HOME FIELD ADVANTAGE: DOES IT EXIST? DID IT PERSIST?

Image source: https://www.paceacademy.org/

What is home field advantage?

- The idea that a team performs better when playing at their own stadium

Why?

- It is hypothesized that the crowd of supporters jeering the visiting team and cheering for the home team creates an atmosphere that shifts to outcome of the game
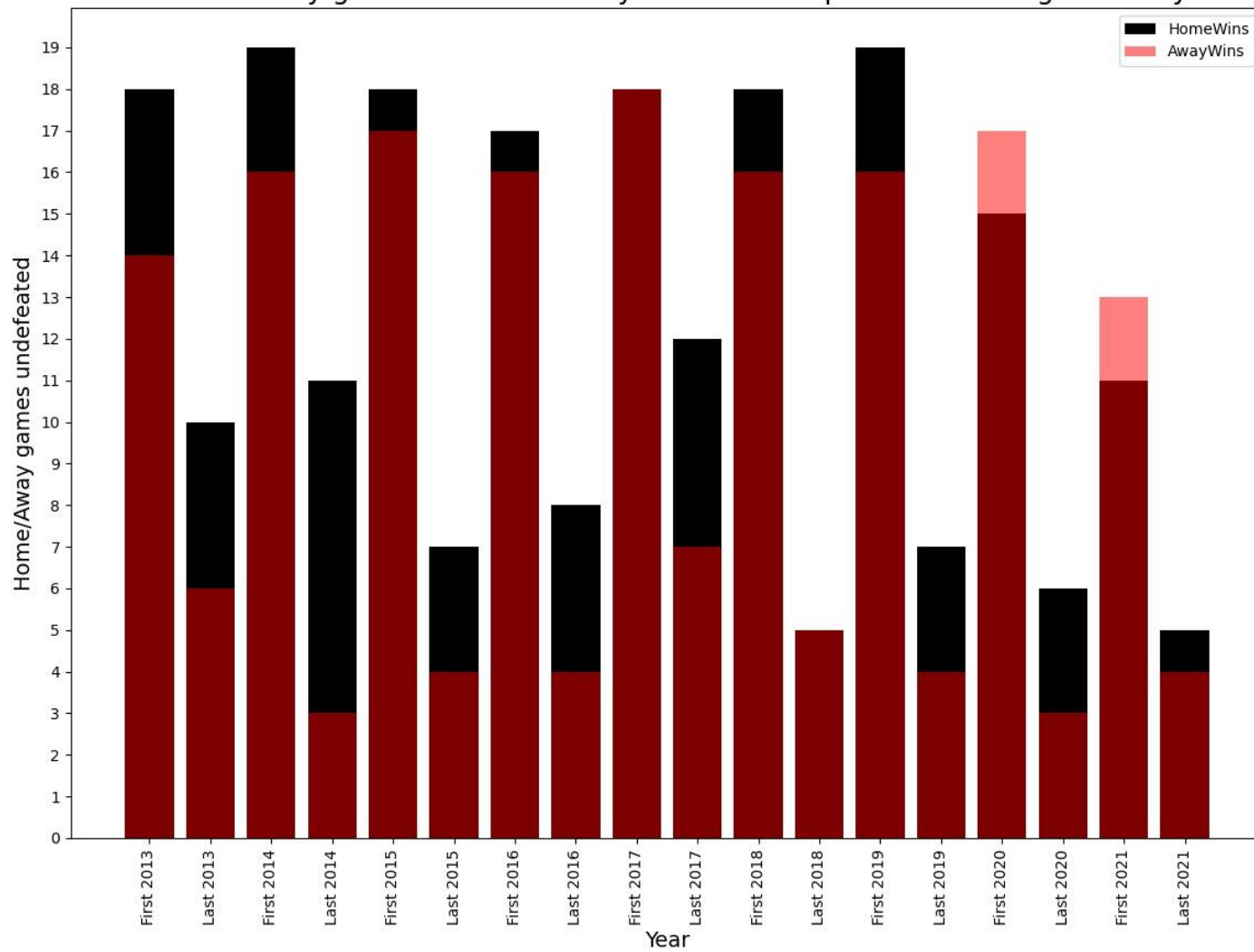
Image source: https://www.theanfieldwrap.com/

