



PLAYER PERFORMANCE ANALYSIS FOR CHARLTON ATHLETIC

Arjun Sridhar

September 12, 2024



PROJECT OVERVIEW & OBJECTIVES

Primary Objective 🎯

- Recommend 3 standout players for Charlton Athletic's first-team squad based on in-depth performance analysis.

Sub-objectives

- **Data Cleaning & Preprocessing** 🧹
Handle missing values, standardize metrics, and normalize data.
- **Performance Analysis** 📊
Assess players' attacking, defensive, and transitional abilities.
- **Player Comparison** 🔍
Identify top performers for each position based on impact per 90 minutes.
- **Player Recommendation** 🏆
Deliver data-backed recommendations for the top 3 players.

Key Metrics Defined 📏

- **Play Duration** 🕒
Total seconds a player has spent on the pitch, reflecting their experience and contribution.
- **Match Share** 📈
Proportion of match time participated in, indicating consistency and reliability.

Deliverables 📁

- **Comprehensive Data Analysis**
Detailed review of player performance across positions and leagues.
- **Data-Driven Visualizations**
Insights into playtime, ultimate scores, and top players.
- **Recommendations**
Selection of 3 key players with detailed justification and supporting visuals.

DATASET BREAKDOWN

Key Features of the Dataset 📊

➤ **Play Duration** 📅

Total time a player has spent on the pitch.

Importance: Reflects experience and contribution during matches.

➤ **Match Share** 📈

Percentage of total available match time played by the player.

Importance: Measures reliability and consistency in team selection.

Additional Features 🔍

➤ **Position Categories** ⚽

Various roles (e.g., Central Midfield, Goalkeeper, Winger) for role-specific comparison.

➤ **Performance Scores** 📊

Metrics like AI Score, Weighted Score, Z-Score to objectively rank players.

Challenges 🚧

➤ **Missing Data** ?




Incomplete records addressed via imputation or removal.

➤ **Data Normalization** 📏


Applied scaling across leagues for fair player comparison.

DATA CLEANING & PREPROCESSING

Steps Taken

- **Standardized Column Names** 
Ensured uniformity and clarity in data labels.
- **Handled Missing Values** 
Addressed incomplete data through imputation or removal.
- **Scaled Important Features** 
Normalized Play Duration and Match Share for consistent comparison.

Outcome

- **Data Consistency Achieved** 
Dataset is now uniform and ready for insightful analysis.

SCORING AND RANKING PLAYERS

Scores Applied 📊

- **AI Score** 📊
Generated using the rainforest model for unlabeled data.
- **Weighted Score** 📊
Balanced based on specific metrics.
- **Z-Score** 📊
Standardized measure of performance.
- **PCA Score** 🔍
Principal Component Analysis for dimensionality reduction.
- **Simple Sum Score** +
Aggregated sum of key metrics.
- **Geometric Mean Score** 📊
Average score based on multiplicative factors.
- **Harmonic Mean Score** 📊
Average score emphasizing lower values.

Final Score 🏆

- **The Ultimate Score** ★
A weighted combination of all scores to rank players effectively.

Weights 📊

- **AI Score:** 25%
- **Weighted Score:** 20%
- **Z-Score:** 15%
- **PCA Score:** 10%
- **Geometric Mean Score:** 10%
- **Harmonic Mean Score:** 10%
- **Simple Sum Score:** 10%

Method

➤ Ranking Players

Used **Ultimate Score** to rank players within each position.

➤ Top 3 Flag

Created a flag for the top 3 players in each position category.

Positions Covered

➤ Central Midfield

➤ Goalkeeper

➤ Center Forward

➤ (and others)

New Column

➤ `is_top_3_in_position`

Indicates whether a player is among the top 3 in their position.

IDENTIFYING TOP PLAYERS BY POSITION

VISUALIZATIONS: PLAYER ANALYSIS

Ultimate Scores

➤ Bar Chart

Displays players' Ultimate Scores, sorted from highest to lowest.

