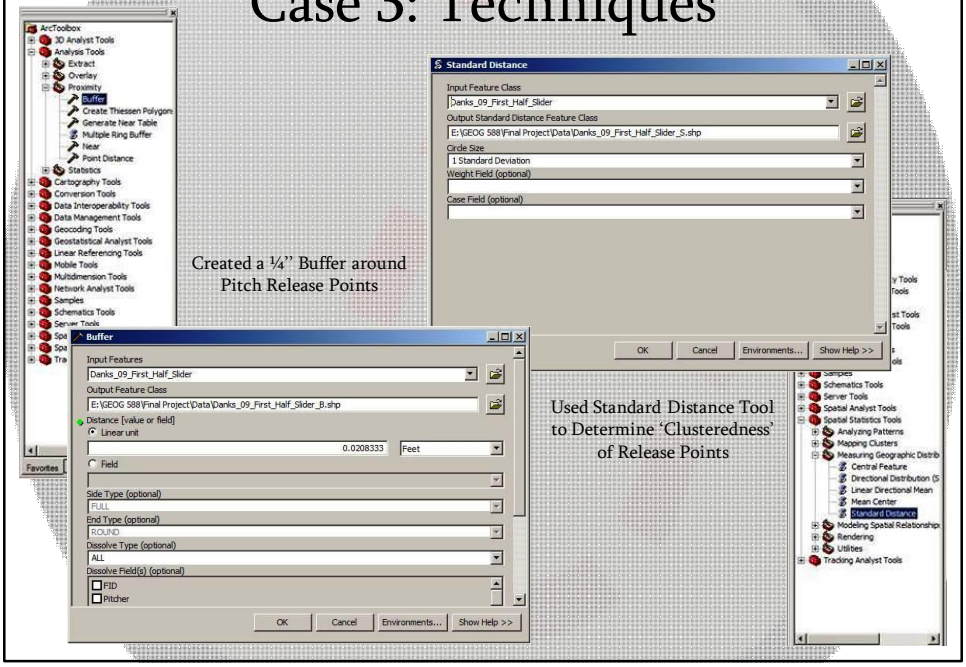
General Pitching Statistics

Season	Team	K/9	BB/9	HR/9	FIP	xFIP	GB%	FB%
2009 1/2	White Sox	8.3	3.32	1.14	4.11	3.94	46.4%	36.9%
2009 2/2	White Sox	5.6	3.3	1.38	5.06	4.95	42.6%	43.8%

Advanced Pitch Statistics

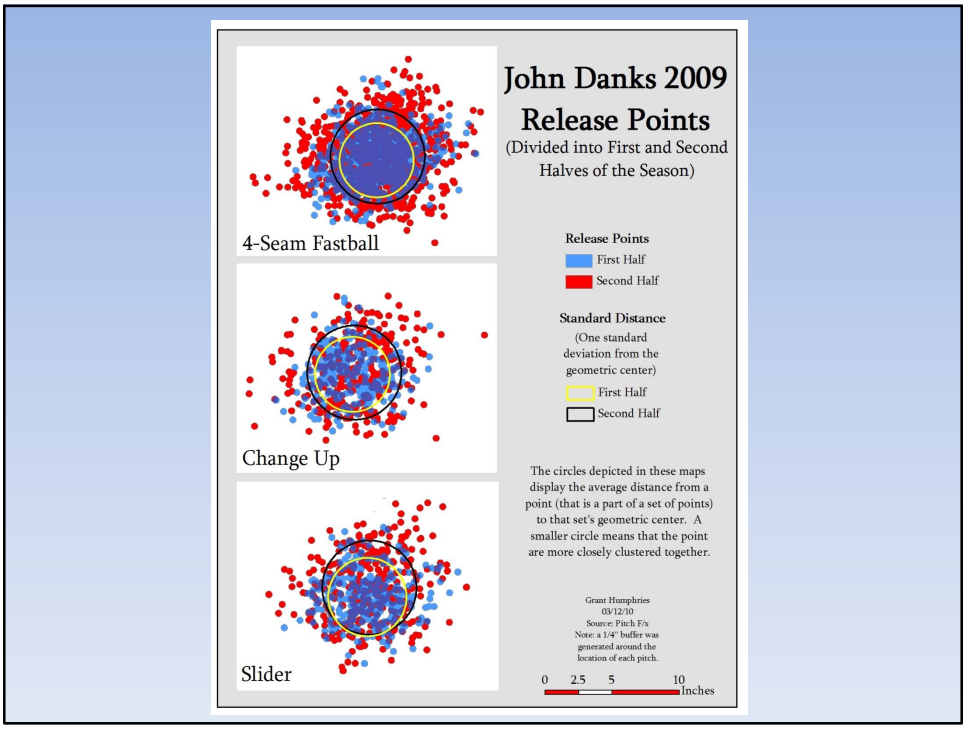
1st Half				
	Swinging Strike %	Average Velo	Average pfx	Average brk
Change Up	22.8%	82.9 mph	11.95"	-
4-Seam FB	8.2%	91.0 mph	-	-
Slider	17.5%	86.1 mph	-	6.67"
2nd Half				
	Swinging Strike %	Average Velo	Average pfx	Average brk
Change Up	17.3%	82.1 mph	11.55"	-
4-Seam FB	3.1%	89.9 mph	-	-
Slider	10.5%	85.2 mph	-	6.52"

Case 3: Techniques



Created a ¼" Buffer around Pitch Release Points

Used Standard Distance Tool to Determine 'Clusteredness' of Release Points



Case 3: Conclusions

- Has Approach Changed?

