



Shot analysis with selected features

- Attempt to discover player rankings with different features
- Identify player tendencies
- Display statistics not usually found in official statistics sites
- Visualize player shots

Available features from datasets

- Game/Date
- Match Up
- Home/Away
- Final margin
- Shot number
- Period
- Game/shot clock
- Dribbles

- Shot Distance
- Touch Time
- Event Type
- Action Type
- Shot Type
- X/Y Coordinates

Identifying the 'Right' Dataset

- Obtained data from GitHub
 - User collected data from stats.nba.com
 - 30 MB 203,589 rows, 490 unique players
 - Covers shots from 2014-15 NBA season
- Secondary dataset scraped from stats.nba.com using Python
 - Obtained 11 players' shot information, including X and Y coordinates of all shots in 2015-16 NBA season
- Set up data in Excel and used basic data cleansing techniques
- Imported data to Tableau to generate visualizations and calculated fields

Understanding the Data

Initial Assumptions/Limitations

- Exclusion of Free Throws
 - Point totals distorted
 - Unable to identify player strength from drawing fouls
- Incomplete records (Data set 1)
 - In addition to exclusion of free throws, some shots were not recorded
 - E.g. Stephen Curry recorded 1,573 points, but official NBA stats show 1,592
 - E.g. December 14, 2014 VS Pelicans, Curry's first shot in OT was not recorded, resulting in a difference of 2 points

Data Cleaning

- Separation of Date, Home Team, and Away Team from Matchup Column
 - E.g. APR 15, 2015 GSW vs. DEN
- Shot Clock NULL Values
 - When the game clock counts down to 24 seconds, it becomes the shot clock and the shot clock value becomes NULL
 - Filtered 4th quarter and overtimes and replaced NULL shot clock values with **'CLUTCH'** to measure player effectiveness in high-pressure situations
- Negative Touch Time Values
 - 439 out of 203,589 rows (0.2%) excluded from data analysis

Exploratory Data Analysis

- Shot Number
 - Mean = 6.29
 - Median = 5
 - Max = 43 (Russell Westbrook)
 - Variance = 21.45
 - Standard Dev. = 4.63
- Largest Final Margin
 - 53 (123 70 DAL vs. PHI)

- Dribbles
 - Mean = 2.00
 - Median = 1
 - Max = 32 (Mo Williams)
 - Variance = 11.78
 - Standard Dev. = 3.43

- Shot Distance
 - Mean = 13.61
 - Median = 13.6
 - Max = 47.4 (Michael Carter-Williams)
 - Variance = 79.54
 - Standard Dev. = 8.92

