

ncaahoopR EDA

```
# install.packages("devtools")
devtools::install_github("lbenz730/ncaahoopR", force = TRUE)
```

```
## Downloading GitHub repo lbenz730/ncaahoopR@HEAD
```

```
## ggplot2    (3.4.0 -> 3.4.1) [CRAN]
## readr      (2.1.3 -> 2.1.4) [CRAN]
## lubridate  (1.9.1 -> 1.9.2) [CRAN]
## igraph     (1.3.5 -> 1.4.0) [CRAN]
```

```
## Installing 4 packages: ggplot2, readr, lubridate, igraph
```

```
##
## The downloaded binary packages are in
## /var/folders/fg/58bgcw890xndbnp2g11w7w4h0000gn/T//RtmpR3jIvY/downloaded_packages
## * checking for file '/private/var/folders/fg/58bgcw890xndbnp2g11w7w4h0000gn/T/RtmpR3jIvY/remotesa6c7
## * preparing 'ncaahoopR':
## * checking DESCRIPTION meta-information ... OK
## * checking for LF line-endings in source and make files and shell scripts
## * checking for empty or unneeded directories
## * building 'ncaahoopR_1.7.0.9.tar.gz'
```

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.1 --
```

```
## v ggplot2 3.4.1      v purrr   1.0.1
## v tibble  3.1.8      v dplyr  1.1.0
## v tidyr   1.3.0      v stringr 1.5.0
## v readr   2.1.4      v forcats 0.5.1
```

```
## Warning: package 'ggplot2' was built under R version 4.1.2
```

```
## Warning: package 'tibble' was built under R version 4.1.2
```

```
## Warning: package 'tidyr' was built under R version 4.1.2
```

```
## Warning: package 'readr' was built under R version 4.1.2
```

```
## Warning: package 'purrr' was built under R version 4.1.2
```

```
## Warning: package 'dplyr' was built under R version 4.1.2
```

```

## Warning: package 'stringr' was built under R version 4.1.2

## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag() masks stats::lag()

library(backports)
library(ncaahoopR)

data(ids)
view(ids)

ark_pbp <- get_pbp("Arkansas", season = "2022-23")

## Getting Game IDs: Arkansas

## Scraping Data for Game: 1 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 2 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 3 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 4 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 5 of 25

```

```
## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 6 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 7 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 8 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 9 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 10 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 11 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions
```

```
## Scraping Data for Game: 12 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 13 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 14 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 15 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 16 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 17 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 18 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 19 of 25
```

```
## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 20 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 21 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 22 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 23 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions

## Scraping Data for Game: 24 of 25

## Getting Shots for Game 1 of 1

## Parsing Possessions

## Scraping Data for Game: 25 of 25

## Getting Shots for Game 1 of 1

## No shot location data available for this game.

## Parsing Possessions
```



```

### Get into Appropriate Format
x <- rbind(
  dplyr::select(data, secs_remaining_absolute, win_prob) %>%
    dplyr::mutate(team = "home"),
  dplyr::select(data, secs_remaining_absolute, win_prob) %>%
    dplyr::mutate("win_prob" = 1 - win_prob,
                  team = "away")
) %>%
  dplyr::mutate("secs_elapsed" = max(secs_remaining_absolute) - secs_remaining_absolute)

### Game Excitement Index
data$wp_delta <- 0
for(i in 2:nrow(data)) {
  data$wp_delta[i] <- abs(data$win_prob[i] - data$win_prob[i-1])
}
gei <- sum(data$wp_delta, na.rm = T)
gei <- paste("Game Excitement Index:", round(gei, 2))

### Minimum Win Probability
if(data$score_diff[nrow(data)] > 0) {
  min_prob <- min(data$win_prob)
  min_prob <- paste0("Minimum Win Probability for ", home_team, ": ",
                    ifelse(100 * min_prob < 1, "< 1%",
                          paste0(round(100 * min_prob), "%")))
} else {
  min_prob <- min(1 - data$win_prob)
  min_prob <- paste0("Minimum Win Probability for ", away_team, ": ",
                    ifelse(100 * min_prob < 1, "< 1%",
                          paste0(round(100 * min_prob), "%")))
}

home_score <- data$home_score[nrow(data)]
away_score <- data$away_score[nrow(data)]
st <- paste0(home_team, ": ", home_score, " ", away_team, ": ", away_score, "\n", date)

p <- ggplot2::ggplot(x, aes(x = secs_elapsed/60, y = win_prob, group = team, col = team)) +
  ggplot2::geom_line(size = 1) +
  ggplot2::theme_bw() +
  ggplot2::geom_vline(xintercept = plot_lines/60, lty = 2, alpha = 0.5, size = 0.8) +
  ggplot2::labs(x = "Minutes Elapsed",
               y = "Win Probability",
               col = "",
               title = paste0(ifelse(include_spread, "", "Naive "), "Win Probability Chart for ", home_team,
                                   " vs. ", away_team),
               subtitle = st,
               caption = "Jacob Haarala (@jhaarala23) Data Accessed via ncaahoopR") +
  ggplot2::theme(plot.title = element_text(size = 16, hjust = 0.5),
                plot.subtitle = element_text(size = 12, hjust = 0.5, face = "italic"),
                axis.title = element_text(size = 14),
                plot.caption = element_text(size = 8, hjust = 0),
                legend.position = "bottom",) +
  ggplot2::scale_x_continuous(breaks = seq(0, msec/60, 5)) +
  ggplot2::scale_y_continuous(labels = function(x) {paste(100 * x, "%")}) +

```

