A New Perspective on NHL Shot Mapping

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RITSAC19

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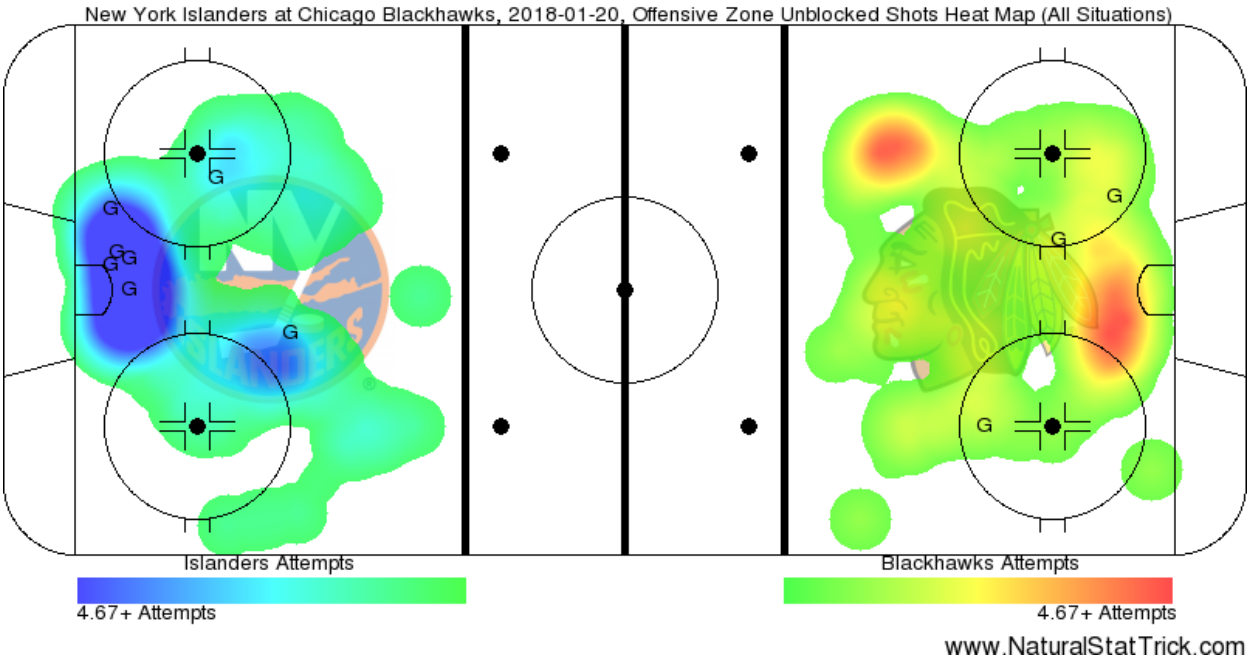
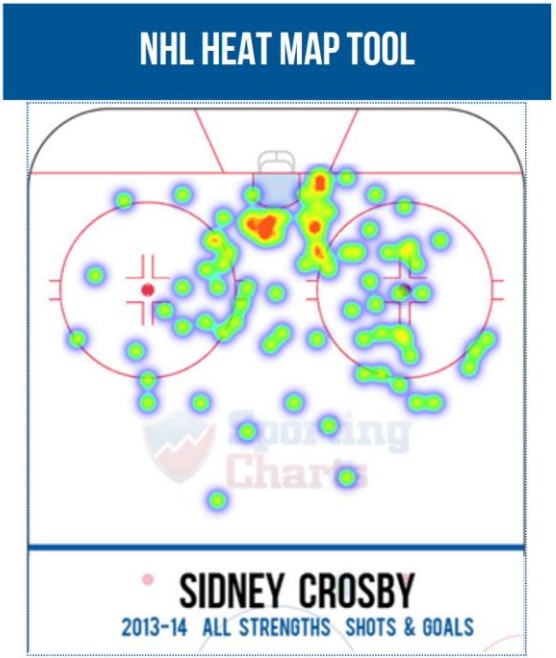
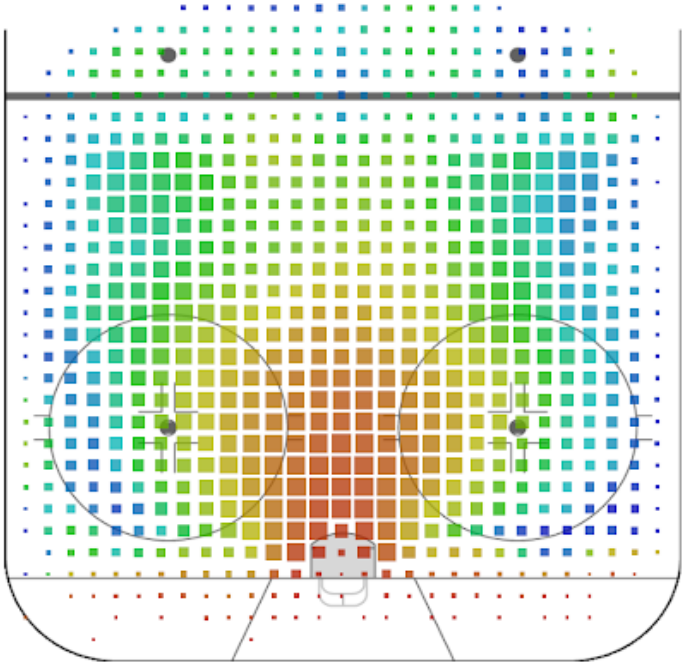
https://www.sny.tv/islanders/news/islanders-scratchpad-the-rocky-balboa-of-the-nhl/265088142/
http://www.NaturalStatTrick.com



