Shoot! Optimising the location of attempts on goal

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#OptaProForum

Was this shot a good choice and if not, could it ever be?

Ross Barkley | 59 minutes | Everton 2-1 Arsenal (13-Dec-16)

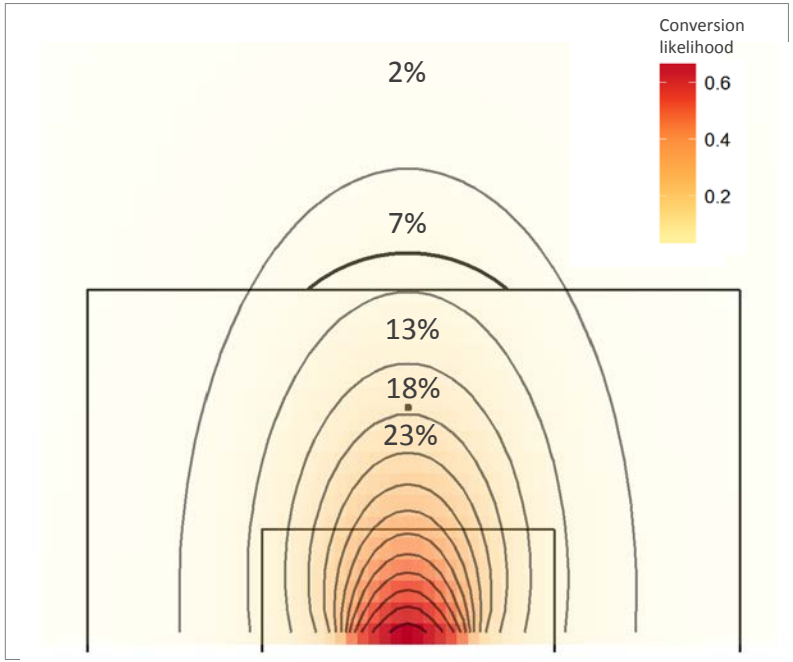
Expected goals are a powerful diagnostic, but limited tactical tool

Good tool for measuring chance quality

But “shoot from closer” implication has limited value

How close is close enough?

Does the optimal location change?



Likelihood of scoring from open play shot
Binomial regression model of 10,726 attempts
EPL 2014/15, 2015/16 & 2016/17

How close to goal can we achieve possession? A new model.

Random Forest “machine learning”

Pass completion chance depends on…

Origin
Destination
Distance
Distance forward
Team (optional)

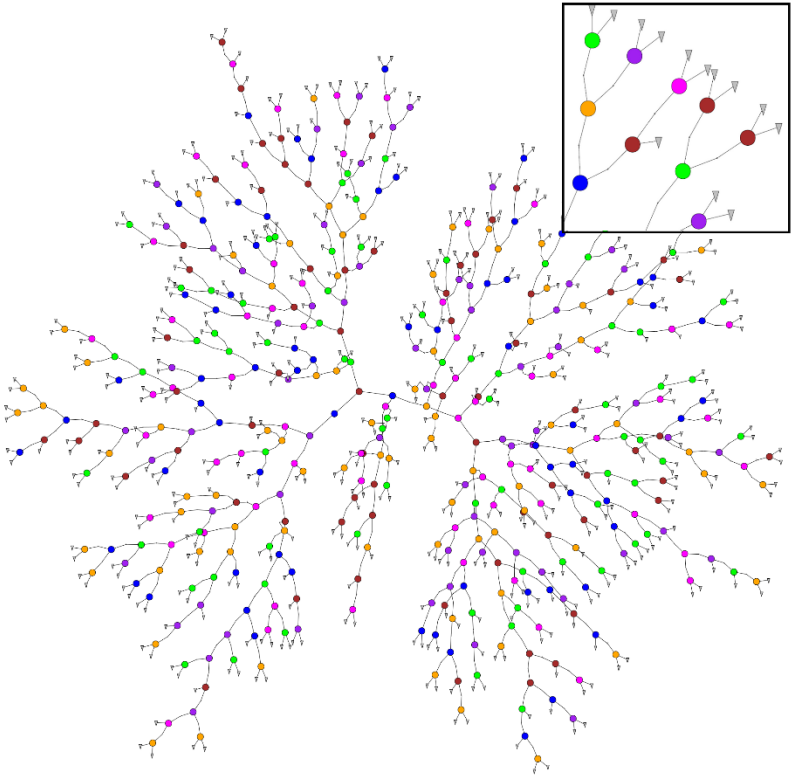
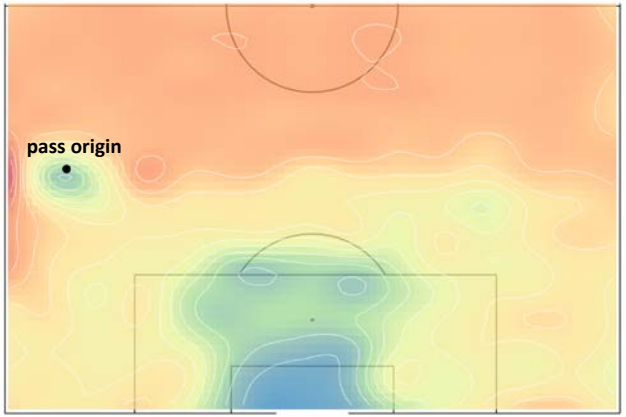