Play Duration vs. Match Share

➤ Scatter Plot

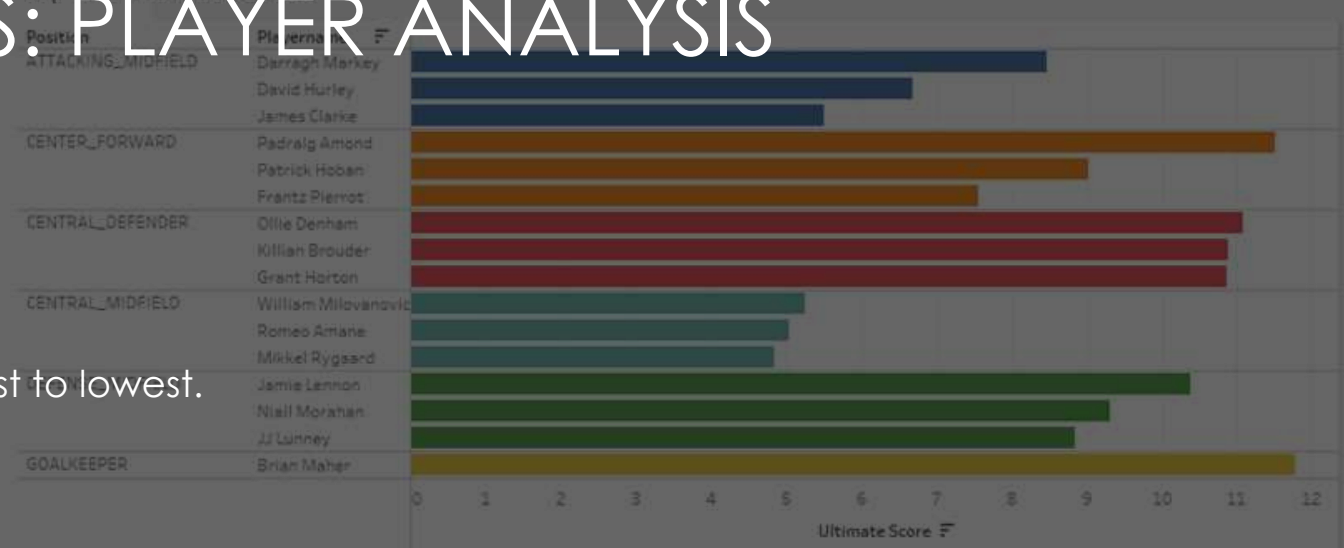
Shows the relationship between Play Duration and Match Share, with player names labeled.