  Yes
- New Skills Displayed?

  No
- Sustainable?

  No

Case 4:

Jose Bautista's Breakout

Offensive Season in 2010

Advanced Offensive Statistics

Season	Team	OBP	SLG	ISO	OPS	wOBA	wRC+	WAR
2009	Blue Jays	0.349	0.408	0.173	0.757	0.339	107	1.9
2010	Blue Jays	0.377	0.605	0.355	0.982	0.415	161	2.0

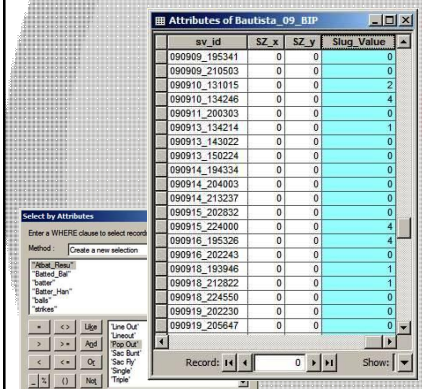
Basic Offensive Statistics

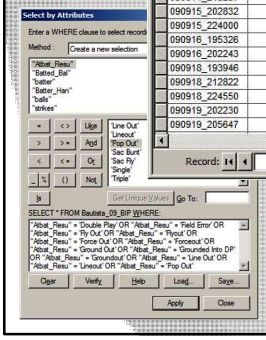
PA	BB	2B	3B	HR	BB%
404	56	13	3	13	13.9%
244	39	13	2	18	16.0%

Stats via FANGRAPHS

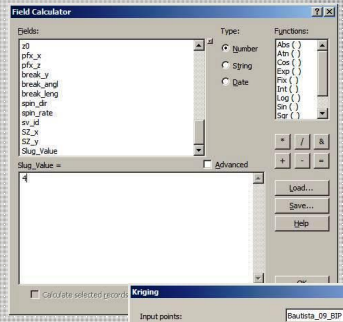
Case 4: Techniques

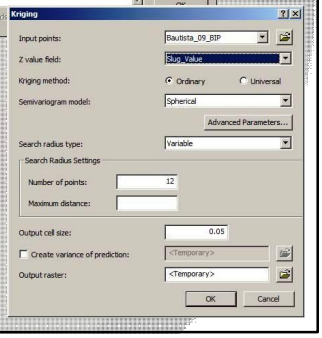
Created a New Field and Assigned Figures to Each Pitch Based on Slugging Value (Power)

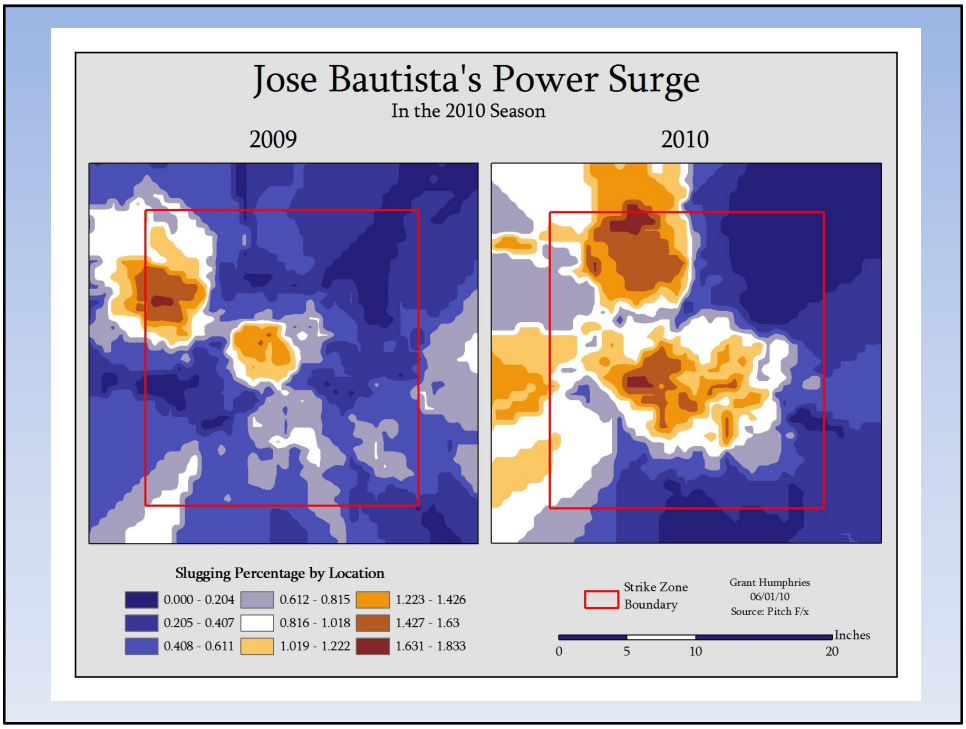




Interpolated a Surface with Slugging as the Z-Component







Case 4: Conclusions

- Has Approach Changed?

  ???
- New Skills Displayed?

  Yes
- Sustainable?

  ??? - Need More Data

Questions?

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