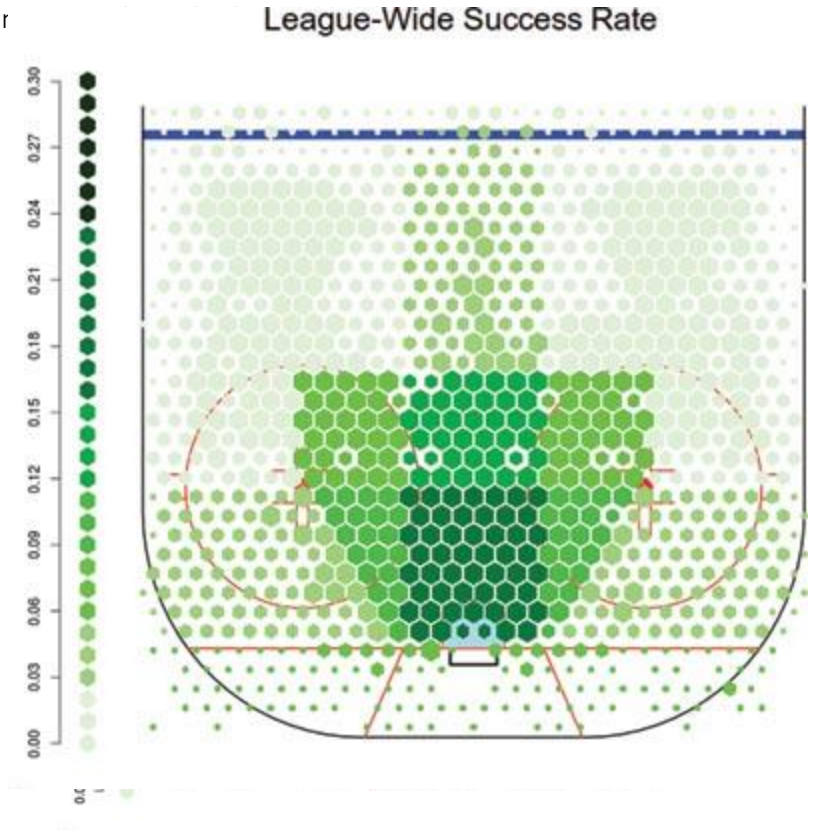
https://www.sportingcharts.com/nhl/



https://www.greaterthanplusminus.com/2014/04/nhl-heat-map.html

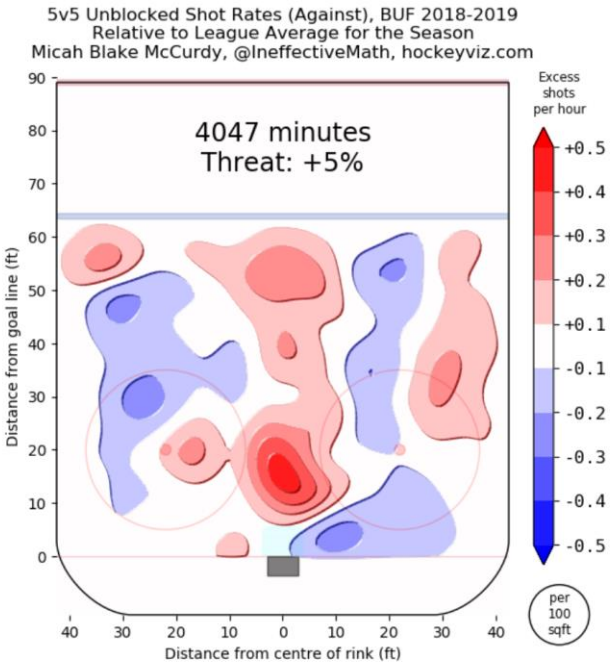


https://chance.ar

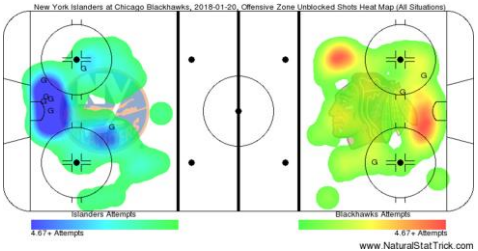


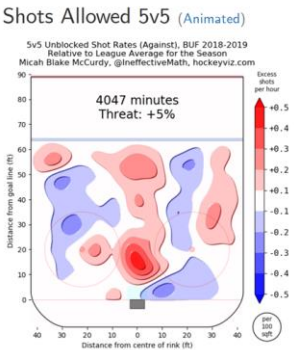
https://hockeyviz.com/team/BUF/1819

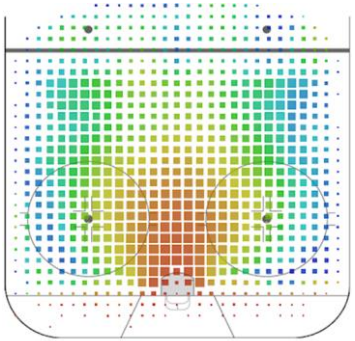
Shots Allowed 5v5 (Animated)