Top 3 vs. Ultimate Score

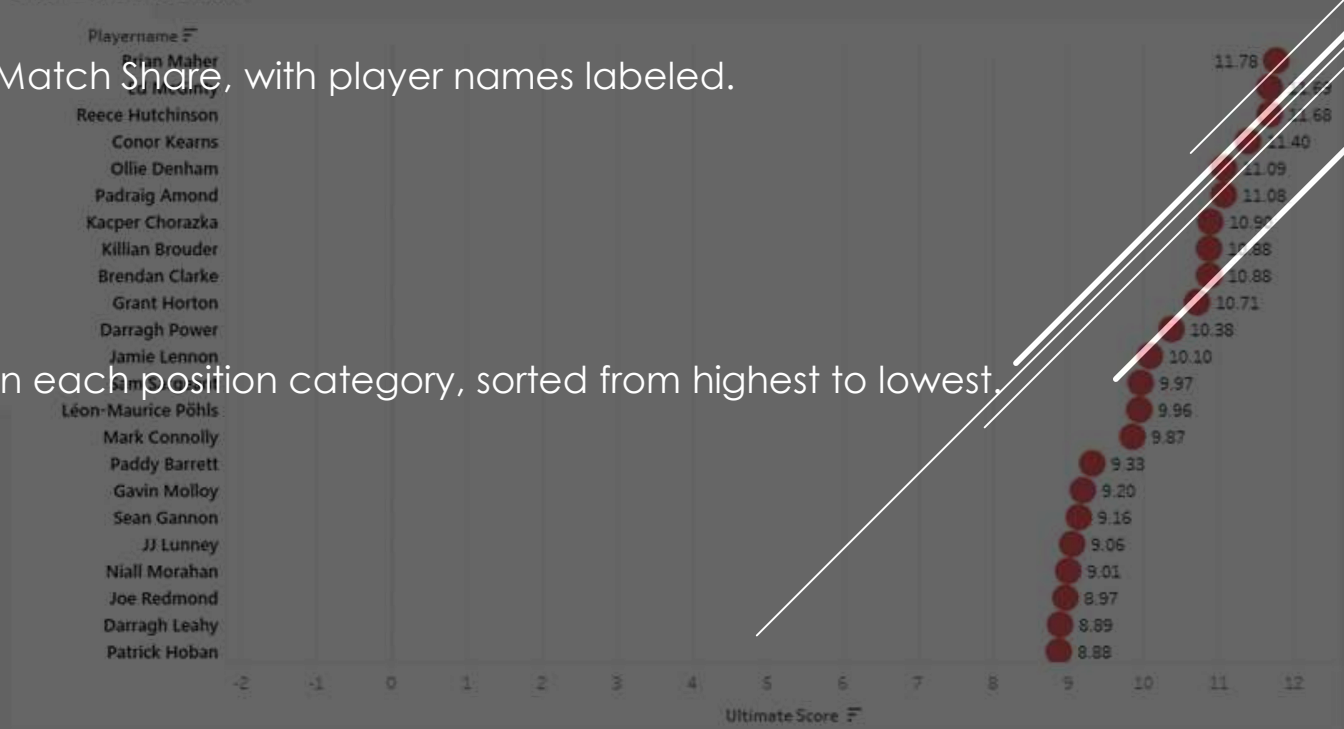
➤ Bar Chart

Compares the Ultimate Scores of the top 3 players in each position category, sorted from highest to lowest.

top 3 vs ultimate score



score distribution



Top 3 Recommended Players ★

- 🏟️ The top three players for each position category will be showcased in the following slides

Selection Criteria 📋

- **High Ultimate Score** 📈
Prioritized based on performance metrics.
- **Key Metrics** 🔍
Includes Play Duration and Match Share.
- **Position-Specific Needs** ⚽
Tailored to fit team requirements.

FINAL PLAYER RECOMMENDATIONS

1. Brian Maher

➤ ✨ Ultimate Score: 11.78

2. Ed McGinty

➤ ⬆_{TOP} Ultimate Score: 11.69

3. Conor Kearns

➤ ✨ Ultimate Score: 11.40



 **GOALKEEPERS**

1. William Milovanovic

➤ ★ Ultimate Score: 5.26

2. Romeo Amane

➤ ⚡ Ultimate Score: 5.04

3. Mikkel Rygaard

➤ ⚔ Ultimate Score: 4.84



CENTRAL MIDFIELDERS ⚽📺

1. Darragh Power

➤ ⚡ Ultimate Score: 10.52

2. Sean Gannon

➤ ⬆ TOP Ultimate Score: 8.89

3. John Ross Wilson

➤ 🏆 Ultimate Score: 8.77



RIGHT WINGBACK DEFENDERS

1. Reece Hutchinson

➤ ⚡ Ultimate Score: 11.68

2. Paddy Kirk

➤ ⬆ Ultimate Score: 8.73

3. Anto Breslin

➤ 🏆 Ultimate Score: 8.40



LEFT WINGBACK DEFENDERS



1. Jamie Lennon

➤ ⚡ Ultimate Score: 10.39

2. Niall Morahan

➤ ⬆ TOP Ultimate Score: 9.32

3. JJ Lunney

➤ 🏆 Ultimate Score: 8.84



DEFENSE MIDFIELDERS



1. Padraig Amond

➤ ★ Ultimate Score: 11.51

2. Patrick Hoban

➤ ↻ Ultimate Score: 9.02

3. Frantz Pierrot

➤ ✂ Ultimate Score: 7.57



CENTER FORWARDS ⚽📺

1. Darragh Markey

➤ ★ Ultimate Score: 8.48



2. David Hurley

➤ ★ Ultimate Score: 6.68



3. James Clarke

➤ ✖ Ultimate Score: 5.51

ATTACKING MIDFIELDERS 🎯



1. Ollie Denham

➤ ⚡ Ultimate Score: 11.09

2. Killian Brouder

➤ ⬆ TOP Ultimate Score: 10.88

3. Grant Horton

➤ 🏆 Ultimate Score: 10.86



CENTRAL DEFENDERS



1. Will Jarvis

➤ ⚡ Ultimate Score: 7.48



2. Ed McCarthy

➤ ⬆️ Ultimate Score: 6.98



3. Michael Duffy

➤ 🏆 Ultimate Score: 6.73



LEFT WINGERS ★

1. Fabrice Hartmann

➤ ⚡ Ultimate Score: 5.76



2. Paul McMullan

➤ ⬆️ Ultimate Score: 5.35



3. Gustav Lundgren

➤ 🏆 Ultimate Score: 5.30



RIGHT WINGERS ✨



Summary:

- Data-driven approach to identify top talent.
- Key insights from the analysis.

Next Steps:

- Further validation with scouting.
- Possible additional analysis based on more data.

CONCLUSION & NEXT STEPS

Questions?

- Feel free to ask!

Contact Info:

- arjunsridhar445@gmail.com
- <https://arjunsridhar.journoportfolio.com>
- <https://www.linkedin.com/in/arjun-sridhar-6466751b7>
- <https://github.com/smooth-glitch>

Project repository:

- <https://github.com/smooth-glitch/charltonFC>

Looking forward to discussing my recommendations further! 😊

THANK YOU!