```

ggplot2::scale_color_manual(values = c(away_col, home_col),
                             labels = c(away_team, home_team))

if(show_labels) {
  p <- p +
    ggplot2::annotate("text", x = 5, y = 0.05, label = gei) +
    ggplot2::annotate("text", x = 5, y = 0.025, label = min_prob)
}

p
}

```

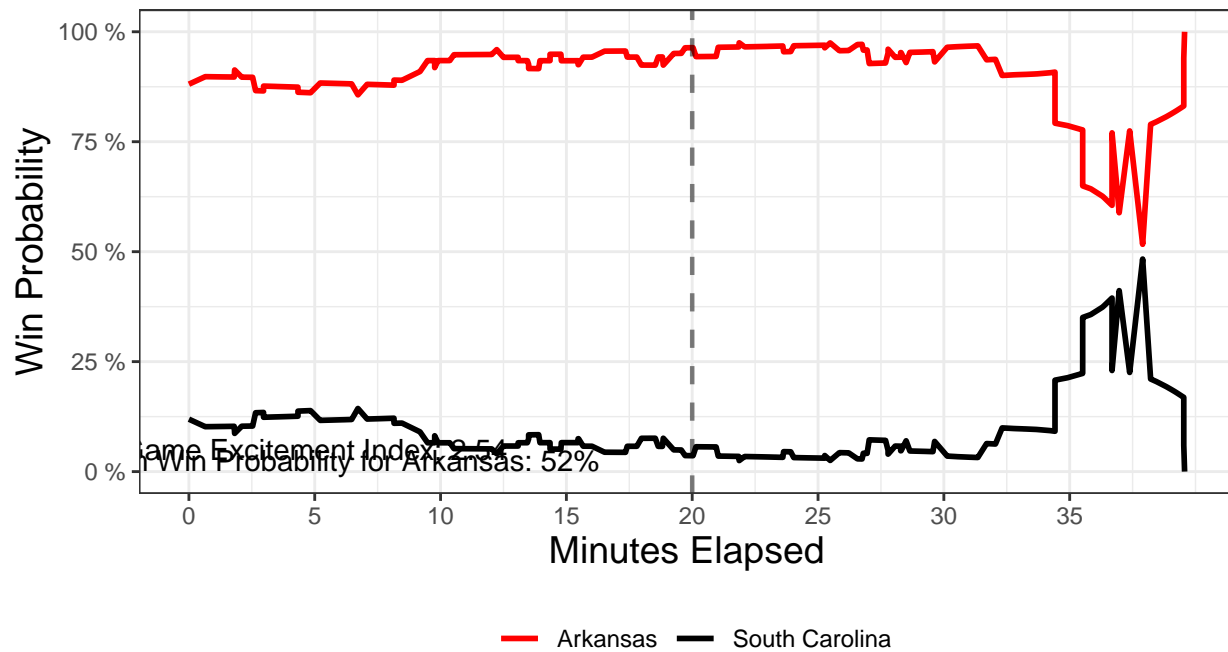
```
wp_chart(game_id = 401484594, home_col = "black", away_col = "red")
```

```
## Scraping Data for Game: 1 of 1
```

```
## Warning: Using 'size' aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use 'linewidth' instead.
```

Win Probability Chart for South Carolina vs. Arkansas

South Carolina: 63 Arkansas: 65
February 04, 2023



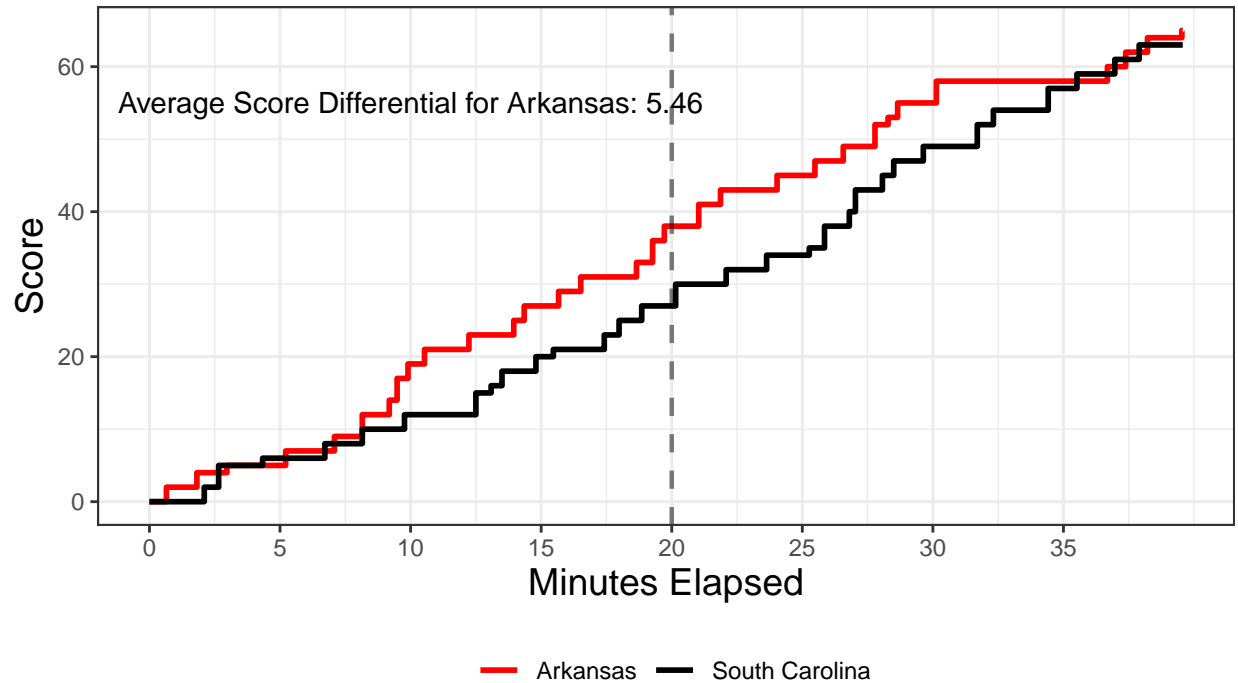
Jacob Haarala (@jhaarala23) Data Accessed via ncaahoopR

```
game_flow(game_id = 401484594, home_col = "black", away_col = "red")
```

```
## Scraping Data for Game: 1 of 1
```


Game Flow Chart for South Carolina vs. Arkansas

February 04, 2023



Luke Benz (@recspecs730) Data Accessed via ncaahoopR

```
average_win_prob(game_id = 401484594, include_spread = T)
```

```
## Scraping Data for Game: 1 of 1
```

```
## Getting Shots for Game 1 of 1
```

```
## No shot location data available for this game.
```

```
## Parsing Possessions
```

```
## [1] 0.09499065
```

ESPN game_id for which to compute time-based average win probability (from perspective of home team).