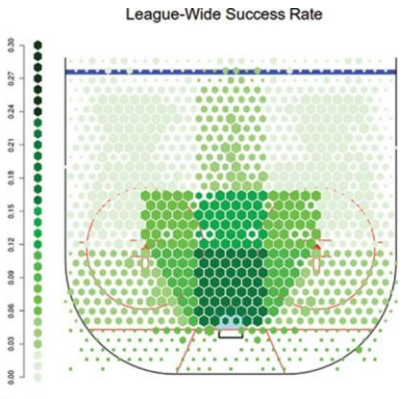


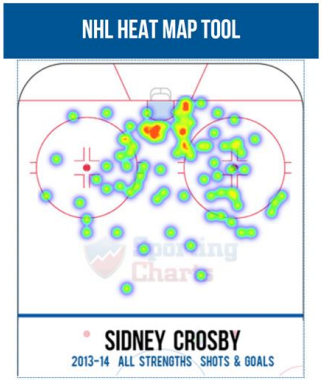
NHL Shot Maps



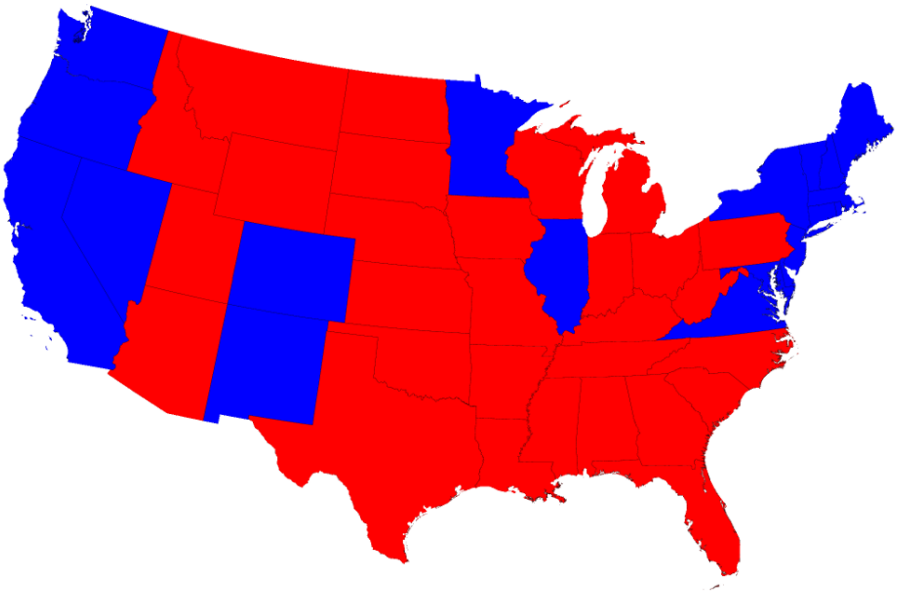






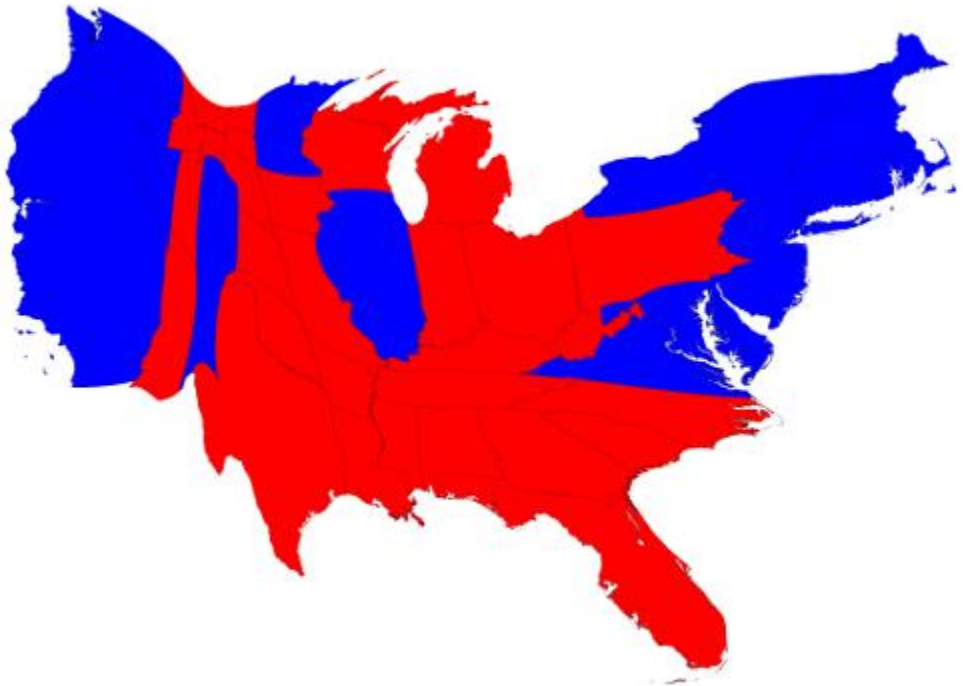


US States (Lower 48) by Area & Politics



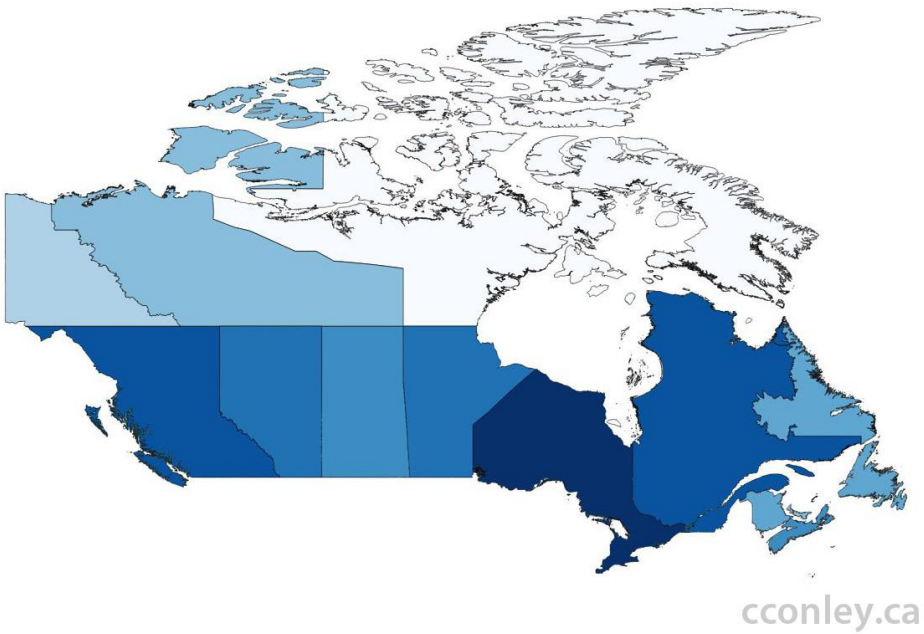
http://www-personal.umich.edu/~mejn/election/2016/