Data Visualization with Tableau

Setup

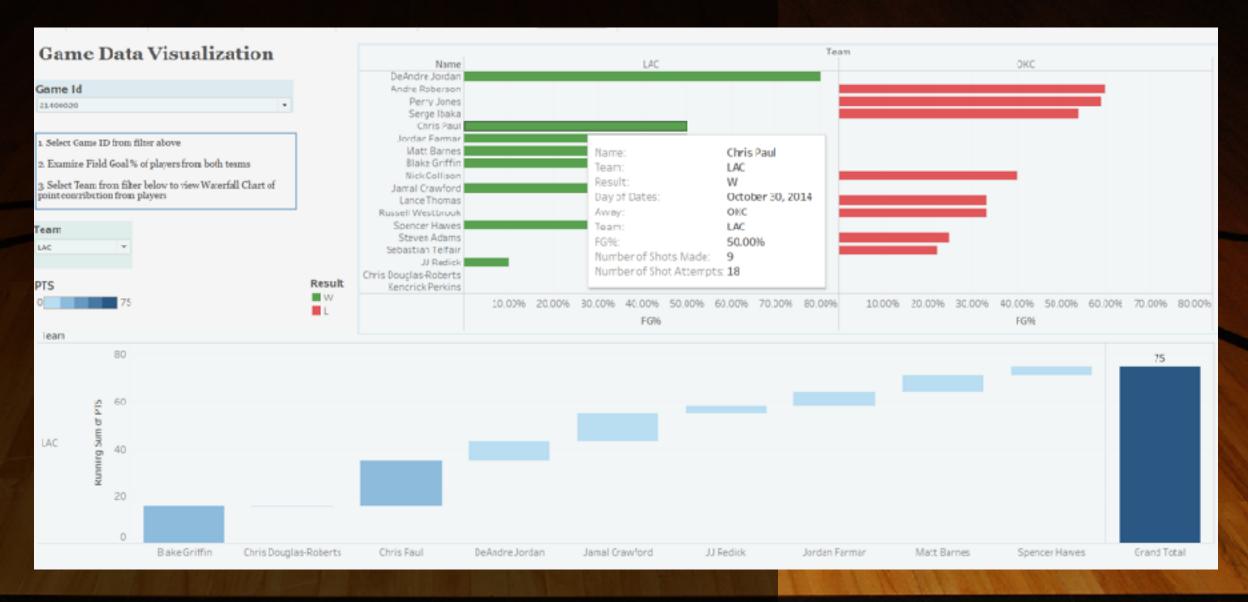
Workbook 1

 Left join Shots dataset with CSV file of Player ID, Name, and an image URL of player

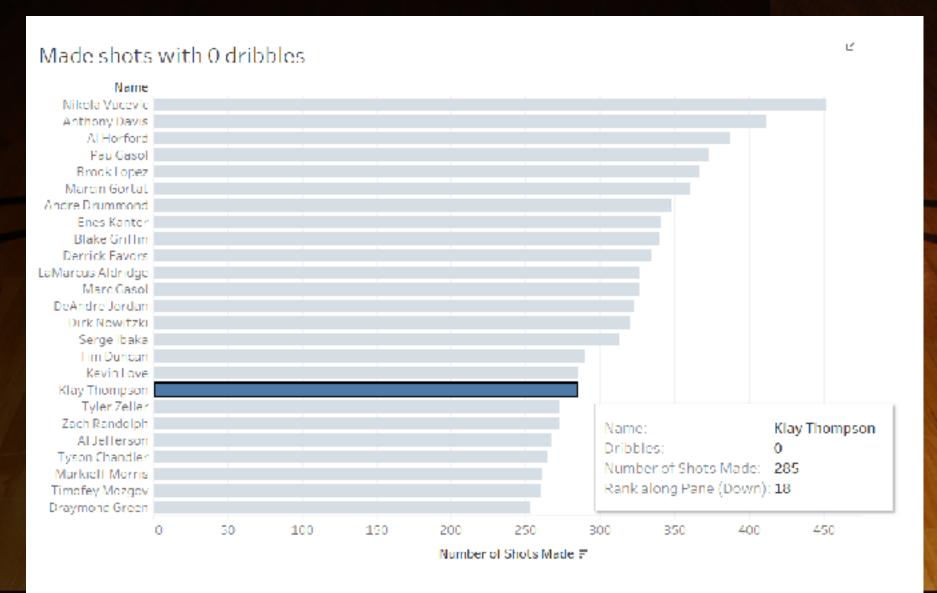
Workbook 2

 Inner join CSV file of Player ID, Name, and image URL with CSV file of scraped data of 11 players

Game Data Dashboard



Identifying top catch and shoot player





Ranking of Top 25 players composed of either Power Forwards (PF) or Centers (C)

Their short proximity to the basket enables dunks, put-backs, and offensive rebound chances, resulting in 0 dribbles

The exception is Klay Thompson, who ranks 18th in this list

Being able to be placed in this list of PFs and Cs proves that he makes an extremely high volume of catch and shoot shots for a Shooting Guard

Identifying 'clutch' shooters

Clutch Shots Made

Kyle Lowry 11	VictorOladipo 8	Pau Gasol 7	Dwyane Wade 5	L1Twa Moore 5	ore Haywa 5		Gordon Ma Hayward Ga 5 5		-	Lvan Turner 5
Carmelo Anthony 8	Jordan Clarkson 7	James Harden 6	Jordan Hill S	Avery Bradie			Damian Lillard 4		Jeremy Lin 4	y Gerald
Kentavious	George Hill 7	Andre Drummenel 6								
Caldwell-Pope 8	Brandon Knight 7	Chris Paul 6	LaMarcus Aldridge		Monta Ellis 4		Reggie Jackson 4		Troy Daniels 4	
J.R. Smith 8	Goran Dragic		Lou William 4	is	0.J. Mayo 4					
Kemba Walker 8	7 Jamett Jack /	Zach LeVine 6	Michael Carter-Williams		PJ Tucker 4		Eric Blodsoc 4		Wayne Ellington 4	
		Anthony Davis 5	Mike Conley 4		Ray McCallum 4			Will 4	Willie Green 4	