```
average_score_diff(game_id = 401484594)
```

```
## Scraping Data for Game: 1 of 1
```

```
## [1] -5.455771
```

ESPN game_id for which to compute time-based average score differential (from perspective of home team).

```
# switched to the LSU game because the data for the South Carolina game was not there yet  
get_shot_locs(game_id = 401484577)
```

```
## Getting Shots for Game 1 of 1
```

##	game_id	date
## 1	401484577	2023-01-24
## 2	401484577	2023-01-24
## 3	401484577	2023-01-24
## 4	401484577	2023-01-24
## 5	401484577	2023-01-24
## 6	401484577	2023-01-24
## 7	401484577	2023-01-24
## 8	401484577	2023-01-24
## 9	401484577	2023-01-24
## 10	401484577	2023-01-24
## 11	401484577	2023-01-24
## 12	401484577	2023-01-24
## 13	401484577	2023-01-24
## 14	401484577	2023-01-24
## 15	401484577	2023-01-24
## 16	401484577	2023-01-24
## 17	401484577	2023-01-24
## 18	401484577	2023-01-24
## 19	401484577	2023-01-24
## 20	401484577	2023-01-24
## 21	401484577	2023-01-24
## 22	401484577	2023-01-24
## 23	401484577	2023-01-24
## 24	401484577	2023-01-24
## 25	401484577	2023-01-24
## 26	401484577	2023-01-24
## 27	401484577	2023-01-24
## 28	401484577	2023-01-24
## 29	401484577	2023-01-24
## 30	401484577	2023-01-24
## 31	401484577	2023-01-24
## 32	401484577	2023-01-24
## 33	401484577	2023-01-24
## 34	401484577	2023-01-24
## 35	401484577	2023-01-24
## 36	401484577	2023-01-24
## 37	401484577	2023-01-24
## 38	401484577	2023-01-24
## 39	401484577	2023-01-24
## 40	401484577	2023-01-24
## 41	401484577	2023-01-24
## 42	401484577	2023-01-24
## 43	401484577	2023-01-24
## 44	401484577	2023-01-24
## 45	401484577	2023-01-24
## 46	401484577	2023-01-24
## 47	401484577	2023-01-24

48 401484577 2023-01-24
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101 401484577 2023-01-24

```

## 102 401484577 2023-01-24
## 103 401484577 2023-01-24
## 104 401484577 2023-01-24
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## 113 401484577 2023-01-24
## 114 401484577 2023-01-24
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## 126 401484577 2023-01-24
## 127 401484577 2023-01-24
## 128 401484577 2023-01-24
## 129 401484577 2023-01-24
## 130 401484577 2023-01-24
## 131 401484577 2023-01-24
## 132 401484577 2023-01-24
## 133 401484577 2023-01-24

```