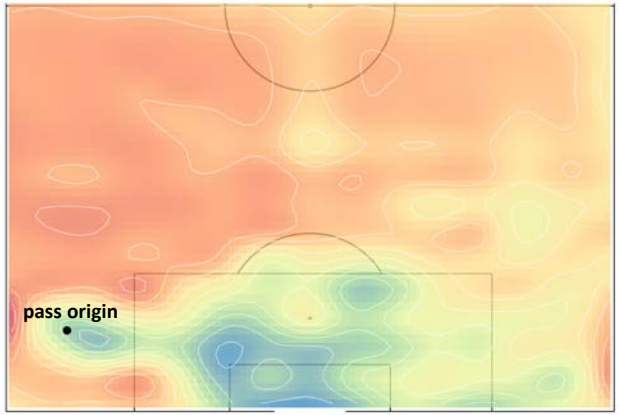
Image: http://www.worldominance.com/wp-content/uploads/2014/12/TPZ_Figures_example_tree.png

The RF Model predicts pass success from and to any location

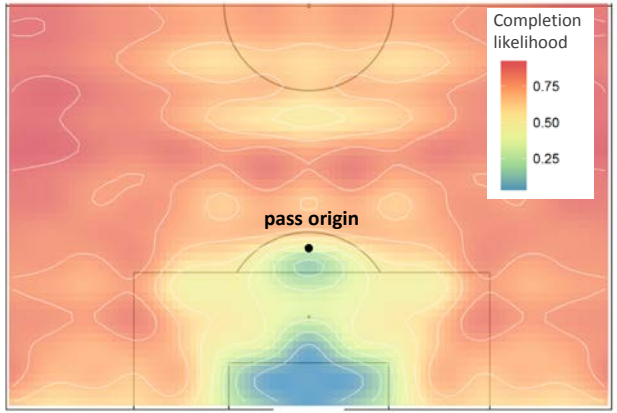
Completion likelihood from wide
Origin: x=70, y=10



Completion likelihood from advanced wide
Origin: x=90, y=10



Completion likelihood from advanced central
Origin: x=80, y=50



Likelihood of completing pass from open play
Random Forest Model of 515,086 passes
EPL 2014/15, 2015/16 & 2016/17
Visualisation smoothed for clarity