Cartogram: US States (Lower 48) by Area & Politics



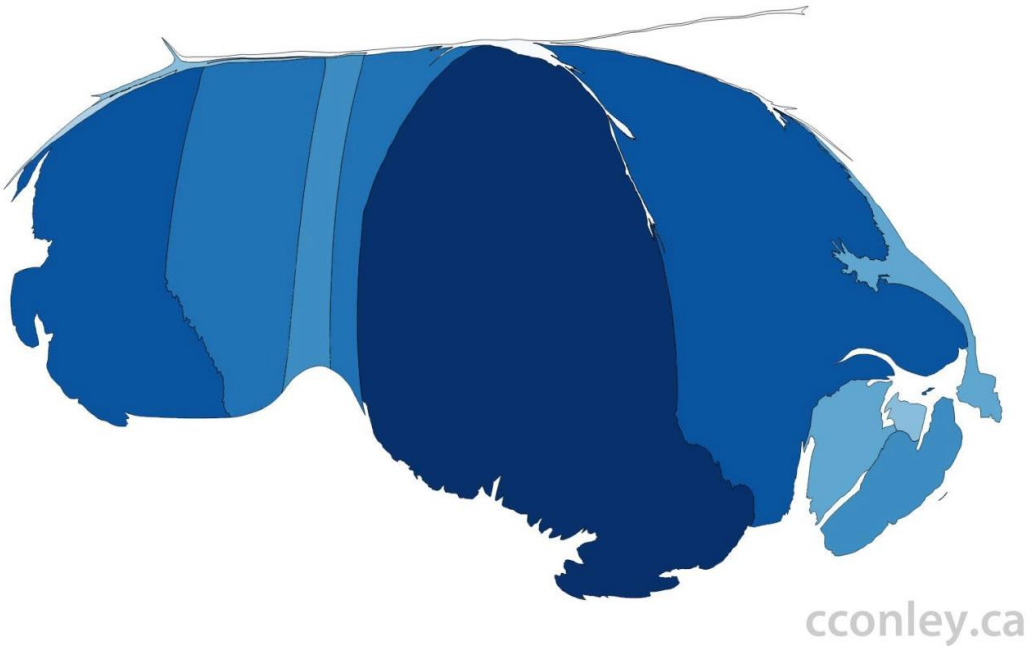
http://www-personal.umich.edu/~mejn/election/2016/

Cartograms: Canadian Provinces by Area



https://cconley.ca/2012/05/06/reshaping-the-country/

Cartograms: Canadian Provinces by Population



SOURCE: https://cconley.ca/2012/05/06/reshaping-the-country/c

Goal:

Make a

‘nice’ graphical representation of the ice

that (approx.) conveys:

x,y locations

shot probability at x,y

shot density at x,y

Data

Source: www.moneypuck.com

Even Strength

Goalies in net

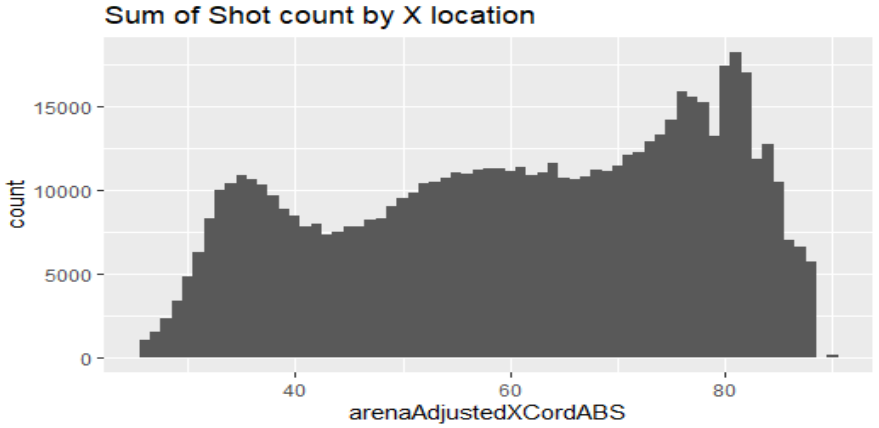
2007-08 to 2018-19 NHL Seasons

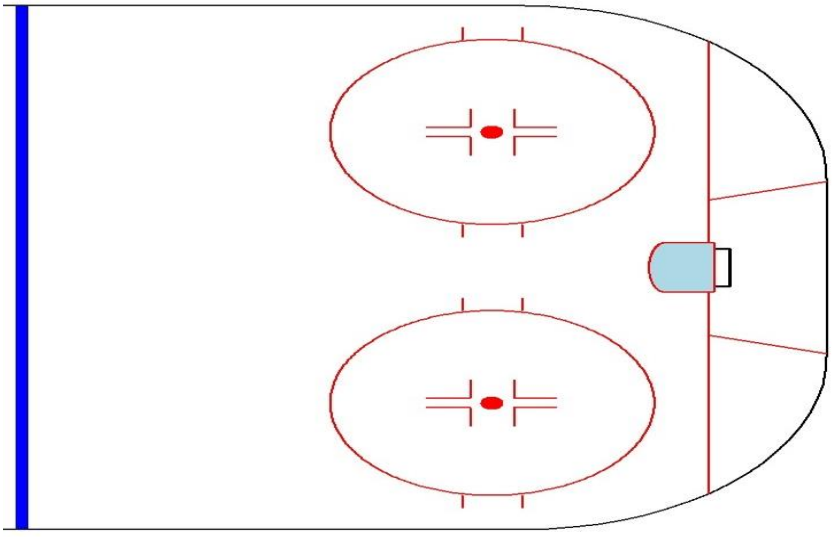
Regular season games

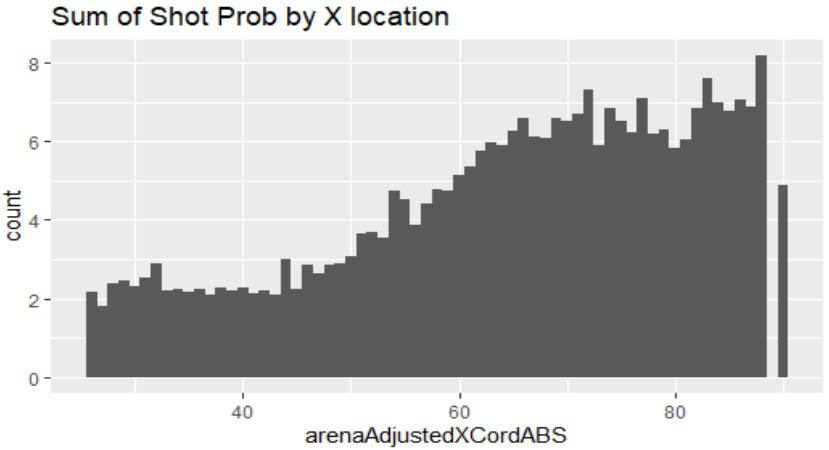
Regulation, no OT

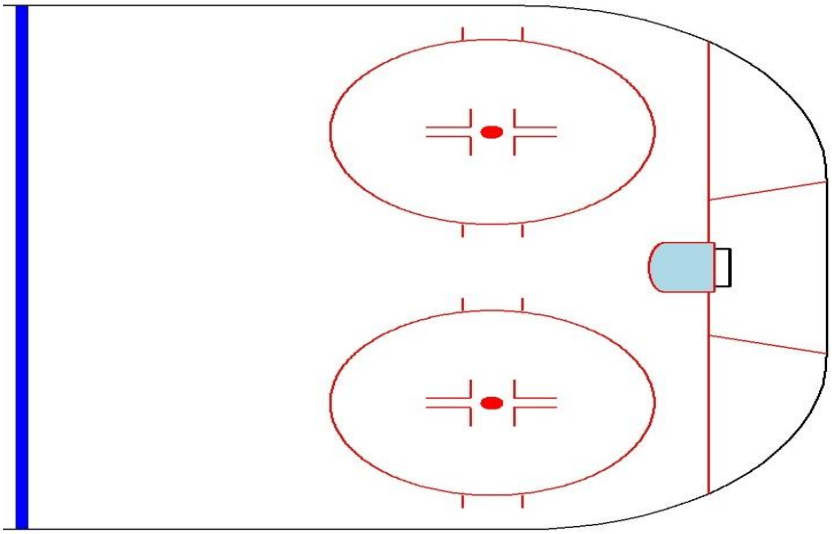
Ignore shot type

It is after all RTSS data

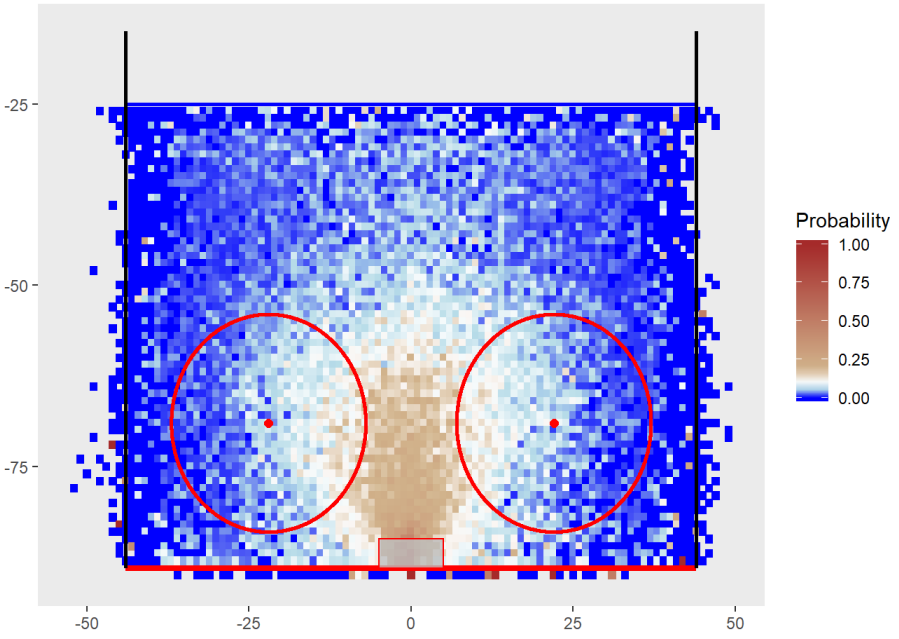

Sum of Shot count by X location
count
15000
10000
5000
0
40
60
80
arenaAdjustedXCordABS