```

##                                     shot_text  x  y
## 1                                Jordan Walsh missed Jumper. 29  5
## 2                                Adam Miller missed Jumper. 13 77
## 3                Davonte Davis made Jumper. Assisted by Makhi Mitchell. 8  0
## 4                                Justice Williams missed Free Throw. 25 94
## 5                                Justice Williams made Free Throw. 25 94
## 6                                Anthony Black missed Jumper. 23 14
## 7                                Justice Williams missed Layup. 21 94
## 8                                KJ Williams made Free Throw. 25 94
## 9                                KJ Williams missed Free Throw. 25 94
## 10                               Anthony Black made Free Throw. 25  0
## 11                               Anthony Black made Free Throw. 25  0
## 12                               Jalen Reed missed Layup. 29 94
## 13                               Derek Fountain missed Layup. 24 91
## 14                               Justice Williams missed Layup. 24 92
## 15                Makhi Mitchell made Layup. Assisted by Anthony Black. 25  3
## 16                               Derek Fountain made Free Throw. 25 94
## 17                               Derek Fountain made Free Throw. 25 94
## 18                Ricky Council IV made Jumper. Assisted by Kamani Johnson. 40 10
## 19                               Trae Hannibal made Jumper. 40 85
## 20                               Anthony Black missed Jumper. 35 13
## 21                               Cam Hayes missed Three Point Jumper. 45 79

```

22 Kendal Coleman missed Layup. 28 92
 ## 23 Davonte Davis made Three Point Jumper. Assisted by Ricky Council IV. 2 1
 ## 24 Ricky Council IV made Layup. 28 -1
 ## 25 KJ Williams made Jumper. Assisted by Adam Miller. 37 91
 ## 26 Cam Hayes missed Jumper. 39 81
 ## 27 Jordan Walsh missed Jumper. 17 17
 ## 28 Davonte Davis made Layup. Assisted by Ricky Council IV. 24 1
 ## 29 KJ Williams made Free Throw. 25 94
 ## 30 KJ Williams made Free Throw. 25 94
 ## 31 KJ Williams made Free Throw. 25 94
 ## 32 Anthony Black made Free Throw. 25 0
 ## 33 Anthony Black made Free Throw. 25 0
 ## 34 KJ Williams missed Jumper. 32 94
 ## 35 Anthony Black made Three Point Jumper. 28 25
 ## 36 Adam Miller missed Jumper. 41 79
 ## 37 Jordan Walsh made Layup. Assisted by Ricky Council IV. 29 0
 ## 38 KJ Williams missed Jumper. 25 85
 ## 39 Jordan Walsh made Layup. 28 1
 ## 40 Adam Miller missed Jumper. 17 94
 ## 41 Jalen Graham made Dunk. Assisted by Anthony Black. 23 2
 ## 42 Davonte Davis made Layup. 22 1
 ## 43 Trae Hannibal missed Jumper. 29 78
 ## 44 Jalen Graham made Dunk. Assisted by Ricky Council IV. 23 2
 ## 45 Trae Hannibal missed Jumper. 40 83
 ## 46 Jordan Walsh missed Dunk. 22 -1
 ## 47 Trae Hannibal missed Layup. 27 94
 ## 48 Trae Hannibal missed Layup. 24 93
 ## 49 Trae Hannibal made Layup. 26 93
 ## 50 Davonte Davis made Three Point Jumper. Assisted by Anthony Black. 2 4
 ## 51 Anthony Black made Three Point Jumper. Assisted by Ricky Council IV. 21 25
 ## 52 Justice Williams missed Three Point Jumper. 43 76
 ## 53 Ricky Council IV missed Three Point Jumper. 39 22
 ## 54 Cam Hayes missed Layup. 28 93
 ## 55 Ricky Council IV made Layup. 22 1
 ## 56 Jalen Reed missed Jumper. 23 89
 ## 57 Ricky Council IV missed Three Point Jumper. 48 6
 ## 58 KJ Williams missed Three Point Jumper. 49 95
 ## 59 Anthony Black missed Three Point Jumper. 33 28
 ## 60 KJ Williams missed Jumper. 16 95
 ## 61 Jalen Graham missed Jumper. 22 16
 ## 62 Cam Hayes missed Layup. 24 93
 ## 63 Derek Fountain made Free Throw. 25 94
 ## 64 Derek Fountain missed Free Throw. 25 94
 ## 65 Jalen Graham missed Jumper. 25 9
 ## 66 Jalen Graham missed Jumper. 29 12
 ## 67 Derek Fountain made Layup. 24 91
 ## 68 Ricky Council IV missed Jumper. 25 7
 ## 69 Justice Williams made Layup. Assisted by Jalen Reed. 22 93
 ## 70 Justice Williams missed Layup. 28 94
 ## 71 Adam Miller made Layup. Assisted by Justice Williams. 26 93
 ## 72 Ricky Council IV made Jumper. 27 14
 ## 73 Adam Miller made Three Point Jumper. Assisted by Derek Fountain. 32 71
 ## 74 Makhi Mitchell missed Layup. 28 1
 ## 75 Adam Miller missed Free Throw. 25 94

## 76	Adam Miller made Free Throw.	25	94
## 77	Joseph Pinion missed Three Point Jumper.	1	-2
## 78	Ricky Council IV missed Layup.	22	1
## 79	Adam Miller made Layup. Assisted by KJ Williams.	27	91
## 80	Adam Miller made Free Throw.	25	94
## 81	Derek Fountain missed Layup.	23	94
## 82	Justice Williams made Layup.	24	92
## 83	Jalen Reed missed Jumper.	23	87
## 84	Ricky Council IV missed Jumper.	16	16
## 85	Joseph Pinion missed Three Point Jumper.	6	17
## 86	Adam Miller missed Three Point Jumper.	25	65
## 87	Ricky Council IV made Free Throw.	