DATA

- English Premier League from 2013-2022

- 38 games per season, 19 home, 19 away

- Data considered will be home wins compared to away wins and performance (goals scored) at home compared to away

- For my purposes, I am looking at undefeatedness instead of just "wins" (win + draws)

- How was Liverpool's performance during that time

- Other match statistics such as fouls, corner kicks, teams played, and even who was refereeing the game will be used for modeling purposes
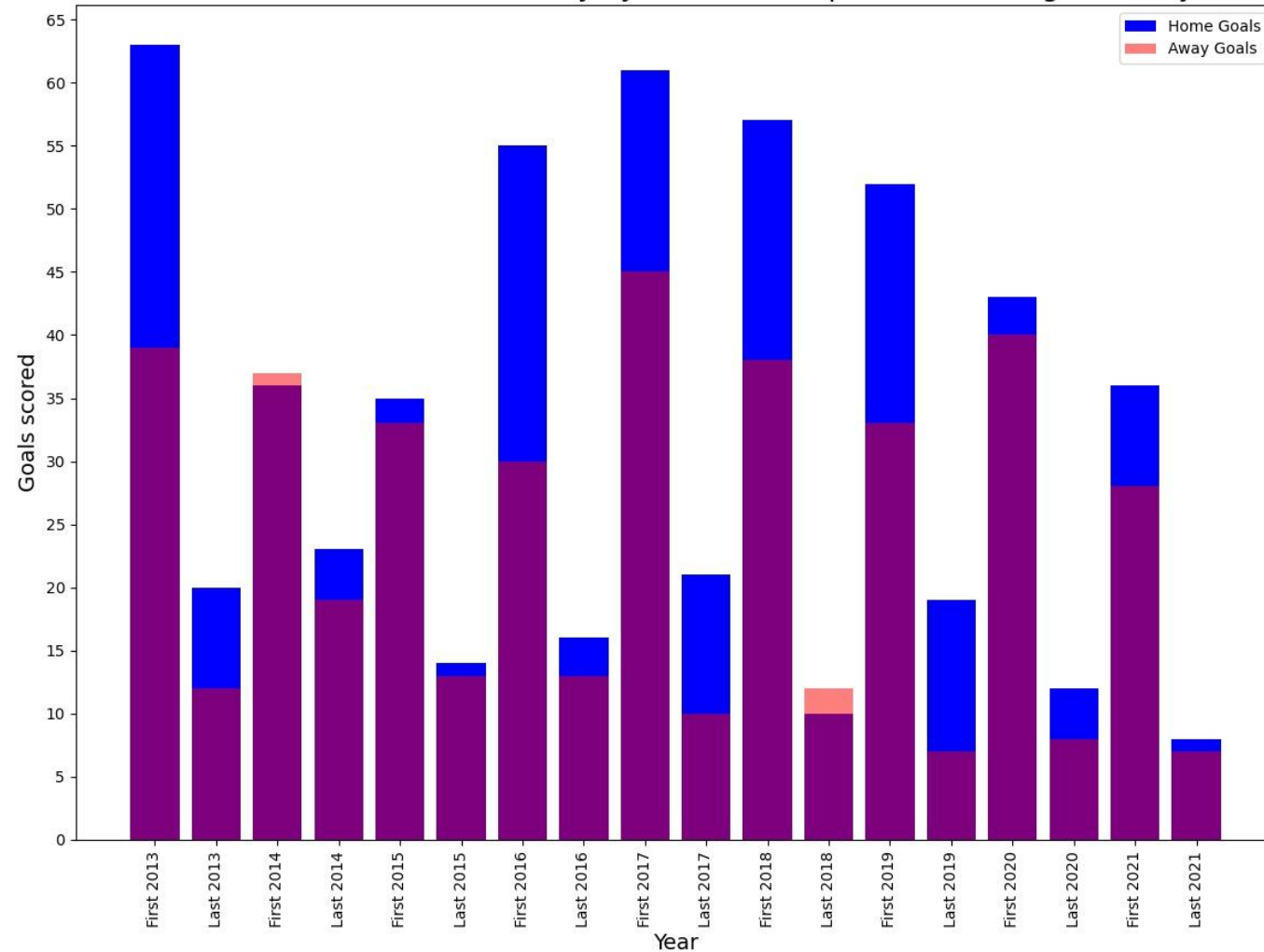
Image source: https://doxa.fm/