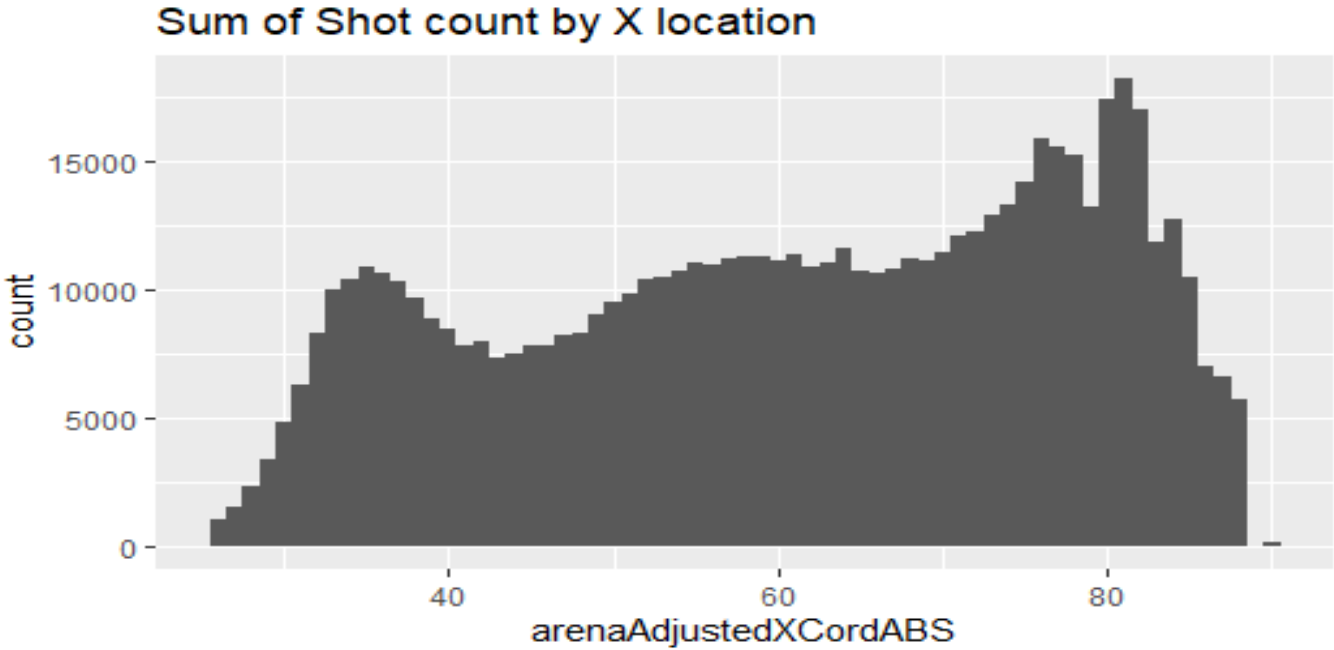


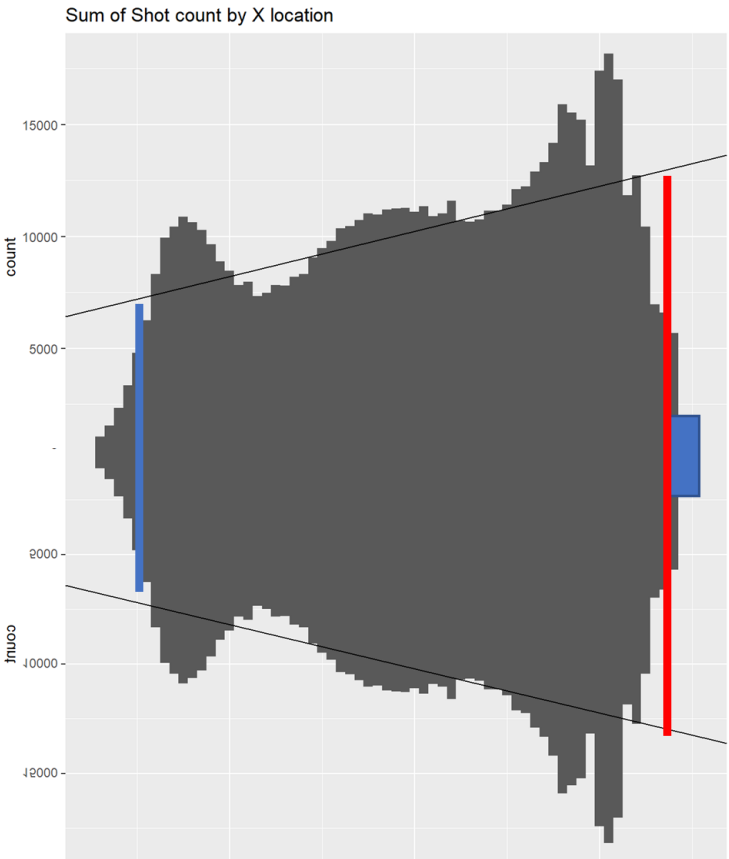

Sum of Shot Prob by X location
count
0
2
4
6
8
40
60
80
arenaAdjustedXCordABS



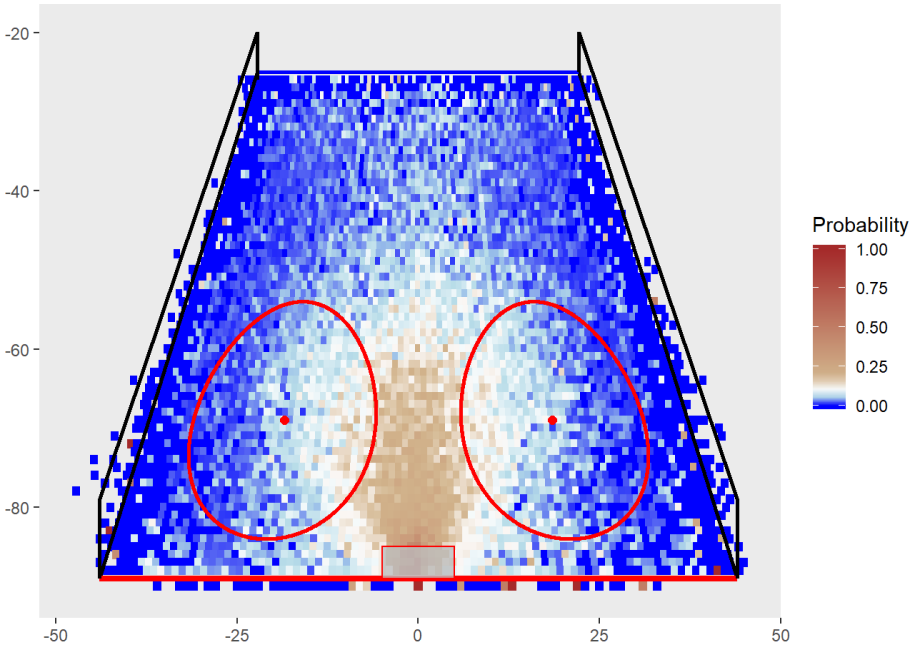
Heat Map: Shot Probability



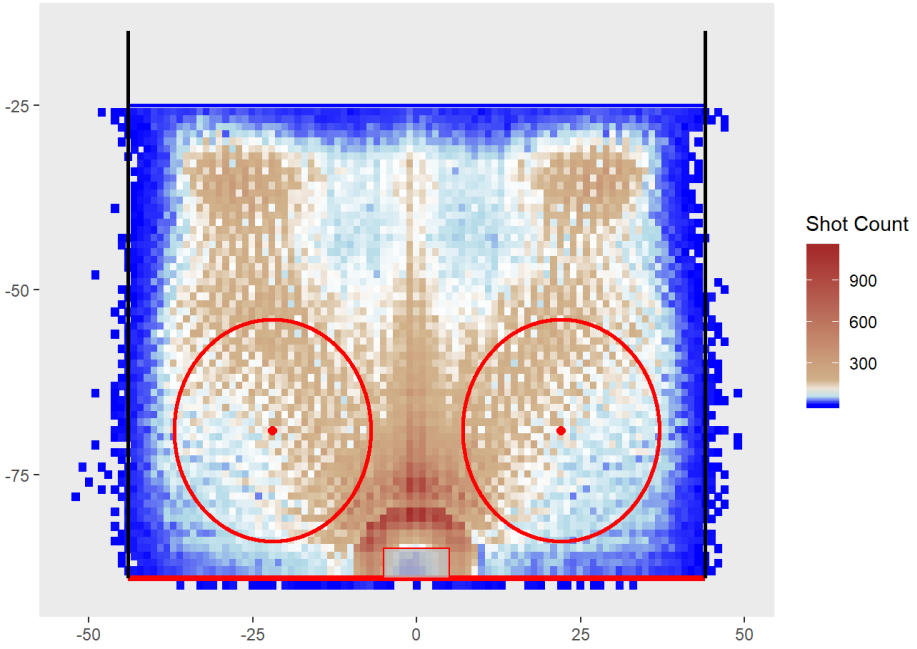

Sum of Shot count by X location
15000
10000
5000
0
count
40
60
80
arenaAdjustedXCordABS