- Labelled shot clock at 24 seconds and under as 'Clutch'
- Filtered 4th quarter and overtime(s)
- Kyle Lowry leads the league in shots made (11)
- However, does not account for Wins/Losses
 - E.g. Losing team may have free shots as time winds down
 - Does not accurately define 'clutch' shooters

Number of Shots Made

Identifying 'clutch' shooters

Gamewinners

Kemba Walker 3	Jarrett Jack 2	Tebias Harris 2	Gerald Gord	lenry Jae Walker		Jeff Green 1	John Wall 1	
Marc Gasol 3	Khris Middleton 2	Stephen Curry 2	Jordan Clarkson Kirk Hinrich	Marcus Mic Smart 1		ke nley	Bradley Bool 1	Nick Johnson 1
Brandon Knight 2	Evan Turner 2	Tim Duncan 2	1 Kyrie Irving 1	Nick Par Young Gas 1 1		sual tier		Reggie Jackson 1
Anthony Davis 2	Ceorge Hill 2 LaMarcus Aldridge 2	Tyler Zeller	Blake Griffin 1	Brandon Johnings		Carl Landr 1	Robin Lopez 1	Tony Zech
Courtney Lee			Lance Stephenson LouWilliams	Russell Westbrook Solomon Hill	Trey Bu		lyreke	
James Harden 2	Monta Filis 2	Er I waun Moord 1 Andre Drummond	1 Bojan Bogdanovic	1 Brook Lopez	DeMarc	шя	Fvans Victor Oladipa	

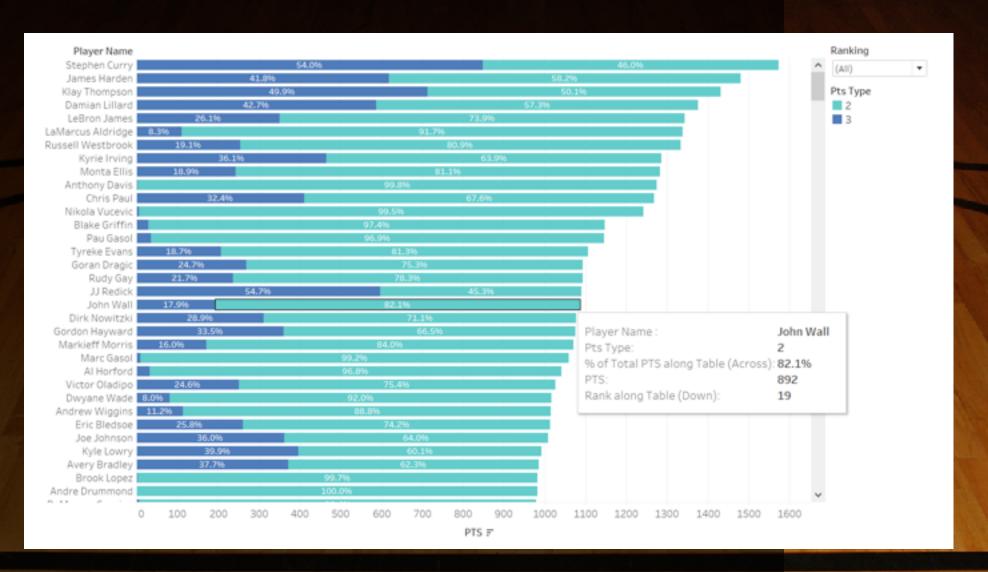


- Adding on 'Win' and Final Margin of 1, 2, and 3 points filter
- We identify the leaders in game-winning shots