25	0
## 88	Ricky Council IV made Free Throw.	25	0
## 89	Justice Williams made Jumper.	16	92
## 90	Anthony Black missed Jumper.	27	10
## 91	Makhi Mitchell made Free Throw.	25	0
## 92	Makhi Mitchell made Free Throw.	25	0
## 93	Trae Hannibal missed Jumper.	26	88
## 94	Davonte Davis missed Jumper.	7	8
## 95	Trae Hannibal missed Jumper.	21	88
## 96	Ricky Council IV missed Jumper.	31	3
## 97	Ricky Council IV missed Free Throw.	25	0
## 98	Adam Miller missed Three Point Jumper.	35	67
## 99	Davonte Davis made Jumper.	19	3
## 100	KJ Williams missed Jumper.	30	94
## 101	KJ Williams missed Layup.	26	94
## 102	KJ Williams made Layup.	25	93
## 103	Jordan Walsh missed Three Point Jumper.	49	0
## 104	Trae Hannibal made Dunk. Assisted by Justice Williams.	23	92
## 105	Makhi Mitchell made Dunk. Assisted by Davonte Davis.	26	3
## 106	KJ Williams missed Jumper.	16	93
## 107	Ricky Council IV missed Jumper.	24	5
## 108	Davonte Davis made Jumper.	9	2
## 109	Adam Miller missed Three Point Jumper.	43	77
## 110	KJ Williams made Free Throw.	25	94
## 111	KJ Williams missed Free Throw.	25	94
## 112	Anthony Black made Three Point Jumper. Assisted by Davonte Davis.	2	3
## 113	Adam Miller missed Three Point Jumper.	45	81
## 114	Justice Williams missed Jumper.	30	92
## 115	Anthony Black missed Jumper.	19	5
## 116	Jalen Graham made Dunk. Assisted by Ricky Council IV.	21	1
## 117	Adam Miller missed Three Point Jumper.	2	84
## 118	Jalen Graham missed Free Throw.	25	0
## 119	Makhi Mitchell made Dunk. Assisted by Davonte Davis.	23	0
## 120	Adam Miller missed Layup.	22	93
## 121	Trae Hannibal made Layup.	24	92
## 122	Makhi Mitchell made Dunk. Assisted by Ricky Council IV.	28	0
## 123	Jalen Reed made Layup.	26	90
## 124	Anthony Black missed Three Point Jumper.	17	26
## 125	KJ Williams missed Jumper.	26	88
## 126	Ricky Council IV missed Three Point Jumper.	10	20
## 127	Makhi Mitchell missed Layup.	25	3
## 128	Anthony Black missed Free Throw.	25	0
## 129	Anthony Black made Free Throw.	25	0

## 130			Jalen Graham missed Layup.	29	1
## 131			Jalen Reed missed Jumper.	20	89
## 132			Ricky Council IV missed Layup.	28	2
## 133			Justice Williams missed Jumper.	39	93
##	outcome	shooter	assisted three_pt	color	team_name
## 1	missed	Jordan Walsh	<NA>	FALSE #9c1831	Arkansas
## 2	missed	Adam Miller	<NA>	FALSE #461d7c	LSU
## 3	made	Davonte Davis	Makhi Mitchell	FALSE #9c1831	Arkansas
## 4	missed	Justice Williams	<NA>	FALSE #461d7c	LSU
## 5	made	Justice Williams	<NA>	FALSE #461d7c	LSU
## 6	missed	Anthony Black	<NA>	FALSE #9c1831	Arkansas
## 7	missed	Justice Williams	<NA>	FALSE #461d7c	LSU
## 8	made	KJ Williams	<NA>	FALSE #461d7c	LSU
## 9	missed	KJ Williams	<NA>	FALSE #461d7c	LSU
## 10	made	Anthony Black	<NA>	FALSE #9c1831	Arkansas
## 11	made	Anthony Black	<NA>	FALSE #9c1831	Arkansas
## 12	missed	Jalen Reed	<NA>	FALSE #461d7c	LSU
## 13	missed	Derek Fountain	<NA>	FALSE #461d7c	LSU
## 14	missed	Justice Williams	<NA>	FALSE #461d7c	LSU
## 15	made	Makhi Mitchell	Anthony Black	FALSE #9c1831	Arkansas
## 16	made	Derek Fountain	<NA>	FALSE #461d7c	LSU
## 17	made	Derek Fountain	<NA>	FALSE #461d7c	LSU
## 18	made	Ricky Council IV	Kamani Johnson	FALSE #9c1831	Arkansas
## 19	made	Trae Hannibal	<NA>	FALSE #461d7c	LSU
## 20	missed	Anthony Black	<NA>	FALSE #9c1831	Arkansas
## 21	missed	Cam Hayes	<NA>	TRUE #461d7c	LSU
## 22	missed	Kendal Coleman	<NA>	FALSE #461d7c	LSU
## 23	made	Davonte Davis	Ricky Council IV	TRUE #9c1831	Arkansas
## 24	made	Ricky Council IV	<NA>	FALSE #9c1831	Arkansas
## 25	made	KJ Williams	Adam Miller	FALSE #461d7c	LSU
## 26	missed	Cam Hayes	<NA>	FALSE #461d7c	LSU
## 27	missed	Jordan Walsh	<NA>	FALSE #9c1831	Arkansas
## 28	made	Davonte Davis	Ricky Council IV	FALSE #9c1831	Arkansas
## 29	made	KJ Williams	<NA>	FALSE #461d7c	LSU
## 30	made	KJ Williams	<NA>	FALSE #461d7c	LSU
## 31	made	KJ Williams	<NA>	FALSE #461d7c	LSU
## 32	made	Anthony Black	<NA>	FALSE #9c1831	Arkansas
## 33	made	Anthony Black	<NA>	FALSE #9c1831	Arkansas
## 34	missed	KJ Williams	<NA>	FALSE #461d7c	LSU
## 35	made	Anthony Black	<NA>	TRUE #9c1831	Arkansas
## 36	missed	Adam Miller	<NA>	FALSE #461d7c	LSU
## 37	made	Jordan Walsh	Ricky Council IV	FALSE #9c1831	Arkansas
## 38	missed	KJ Williams	<NA>	FALSE #461d7c	LSU
## 39	made	Jordan Walsh	<NA>	FALSE #9c1831	Arkansas
## 40	missed	Adam Miller	<NA>	FALSE #461d7c	LSU
## 41	made	Jalen Graham	Anthony Black	FALSE #9c1831	Arkansas
## 42	made	Davonte Davis	<NA>	FALSE #9c1831	Arkansas
## 43	missed	Trae Hannibal	<NA>	FALSE #461d7c	LSU
## 44	made	Jalen Graham	Ricky Council IV	FALSE #9c1831	Arkansas
## 45	missed	Trae Hannibal	<NA>	FALSE #461d7c	LSU
## 46	missed	Jordan Walsh	<NA>	FALSE #9c1831	Arkansas
## 47	missed	Trae Hannibal	<NA>	FALSE #461d7c	LSU
## 48	missed	Trae Hannibal	<NA>	FALSE #461d7c	LSU
## 49	made	