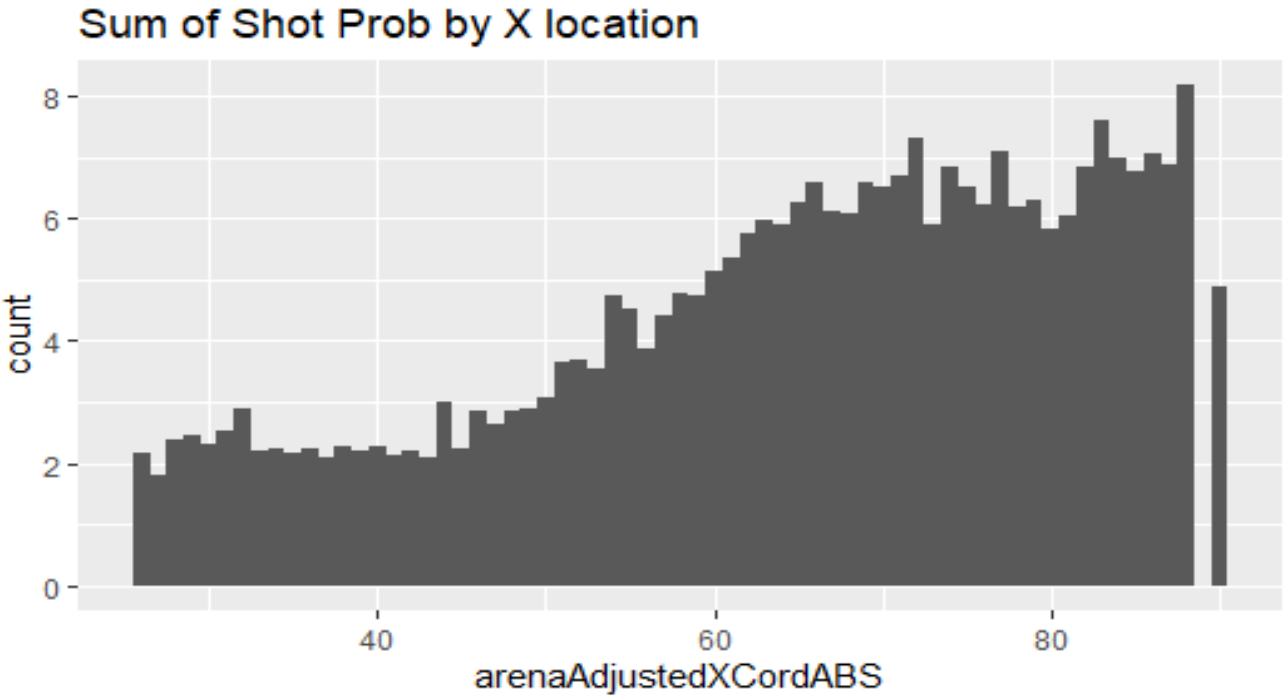

Sum of Shot count by X location
15000
10000
5000
count

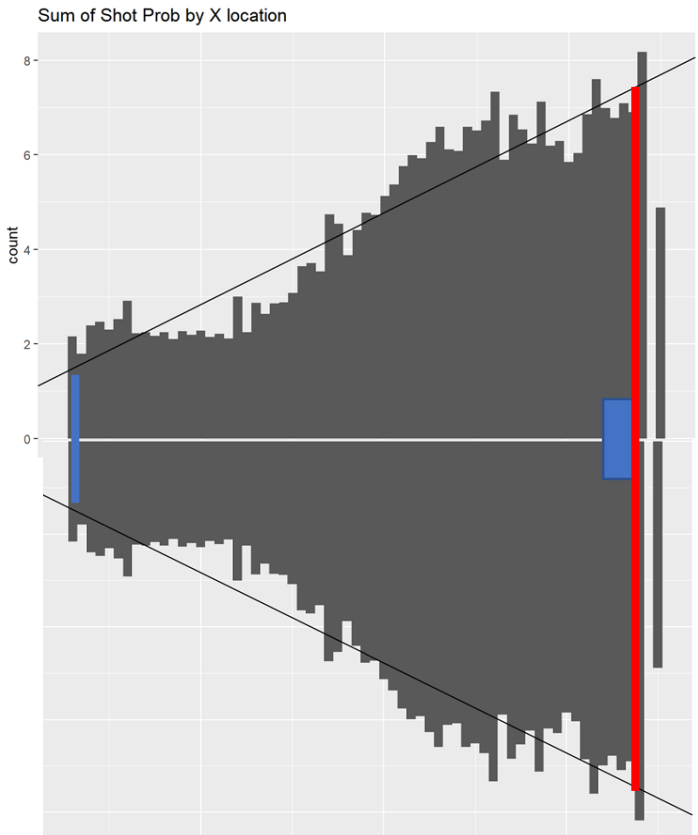
Color = shot probability
Width= Smoothed(# of shots)