Home and Away games undefeated by first and last place in the league each year

DO THE FIRST AND LAST-PLACE TEAMS WIN MORE OFTEN AT HOME?

- No matter their place, even if they are the team losing the most in the league, both the first and last-place teams win more games at home

- Only twice over the past 9 years has a team won more often while playing away games

- Other than a couple outliers, teams win significantly more often at home

Goals scored at home versus away by first and last place in the league each year
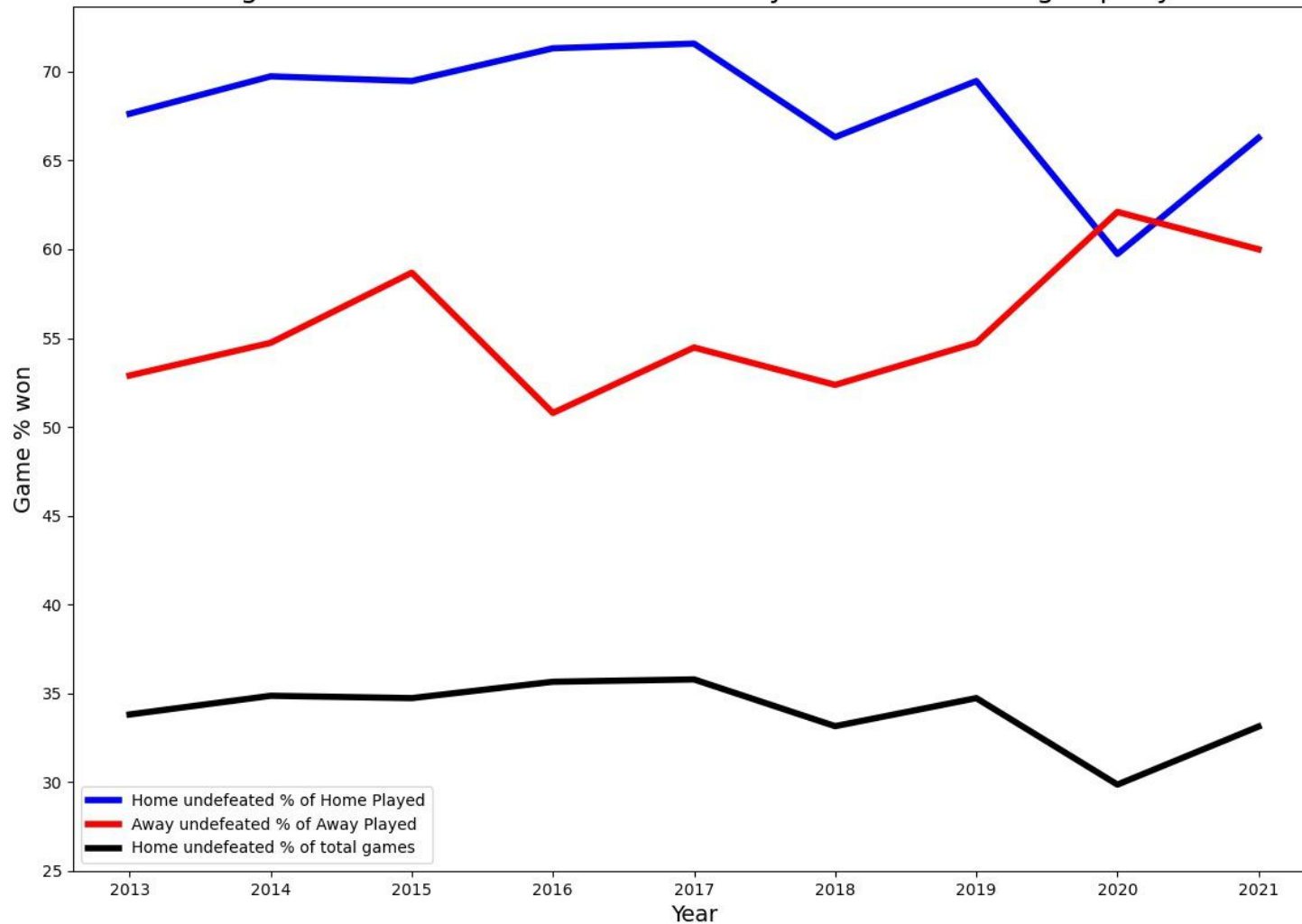
DO TEAMS PERFORM BETTER AT HOME?