PERFORM CONTENT

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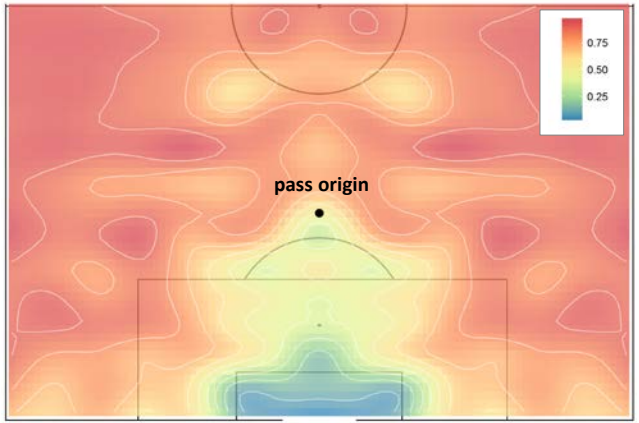
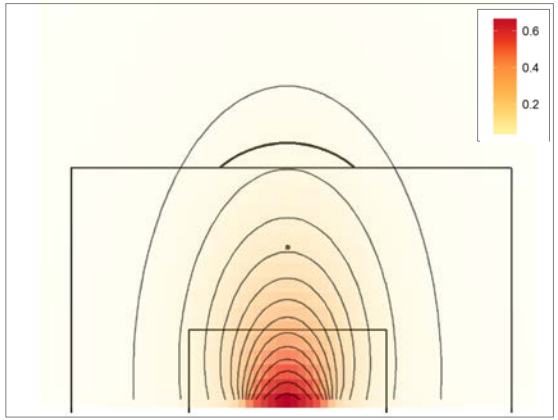
Combining models, we can visualise the chance of creating a goal

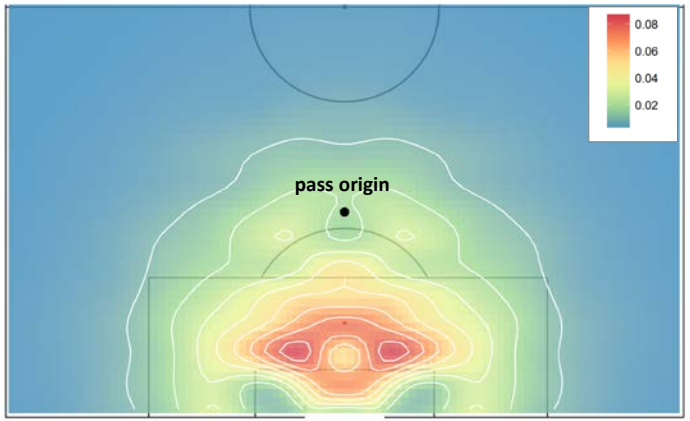
Pass Completion Likelihood
Origin: x=80, y=50



