Assignment 2 - Non-Technical Report

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1 Introduction

In modern football analysis, accurately assessing the potential impact of each pass is crucial for devising game strategies. **Expected assist (xA)** and **Expected goals (xG)** are key metrics for evaluating the quality of passes and shots. This report briefly explains how to use a **neural network model** to calculate the probability that a pass will convert into a goal, which is considered as the Expected assist (xA), to support the decision-making of coaching teams. I analyzed the passing data from a randomly selected 2018 Premier League match. By analysing the Expected assist (xA), we were able to identify key passes that had a decisive impact on the outcome of the match, helping coaches and analysts gain a more comprehensive understanding of player performance and match dynamics.

2 Explanation

2.1 Related definitions

When modeling the calculation of the Expected assist (xA), three key concepts are involved: Expected assist (xA), Expected goals (xG), and Neural Networks. The definitions of these concepts are as follows:

- **Expected assist (xA)**: This metric quantifies the quality of a pass in creating a shooting opportunity and estimates the probability that the pass will result in a goal. The value is derived from the Expected goals (xG) of the shot that follows the pass.

- **Expected goals (xG)**: This metric predicts the probability of a shot being converted into a goal under given conditions.

- **Neural Networks**: This refers to a machine learning model that predicts and classifies by learning complex patterns in large datasets.

2.2 Model explanation

I employed a simple neural network model, utilizing data from the 2018 Premier League will calculate the expected assist (xA). The model primarily analyzes

the positions of passes and shots, outputting the probability of each pass resulting in a goal, thereby determining the xA value for each pass. This method has shown excellent performance in learning from historical data and in calculation accuracy. However, there is room for improvement in the model's feature engineering, such as adding features like type of pass and pattern of play. These enhancements would help in a more detailed evaluation of the effectiveness of passes and increase the accuracy of predictions.

2.3 Explanation of xA

How do we evaluate football players? Evaluating football players typically depends on their ability to create goals for their team. For midfield players, the most important metrics might be their ability to create chances or assists. However, these metrics often depend on teammates' performance and might not accurately reflect the quality of the passes themselves. For instance, if a midfielder delivers a good pass that is not followed by a shot, that pass won't count as a chance created; similarly, if a pass leads to a shot that does not result in a goal, it won't count as an assist. Therefore, to more accurately assess a player's ability to create opportunities or assists, an Expected Assist (xA) model has been proposed. This model evaluates a player's performance by analyzing the expected goal probability after their passes, thus providing an independent metric that is not influenced by teammates' performances.

3 Example

Table 1: Top 5 Premier League Players by xA in 2018

Name	xA	Actual goals scored by team
Kevin De Bruyne	9.120857	94
Mohamed Salah Ghaly	8.519657	78
Christian Dannemann Eriksen	8.06708	67
Riyad Mahrez	7.703627	94
Wilfried Zaha	7.500452	35

According to Table 1, in the 2018 Premier League, the expected assists (xA) data for Kevin De Bruyne, Mohamed Salah, Christian Eriksen, Riyad Mahrez, and Wilfried Zaha demonstrate their contributions to creating scoring opportunities for their teams. De Bruyne and Mahrez, with xA scores of 9.12 and 7.70 respectively, led their team, which also topped the league with 94 goals, reflecting their and their team's excellent performance in 2018. Salah's 8.52 xA and his team's 78 goals also show his efficiency. Eriksen, with an xA of 8.07, performed well individually despite his team scoring fewer goals. Although Zaha had an xA of 7.50, his team only managed 35 goals, indicating that despite creating opportunities, the team had a low conversion rate.