Trae Hannibal	<NA>	FALSE #461d7c	LSU

## 50	made	Davonte Davis	Anthony Black	TRUE	#9c1831	Arkansas
## 51	made	Anthony Black	Ricky Council IV	TRUE	#9c1831	Arkansas
## 52	missed	Justice Williams	<NA>	TRUE	#461d7c	LSU
## 53	missed	Ricky Council IV	<NA>	TRUE	#9c1831	Arkansas
## 54	missed	Cam Hayes	<NA>	FALSE	#461d7c	LSU
## 55	made	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 56	missed	Jalen Reed	<NA>	FALSE	#461d7c	LSU
## 57	missed	Ricky Council IV	<NA>	TRUE	#9c1831	Arkansas
## 58	missed	KJ Williams	<NA>	TRUE	#461d7c	LSU
## 59	missed	Anthony Black	<NA>	TRUE	#9c1831	Arkansas
## 60	missed	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 61	missed	Jalen Graham	<NA>	FALSE	#9c1831	Arkansas
## 62	missed	Cam Hayes	<NA>	FALSE	#461d7c	LSU
## 63	made	Derek Fountain	<NA>	FALSE	#461d7c	LSU
## 64	missed	Derek Fountain	<NA>	FALSE	#461d7c	LSU
## 65	missed	Jalen Graham	<NA>	FALSE	#9c1831	Arkansas
## 66	missed	Jalen Graham	<NA>	FALSE	#9c1831	Arkansas
## 67	made	Derek Fountain	<NA>	FALSE	#461d7c	LSU
## 68	missed	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 69	made	Justice Williams	Jalen Reed	FALSE	#461d7c	LSU
## 70	missed	Justice Williams	<NA>	FALSE	#461d7c	LSU
## 71	made	Adam Miller	Justice Williams	FALSE	#461d7c	LSU
## 72	made	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 73	made	Adam Miller	Derek Fountain	TRUE	#461d7c	LSU
## 74	missed	Makhi Mitchell	<NA>	FALSE	#9c1831	Arkansas
## 75	missed	Adam Miller	<NA>	FALSE	#461d7c	LSU
## 76	made	Adam Miller	<NA>	FALSE	#461d7c	LSU
## 77	missed	Joseph Pinion	<NA>	TRUE	#9c1831	Arkansas
## 78	missed	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 79	made	Adam Miller	KJ Williams	FALSE	#461d7c	LSU
## 80	made	Adam Miller	<NA>	FALSE	#461d7c	LSU
## 81	missed	Derek Fountain	<NA>	FALSE	#461d7c	LSU
## 82	made	Justice Williams	<NA>	FALSE	#461d7c	LSU
## 83	missed	Jalen Reed	<NA>	FALSE	#461d7c	LSU
## 84	missed	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 85	missed	Joseph Pinion	<NA>	TRUE	#9c1831	Arkansas
## 86	missed	Adam Miller	<NA>	TRUE	#461d7c	LSU
## 87	made	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 88	made	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 89	made	Justice Williams	<NA>	FALSE	#461d7c	LSU
## 90	missed	Anthony Black	<NA>	FALSE	#9c1831	Arkansas
## 91	made	Makhi Mitchell	<NA>	FALSE	#9c1831	Arkansas
## 92	made	Makhi Mitchell	<NA>	FALSE	#9c1831	Arkansas
## 93	missed	Trae Hannibal	<NA>	FALSE	#461d7c	LSU
## 94	missed	Davonte Davis	<NA>	FALSE	#9c1831	Arkansas
## 95	missed	Trae Hannibal	<NA>	FALSE	#461d7c	LSU
## 96	missed	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 97	missed	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 98	missed	Adam Miller	<NA>	TRUE	#461d7c	LSU
## 99	made	Davonte Davis	<NA>	FALSE	#9c1831	Arkansas
## 100	missed	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 101	missed	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 102	made	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 103	missed	Jordan Walsh	<NA>	TRUE	#9c1831	Arkansas

## 104	made	Trae Hannibal	Justice Williams	FALSE	#461d7c	LSU
## 105	made	Makhi Mitchell	Davonte Davis	FALSE	#9c1831	Arkansas
## 106	missed	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 107	missed	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 108	made	Davonte Davis	<NA>	FALSE	#9c1831	Arkansas
## 109	missed	Adam Miller	<NA>	TRUE	#461d7c	LSU
## 110	made	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 111	missed	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 112	made	Anthony Black	Davonte Davis	TRUE	#9c1831	Arkansas
## 113	missed	Adam Miller	<NA>	TRUE	#461d7c	LSU
## 114	missed	Justice Williams	<NA>	FALSE	#461d7c	LSU
## 115	missed	Anthony Black	<NA>	FALSE	#9c1831	Arkansas
## 116	made	Jalen Graham	Ricky Council IV	FALSE	#9c1831	Arkansas
## 117	missed	Adam Miller	<NA>	TRUE	#461d7c	LSU
## 118	missed	Jalen Graham	<NA>	FALSE	#9c1831	Arkansas
## 119	made	Makhi Mitchell	Davonte Davis	FALSE	#9c1831	Arkansas
## 120	missed	Adam Miller	<NA>	FALSE	#461d7c	LSU
## 121	made	Trae Hannibal	<NA>	FALSE	#461d7c	LSU
## 122	made	Makhi Mitchell	Ricky Council IV	FALSE	#9c1831	Arkansas
## 123	made	Jalen Reed	<NA>	FALSE	#461d7c	LSU
## 124	missed	Anthony Black	<NA>	TRUE	#9c1831	Arkansas
## 125	missed	KJ Williams	<NA>	FALSE	#461d7c	LSU
## 126	missed	Ricky Council IV	<NA>	TRUE	#9c1831	Arkansas
## 127	missed	Makhi Mitchell	<NA>	FALSE	#9c1831	Arkansas
## 128	missed	Anthony Black	<NA>	FALSE	#9c1831	Arkansas
## 129	made	Anthony Black	<NA>	FALSE	#9c1831	Arkansas
## 130	missed	Jalen Graham	<NA>	FALSE	#9c1831	Arkansas
## 131	missed	Jalen Reed	<NA>	FALSE	#461d7c	LSU
## 132	missed	Ricky Council IV	<NA>	FALSE	#9c1831	Arkansas
## 133	missed	Justice Williams	<NA>	FALSE	#461d7c	LSU

Returns data frame with shot location data when available.