Expected shot conversion from open play

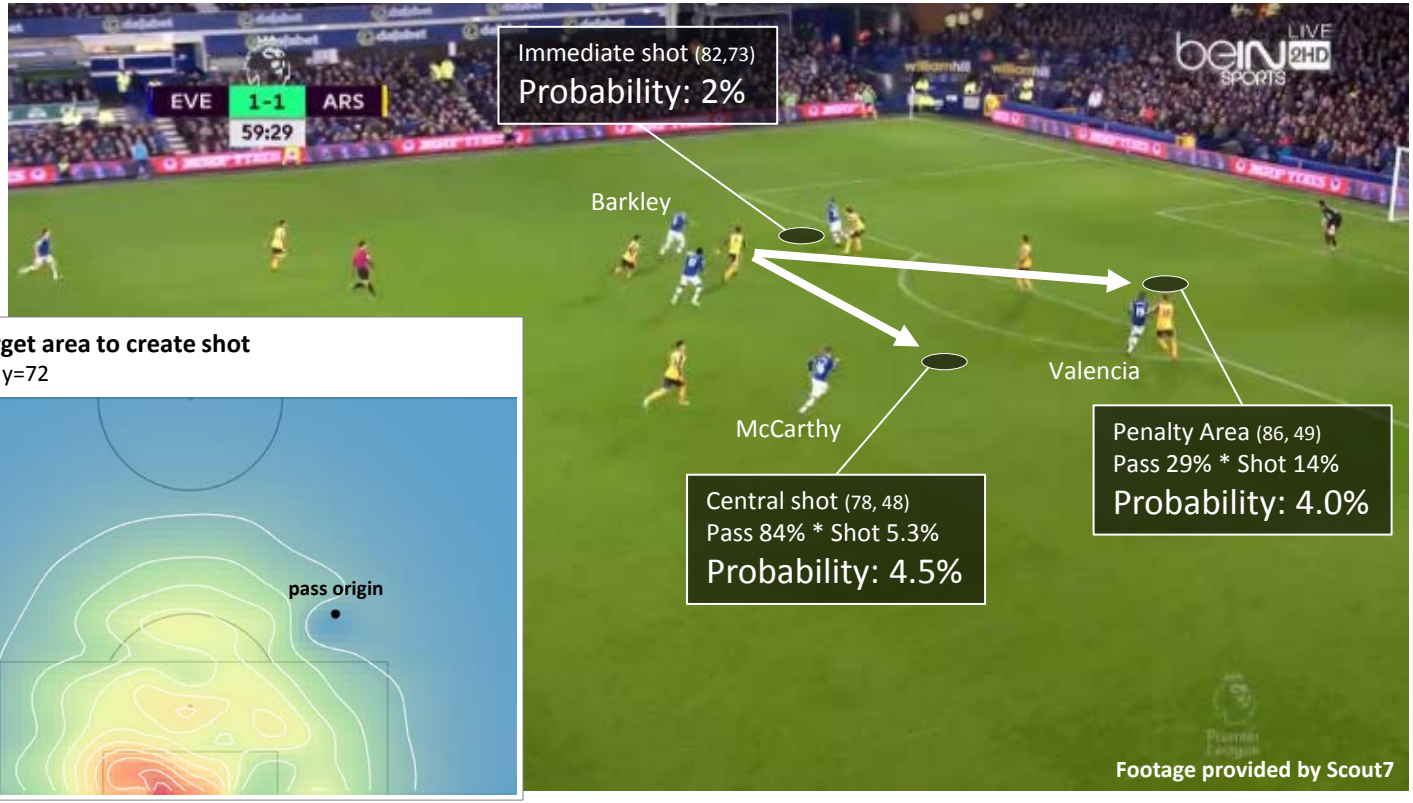


Expected pass completion * shot conversion



Note: Assumes completed pass immediately results in a shot, i.e. that a pass to create a shooting opportunity is available

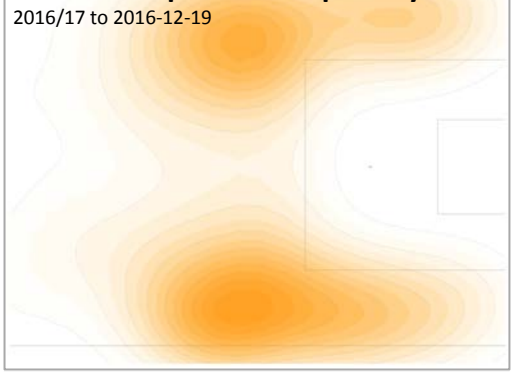
Approximating Barkley's alternatives



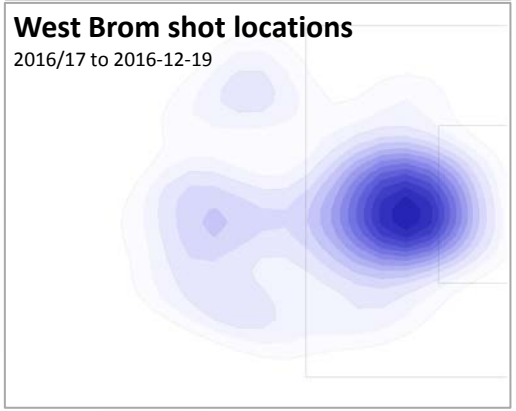
Optimal target area to create shot
Origin: x=77, y=72

The secret to Tony Pulis' success…?