Number of Shots Made

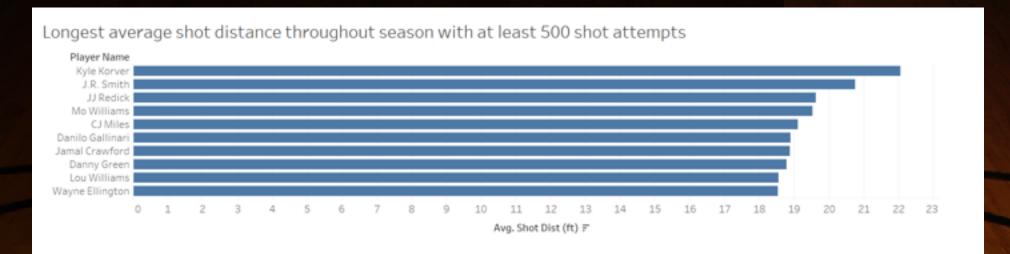
1

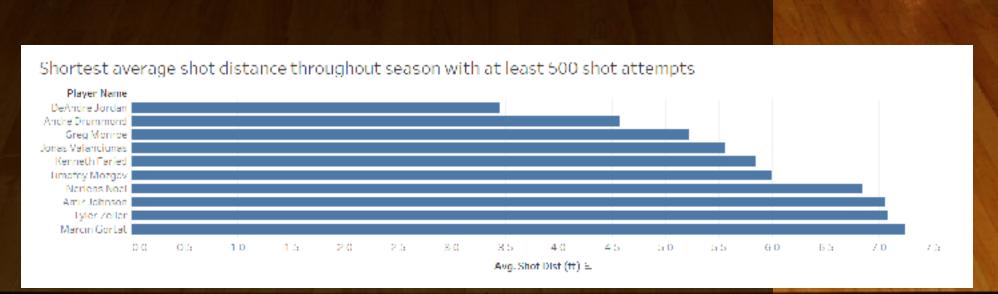
Shot Type Breakdown



- Overall points ranking (kept when filtered)
- Percentage breakdown of 2 and 3 point shots

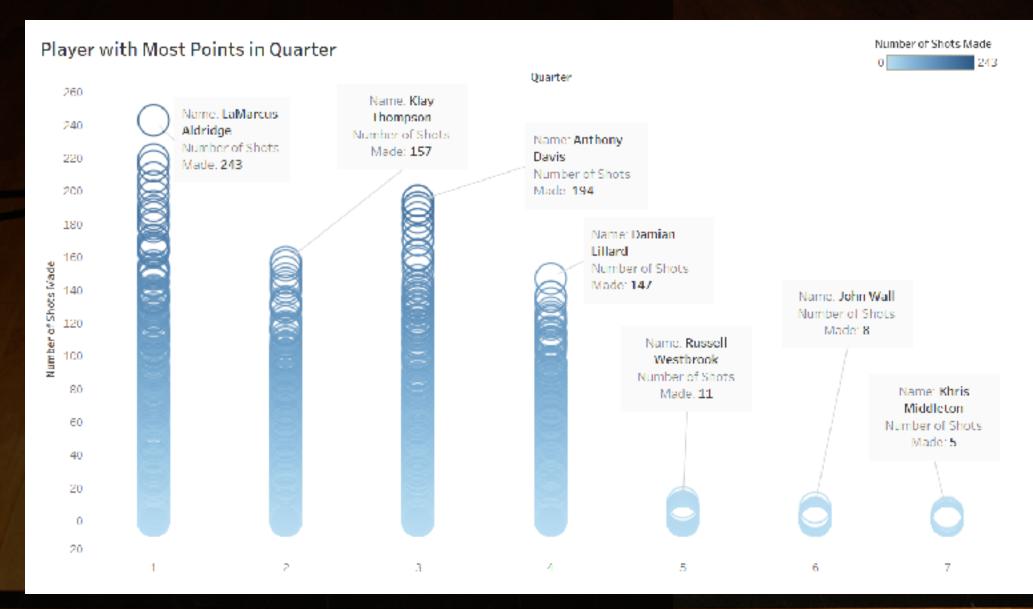
Shot Distance





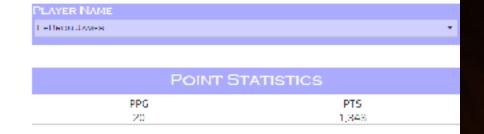
- Tendencies
 would include
 shooting jumpshots only
- 3 point line: 22-24 feet
- Free Throw line: 15 feet
- Tendencies include dunks, hook shots, post-moves, short-range jumpers