```

#' Plot all shots from one game
#'
#' Plots game shot locations from one game.
#'
#' @param game_id ESPN game_id for which to render shot chart
#' @param heatmap Logical, Use a density-type heatmap, Default = False
#' @export
#'
game_shot_chart <- function(game_id, heatmap = F){
  if(any(is.na(game_id))) {
    error("game_id missing with no default")
  }
  if(length(game_id) > 1) {
    error("game_shot_chart only takes in a single game_id")
  }

  shot_loc_df <- get_shot_locs(game_id)
  if(!is.null(shot_loc_df)) {
    teams <- sort(unique(shot_loc_df$team_name))
    game_title <- paste0(teams[1], " vs. ", teams[2])
  }

```

```

color <- c(shot_loc_df$color[shot_loc_df$team_name == teams[1]][1],
          shot_loc_df$color[shot_loc_df$team_name == teams[2]][1])

date <- format(as.Date(shot_loc_df$date[1]), "%B %d, %Y")

if(heatmap){
  full_title <- paste0(game_title, " \n ", date)
  title <- cowplot::ggdraw() +
    cowplot::draw_label(full_title,
                        fontface = 'bold')
  p <- team_shot_chart(game_id, teams[1], heatmap = T) +
    theme(legend.position = "bottom")
  p2 <- team_shot_chart(game_id, teams[2], heatmap=T) +
    labs(caption="") +
    theme(legend.position = "bottom")
  p3 <- cowplot::plot_grid(p,p2)
  p1 <- cowplot::plot_grid(title, p3, ncol = 1, rel_heights = c(0.1, 1))
  return(p1)
}

p1 <- suppressMessages(ggplot2::ggplot() +
  ggplot2::geom_point(data = shot_loc_df,
                    aes(
                      x = x,
                      y = y,
                      shape = team_name,
                      color = outcome),
                    size = 3) +
  ggplot2::geom_polygon(data = court, aes(x = x, y = y, group = group), col = "black") +
  ggplot2::geom_point(alpha = 0.2, size = 1.5) +
  ggplot2::scale_color_manual(values = color) +
  ggplot2::xlab("") +
  ggplot2::ylab("") +
  ggplot2::coord_flip() +
  ggplot2::scale_x_reverse() +
  ggplot2::theme_void() +
  ggplot2::theme(
    axis.text.x = element_blank(),
    axis.text.y = element_blank(),
    axis.ticks.x = element_blank(),
    axis.ticks.y = element_blank(),
    axis.title = element_blank(),
    legend.position = "bottom",
    legend.direction = 'vertical',
    plot.title = element_text(size = 16, hjust = 0.5),
    plot.subtitle = element_text(size = 12, hjust = 0.5),
    plot.caption = element_text(size = 8, hjust = 0),
    plot.background = element_rect(fill = 'cornsilk')) +
  ggplot2::labs(
    title = game_title,
    subtitle = date,
    color = 'Made',
    shape = 'Team',

```

```

        caption = "Jacob Haarala (@jhaarala23) Data Accessed via ncaahoopR"))
  return(p1)
}
}

```

```

#' Plot all shots for a team
#'
#' Plots team shot locations from one game or multiple games.
#'
#' @param game_ids Vector of ESPN game_ids
#' @param team Team Name
#' @param heatmap Use a density-type heatmap (Default = FALSE)
#' @export
team_shot_chart <- function(game_ids, team, heatmap = F) {
  if(any(is.na(game_ids))) {
    error("game_ids missing with no default")
  }
  if(any(is.na(team))) {
    error("team missing with no default")
  }
  df <- get_shot_locs(game_ids)

  if(!is.null(df)) {
    side_one <- court %>% filter(side == 1)
    team_shots <- df %>% filter(team_name %in% c(team, dict$ESPN_PBP[dict$ESPN == team]))

    ### flip shots if they are on the wrong side
    team_shots[team_shots$y > 47, "x"] <- 50 - team_shots[team_shots$y > 47, "x"]
    team_shots[team_shots$y > 47, "y"] <- 94 - team_shots[team_shots$y > 47, "y"]

    ### only pick one color
    color <- as.character(unique(team_shots$color))[1]

    if(heatmap){
      p1 <-
        ggplot2::ggplot() +
        ggplot2::stat_density_2d(data = team_shots,
                                aes(x = x, y = y, fill = stat(density / max(density))),
                                geom = "raster", contour = FALSE, interpolate = TRUE, n = 200) +
        ggplot2::geom_polygon(data = side_one, aes(x = x, y = y, group = group), col = "gray") +
        ggplot2::geom_point(alpha = 0.2, size = 1.5) +
        ggplot2::coord_equal() +
        ggplot2::xlab("") +
        ggplot2::ylab("") +
        ggplot2::scale_fill_viridis_c("Shot Frequency",
                                      limits = c(0, 1),
                                      breaks = c(0, 1),
                                      labels = c("Lower", "Higher"),
                                      option = "plasma") +

        ggplot2::theme_void() +
        ggplot2::theme(
          axis.text.x = element_blank(),
          axis.text.y = element_blank(),

```

```

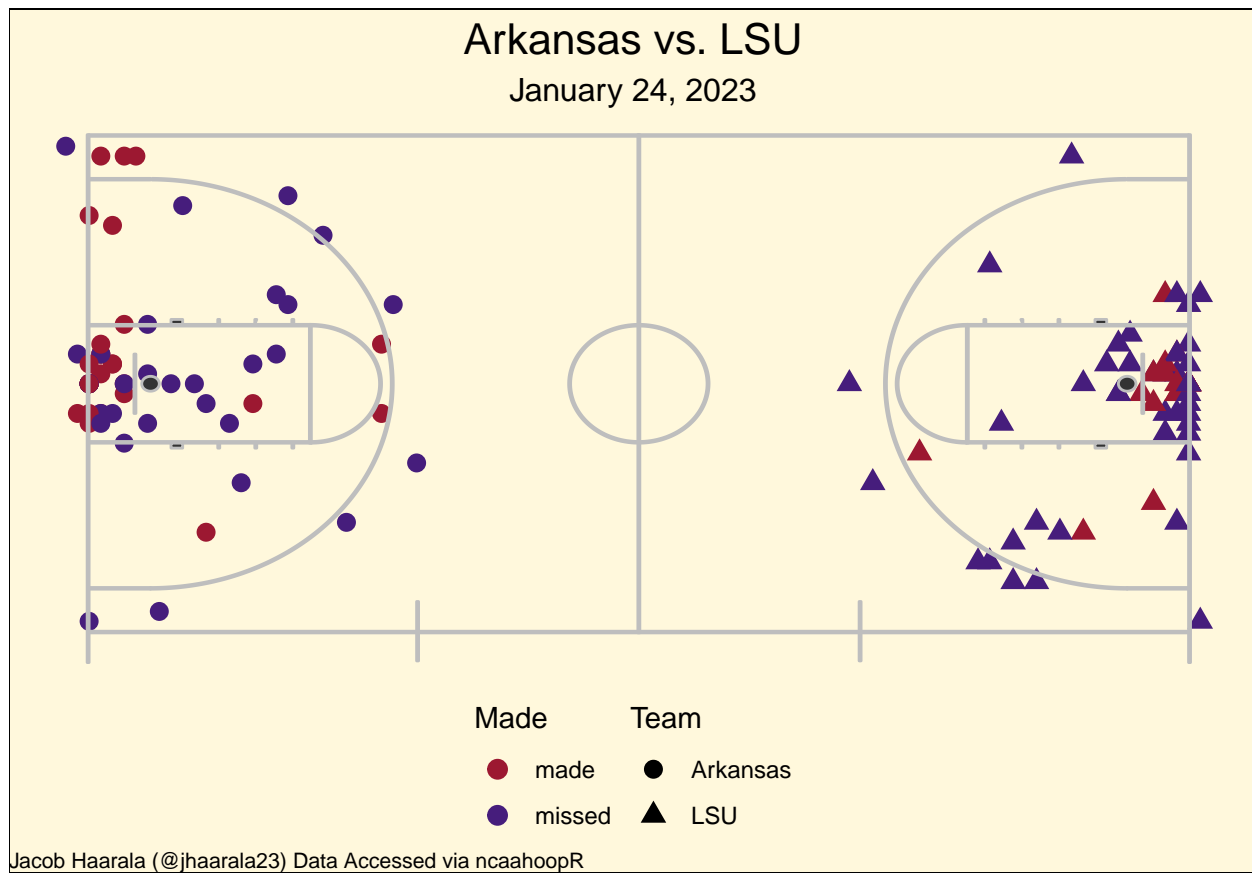
    axis.ticks.x = element_blank(),
    axis.ticks.y = element_blank(),
    axis.title = element_blank(),
    plot.title = element_text(size = 16, hjust = 0.5),
    plot.subtitle = element_text(size = 12, hjust = 0.5),
    plot.caption = element_text(size = 8, hjust = 0)) +
  ggplot2::labs(
    title = paste0(team, " Shots"),
    shape = "Shot Outcome",
    caption = "Jacob Haarala (@jhaarala23) Data Accessed via ncaahoopR")
  return(p1)
}

