For as long as soccer players have been shuffled around in exchange for sums of money, clubs have placed great value in a player's age; they understood that players that were still improving and had not reached their best yet could be more valuable than a similar player who was already past their prime. Thus, the ability to predict when a player will reach their peak level of performance holds tremendous weight for clubs. Understanding how physical factors such as age, early performance, and injuries impact performance peaks is vital in accurately predicting and evaluating a player's potential. However, predicting player performance peaks is a complicated task, facing challenges rooted in the many external factors surrounding a player.. Despite these challenges, the ongoing use and development of analytics holds promise for improving the accuracy of predicting performance peaks, enabling teams and coaches to optimize their decision-making processes. We have developed a method of predicting when players at each position group on the field will typically hit their peak performance, which would ultimately help clubs more accurately determine both the future and present monetary value of a player; this influences what players a club will want to keep for the future. For clubs looking to the future, they will want players who have not reached their peak yet. Big clubs seeking to win now will be willing to buy players at or just past their peak, knowing that they are playing at their highest level currently. Both types of clubs, however, will opt to sell players well past their peak, so it is important to also know at what age players become too far gone from their prime.

We have focused on the Big 5 leagues in Europe: The EPL, Serie A, Bundesliga, Ligue 1, and La Liga; we wanted to look at the highest level of club soccer, but we also wanted to account for player movement across leagues; focusing on one league, the EPL for example, would mean we would not have players like Erling Haaland or Eden Hazard in our dataset for some of the important years of their careers. We obtained our data by web scraping defending, passing, and

goal creation data for 6 seasons- 2017 to 2022; specifically, we wanted tackles, interceptions, total numbers for different types of passes, assists, goals, xA, and xG. While this is not as much data as we would have liked to use, the amount of seasons at our disposal was limited. The statistics we wanted only dated back to the 2017 season, so we just used everything since then. However, to compensate for this, we developed a method that measures player development as well as player decline without needing a player's entire career, seeing as a player's career will typically last longer than 7 years.