- Both first and last-place teams score vastly more goals when playing at home on average

- Scoring more goals is not necessarily the same as achieving wins at home, yet also has a significant difference compared to away games

DID HOME FIELD ADVANTAGE PERSIST THROUGH COVID19?

- During the COVID19 the league shut down from March until June 2020

- Starting in June, and for the rest of the 2020-2021 EPL season, games games were played "behind closed doors", or, with no audience present

- It wasn't until the current season began in 2021 that fans were allowed back into stadiums in full force

- Since games were being played with no audience, did the home field advantage persist? Or is it tied to other factors?
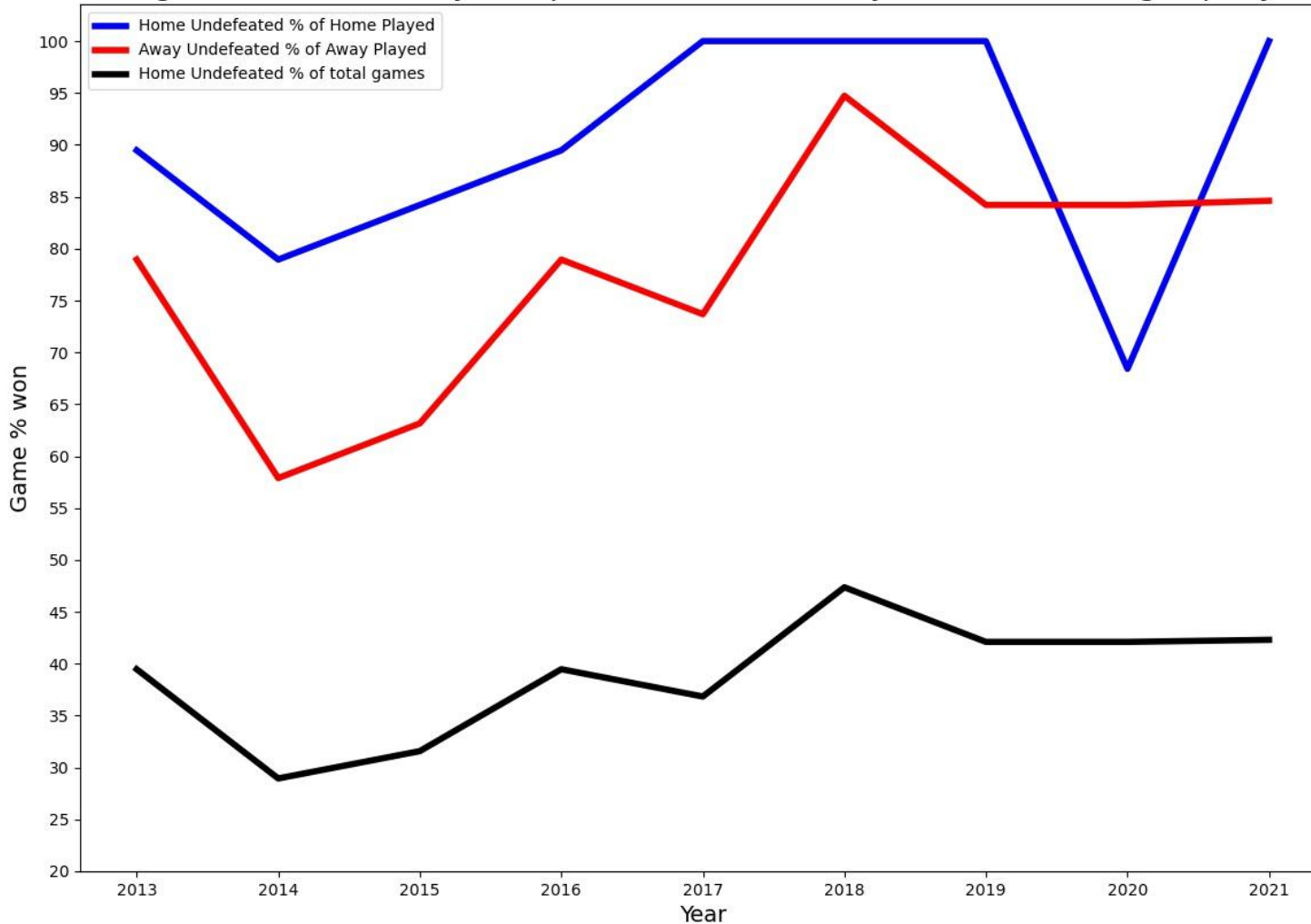
% of games undefeated at home and away for the entire league per year