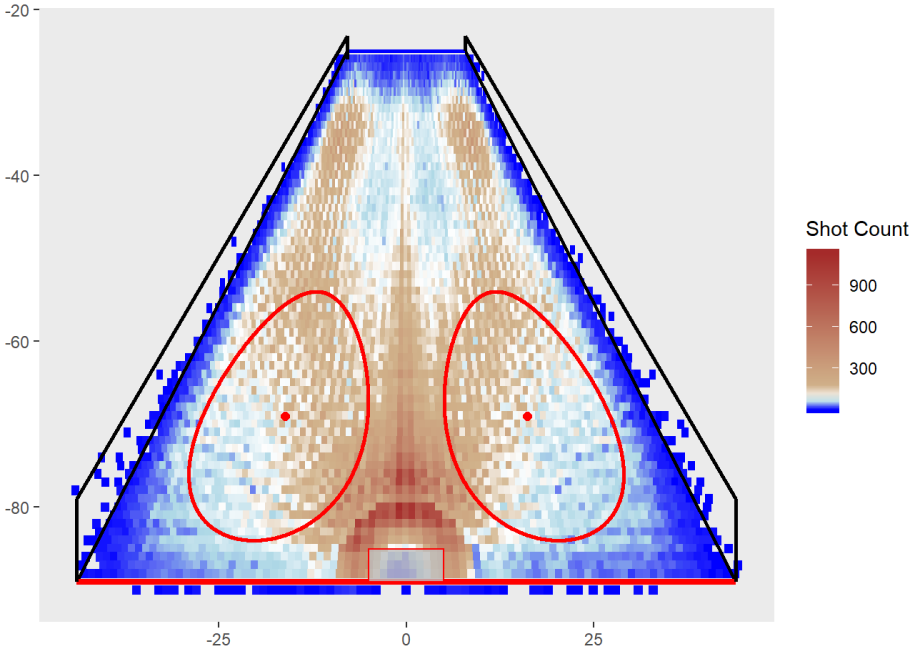
Heat Map: Shot Intensity



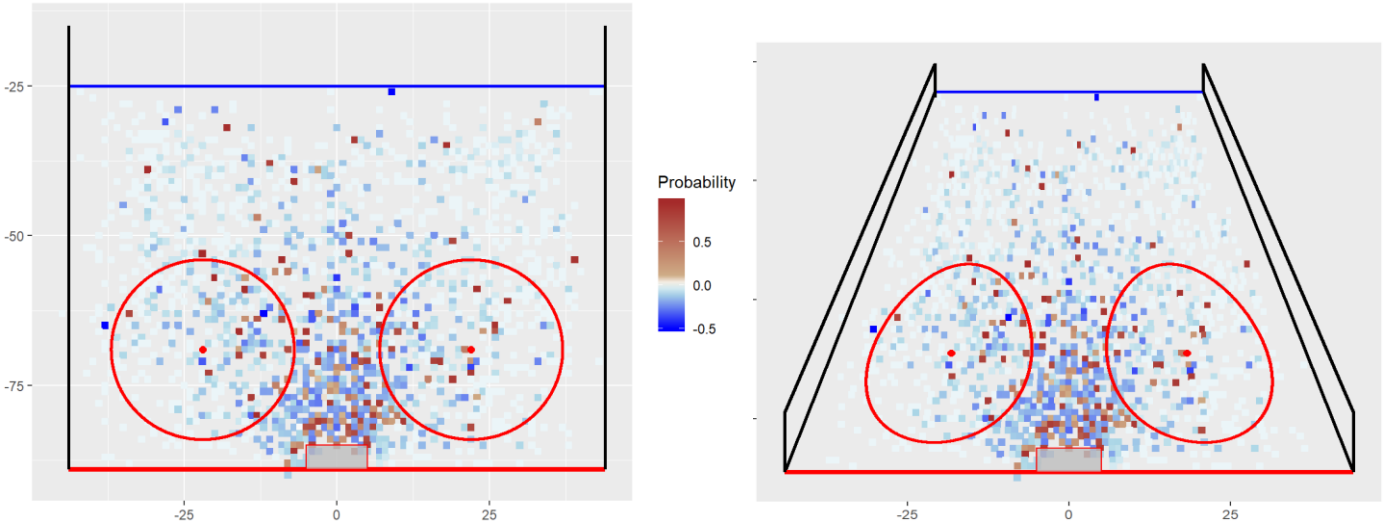

Sum of Shot Prob by X location
count
0
2
4
6
8
40
60
80
arenaAdjustedXCordABS


Sum of Shot Prob by X location
count
8
6
4
2
0

Color = # of shots
Width= Smoothed(shot probability)



Example:
2018-19 Sabres vs League Avg
Mapping of Shot Prob Diff,
Scaling by Number of Shots



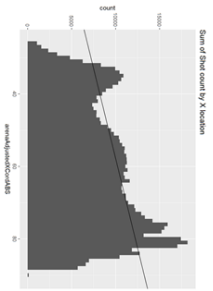
Basic Process: Intensity as Color

1.Determine color variable: Intensity

2. Smooth Sum of Probability as linear function, $\hat{f}(x) = a + by$, to shot location t relative to Goal Line. We used OLS regression.

3. Make width of colored pixel at height, y, proportional to

$$\frac{a+by}{a+b(y=Goal\ Line)}$$



4. Keep height of colored pixels all 1.

For Probability as color exchange Probability for Intensity.
Scaling based upon Intensity f(Blue Line)/f(Goal Line) ~ 0.5
based upon Probability f(Blue Line)/f(Goal Line) ~ 0.2

The Math

- New location, x', for horizontal coordinate at given vertical coordinate y. For estimated line a +b y

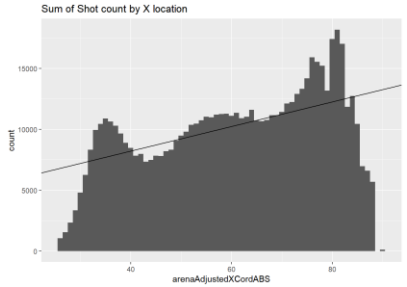
- $\gamma = \frac{a+b(-25)}{a+b(-90)}$

Coordinates of the O-zone:

horizontal	-45 to 45
vertical	-90 to -25

$$x' = 45\gamma + \frac{(y-(-25))}{-90-(-25)}(1-\gamma)\,x$$

Next Steps



Make more plots

Best smoothing methods for perspective, OLS?

Statistical methods for shot heat maps: validity, reliability

Rmarkdown of the graphs in this talk at:
http://myslu.stlawu.edu/~msch/NewPerspective.html

Plots need a name……

Prymaat Plots

Beldar Plots

Coneheads Plots*

*https://www.youtube.com/watch?v=ZQv1-apTJ6U

- Source: https://www.discogs.com/artist/1754616-Prymaat-Conehead

2019 Ottawa Hockey Analytics Conference

November 15, 16

Carleton University

www.statsportsconsulting.com/otthac19

Taking abstracts until Sept 25th

Thank you

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