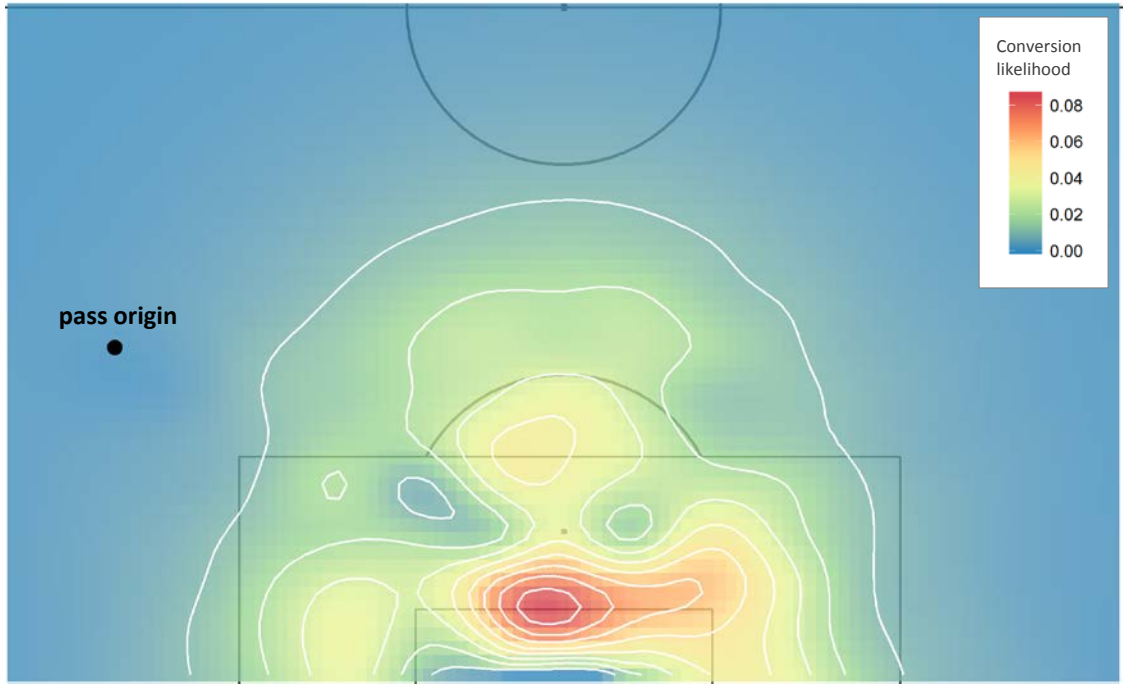
West Brom passes into penalty area
2016/17 to 2016-12-19



West Brom shot locations
2016/17 to 2016-12-19



Optimal target area to create shot
Origin: x=75, y=10

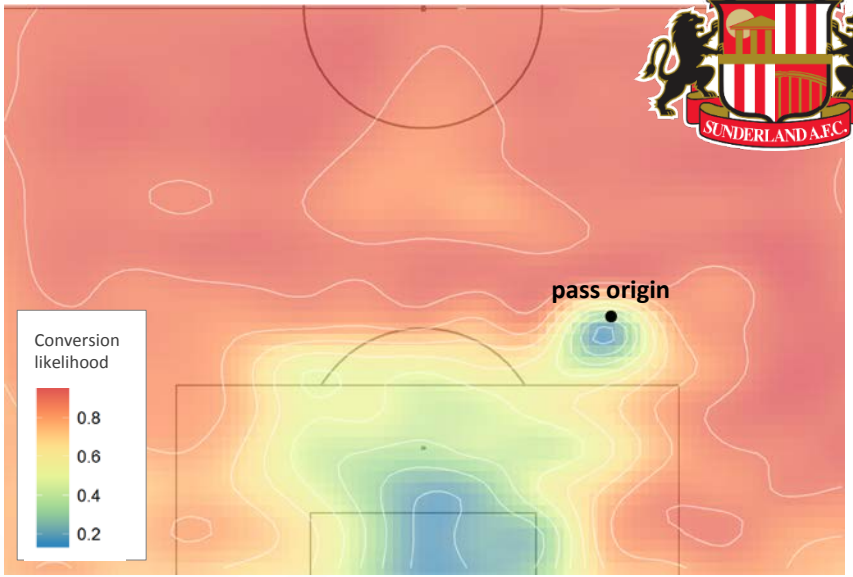


Does the optimal target area move for a team with worse passing?