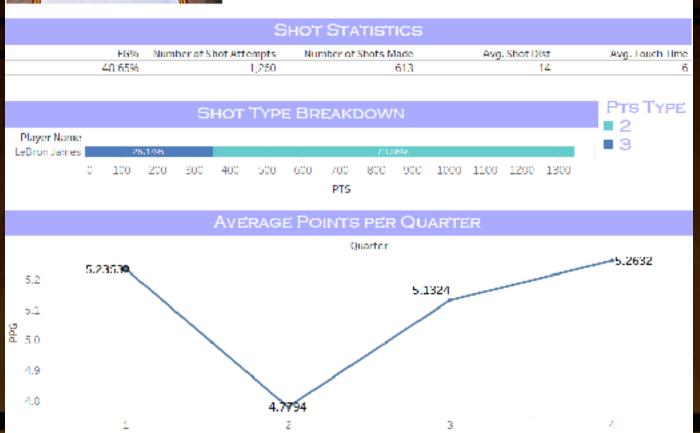
Leaders by Quarters



Player Card

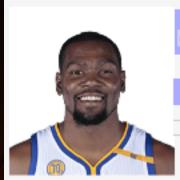




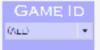


- Created a player profile that show a summary of stats from the data set
- Enabled filter to switch image and stats to any of the 490 players in the data set

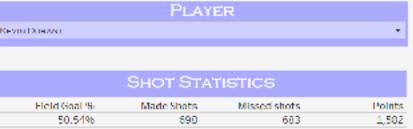
Shot Chart v1

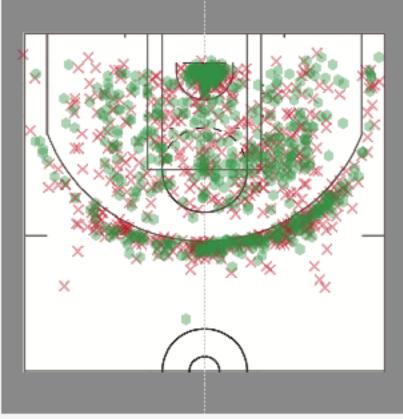


2015-2016 NBA REGULAR SEASON



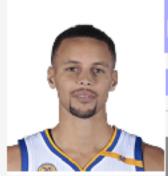
PERIOD (An)





- Created player shot chart using second data set
- Enabled filter to switch image, stats, and shot chart to any of the 11 players in the data set
- Included additional filters of Game ID and Period which affect the stats and the shot chart
- Created Calculated Field 'Points' using nested IF statements

Shot Chart v2

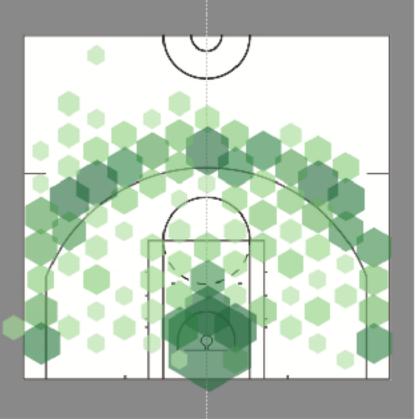


2015-2016 NBA REGULAR SEASON

GAME ID

PERIOD





- Used Hexbins to plot Made Shots
- Different style of visualization with only made shots

Further Analysis

Collect more data from stats.nba.com

Analyze more variables, such as 'Defender Distance'

Improve Tableau Dashboard design

Thanks!

Q&A

- Sources for help:
 - Dataset https://github.com/JunWorks/NBAstat
 - stats.nba.com scraping framework http://savvastjortjoglou.com/nba-shot-sharts.html
 - Dynamic Image Filter https://community.tableau.com/thread/119079?start=0&tstart=0
 - Keeping Overall Rank https://community.tableau.com/message/516072?et=watches.email.thread#516072
 - Hexbin Tutorial http://tableautim.com/tableau-hexbin-tutorial-with-hexbin-shape-pack/