HOME AND AWAY GAMES THROUGH THE COVID19 PANDEMIC

- Games played at home produce a higher win rate than games played away

- Except during COVID year (2020-21)

- Not only did home wins fall, but away wins surpass it

% of games undefeated by Liverpool at home and away for the entire league per year
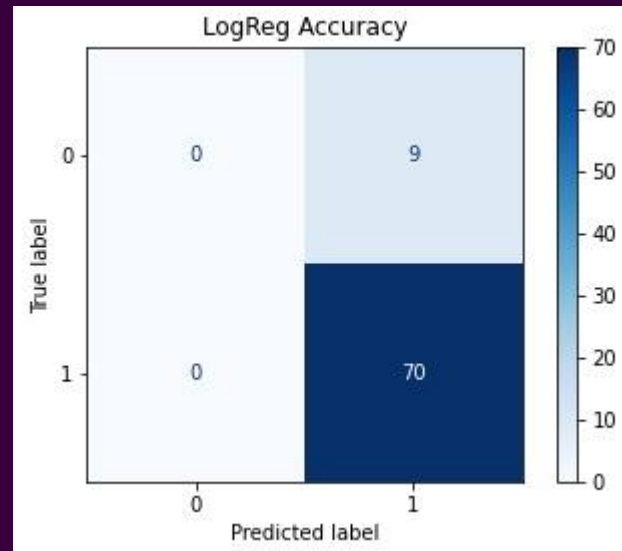
LIVERPOOL'S PERFORMANCE BEFORE AND AFTER COVID19

- Having had a steadily increasingly good home performance, there is almost a 35% decrease during 2020-21

- Similarly, increasing away performance stagnantes through that year

MODELS

- Baseline accuracy: 90% win prediction

- Logistic regression, K-Nearest neighbors, Decision tree, Random Forest, Bagged, Ada Boost, Support Vector classifiers

- Everything was performing the best as it got closer to the baseline accuracy

LogReg Accuracy

CONCLUSIONS

- According to the data, home field advantage is not just a hypothetical idea, but does seem to actually exist
- Teams can not only expect to win more games at home, but to perform better (score more goals) as well
- Not only does it exist, but it was noticeably affected by the COVID 19 pandemic, suggesting that the presence of the crowd supporting the home team does contribute to the advantage
- There must be a lot more that goes into calculating betting odds than the match statistics I used for my models

Additional Data

- Should I have left draws (ties) as their own category?

- Look at data for a less incredible team

- Would it be possible to find and use data from the first half of a game and make a prediction about the final result?

- More match statistics

- Consider more years? (Ship of theseus issue)

Thank you!

Sources:

https://www.soccerstats.com/homeaway.asp?league=england

http://www.football-data.co.uk/englandm.php