Sunderland pass completion likelihood

Final third pass accuracy 74%

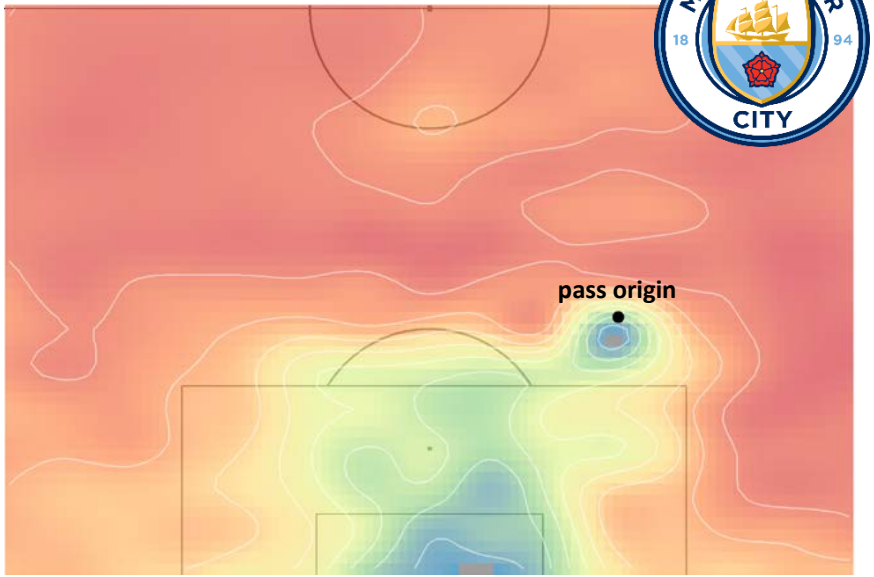
Origin: x=77, y=72



Man City pass completion likelihood

Final third pass accuracy 84%

Origin: x=77, y=72

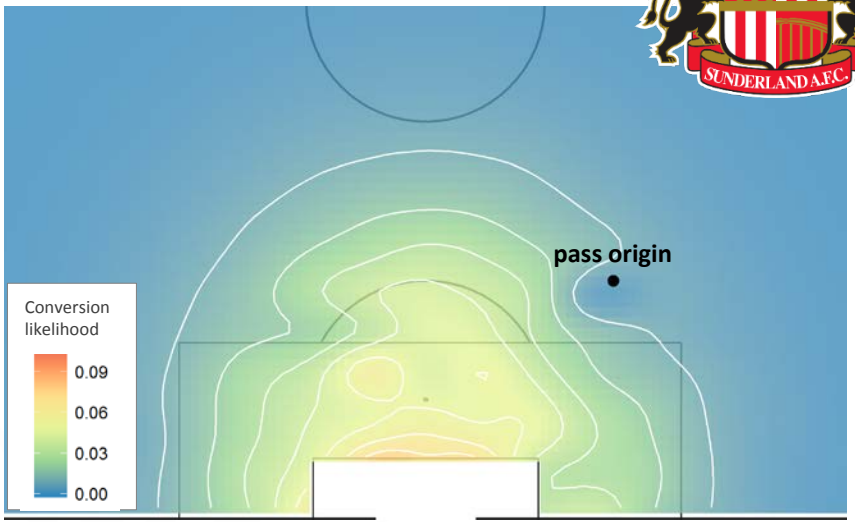


Better teams create more chances but optimal zone is the same

Sunderland optimal target area to create a shot

Final third pass accuracy 74%

Origin: x=77, y=72



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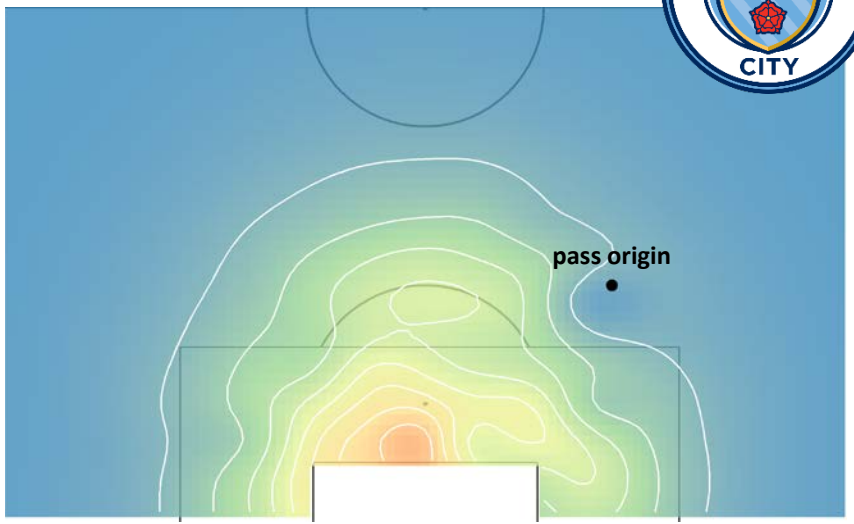
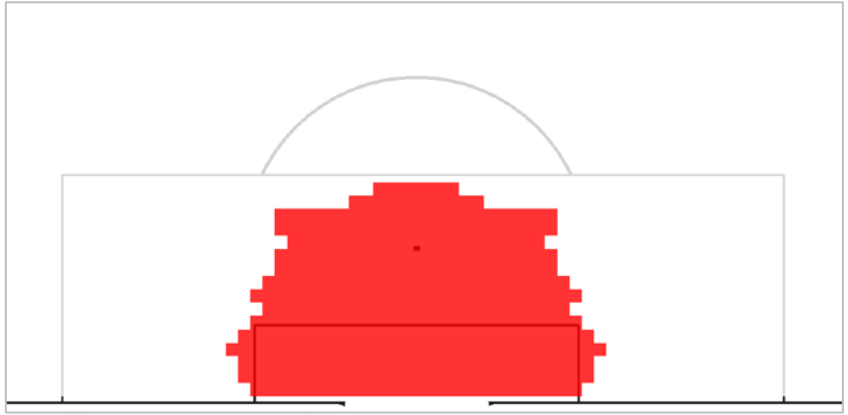
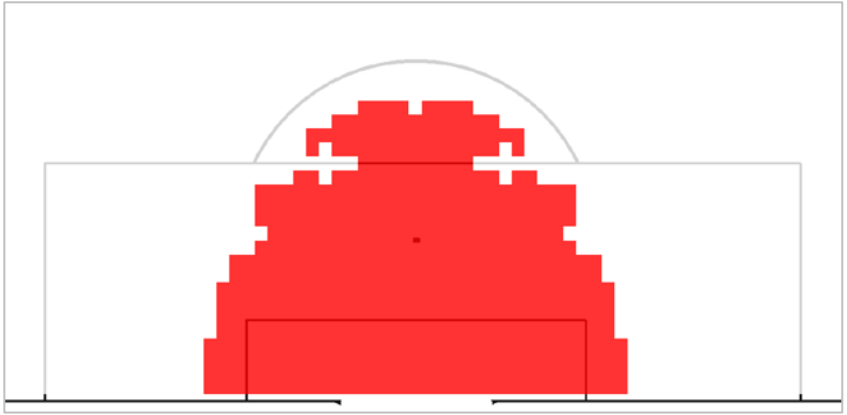


When should a team look to pass vs. definitely shoot?

Shot vs. pass decision point: Average quality team
(Average pass completion index)



Shot vs. pass decision point: Poor quality team
(0.8 pass completion index vs. average team)



Highlighted area shows points where no pass and shot option is available that improves on shooting immediately

Created by analysing 25 million immediate shot vs. pass then shot combinations in opposition half

Future Developments…

- Pass surface during slower build ups vs. counter-attack
- Multiple passes prior to shot
- Passing chain probability
- Modelling opportunities to pass (TRACAB)

Thank you for listening

Questions

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