p1 <-
  suppressMessages(ggplot2::ggplot() +
    ggplot2::geom_point(data = team_shots,
      aes(
        x = x,
        y = y,
        shape = team_name),
        color = outcome,
        size = 3) +
    ggplot2::geom_polygon(data = side_one, aes(x = x, y = y, group = group), col =
    ggplot2::geom_point(alpha = 0.2, size = 1.5) +
    ggplot2::scale_color_manual(values = color) +
    ggplot2::xlab("") +
    ggplot2::ylab("") +
    ggplot2::theme_void() +
    ggplot2::theme(
      axis.text.x = element_blank(),
      axis.text.y = element_blank(),
      axis.ticks.x = element_blank(),
      axis.ticks.y = element_blank(),
      axis.title = element_blank(),
      plot.title = element_text(size = 16, hjust = 0.5),
      plot.subtitle = element_text(size = 12, hjust = 0.5),
      plot.caption = element_text(size = 8, hjust = 0),
      plot.background = element_rect(fill = 'cornsilk')) +
    ggplot2::labs(
      title = paste(team, "Shots"),
      shape = "Shot Outcome",
      caption = "Jacob Haarala (@jhaarala23) Data Accessed via ncaahoopR"))
  return(p1)
}
}

```

```
game_shot_chart(game_id = 401484577, heatmap = F)
```

```
## Getting Shots for Game 1 of 1
```

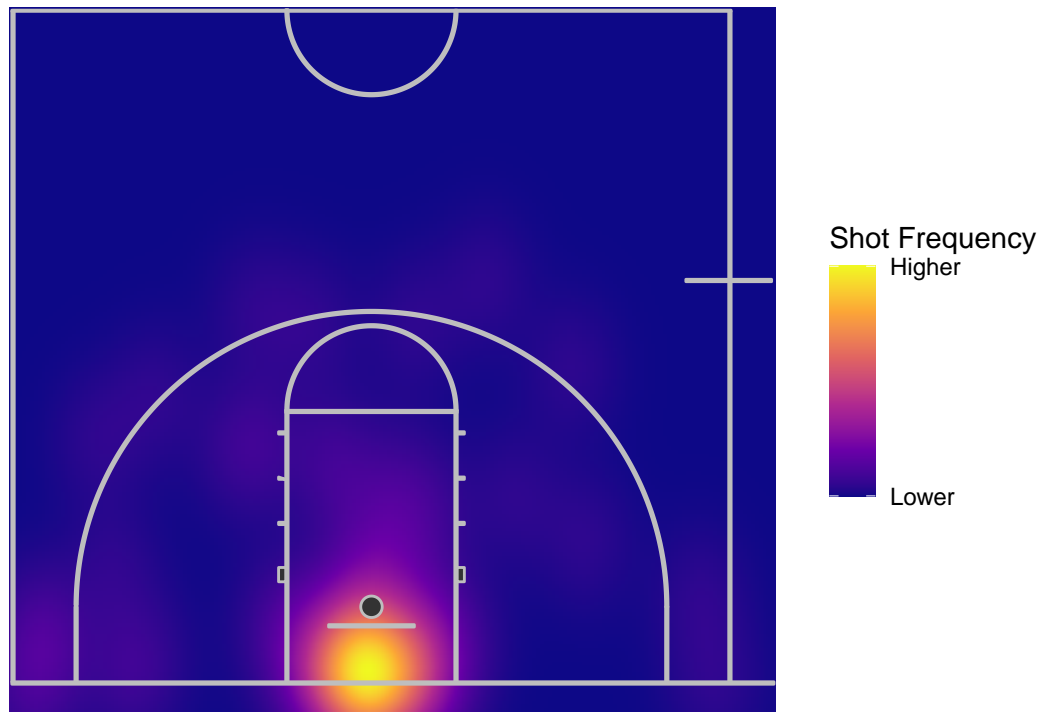


```
team_shot_chart(game_id = 401484577, team = "Arkansas", heatmap = T)
```

```
## Getting Shots for Game 1 of 1
```

```
## Warning: 'stat(density / max(density))' was deprecated in ggplot2 3.4.0.  
## i Please use 'after_stat(density / max(density))' instead.
```

Arkansas Shots



Jacob Haarala (@jhaarala23) Data Accessed via ncaahoopR

If you want to do this over a span of games you can put multiple game ids in a vector for the 'game_id' parameter.