Football Player Data Analysis

Part 3

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https://github.com/s126784/fcd/

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Project Evolution

Previous Parts

- Part 1: Data Collection & Initial Analysis
- Part 2: Text Analysis & Historical Data

Part 3 Goals

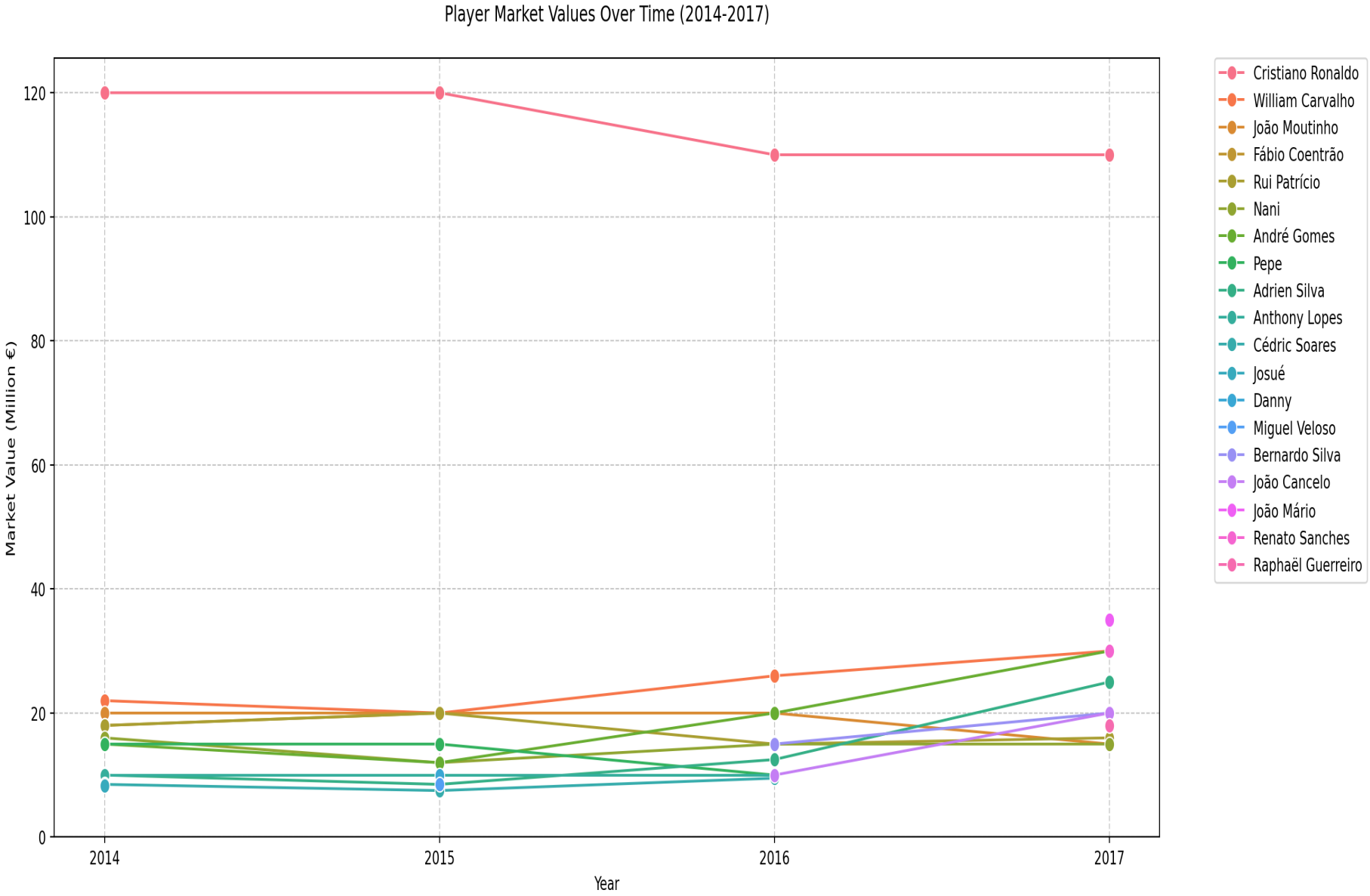
- Advanced text processing & sentiment analysis
- Time series prediction for market values
- Player clustering and network visualization
- Market value trend prediction

Dataset

```
1 years = [2014, 2015, 2016, 2017]
2 data = list(map(lambda year: pd.read_csv(f'data/portugal_{year}_plus.csv'),
3 data[0].head()
```

	#	Player	Age	Market value	Name	Position	search_results
0	7	Cristiano Ronaldo Centre-Forward	30.0	120000000	Cristiano Ronaldo	CF	8631215
1	6	William Carvalho Defensive Midfield	23.0	22000000	William Carvalho	DM	2809567
2	8	João Moutinho Central Midfield	28.0	20000000	João Moutinho	CM	1431291
3	5	Fábio Coentrão Left-Back	27.0	18000000	Fábio Coentrão	LB	503646

Graphical Representation (Matplotlib)



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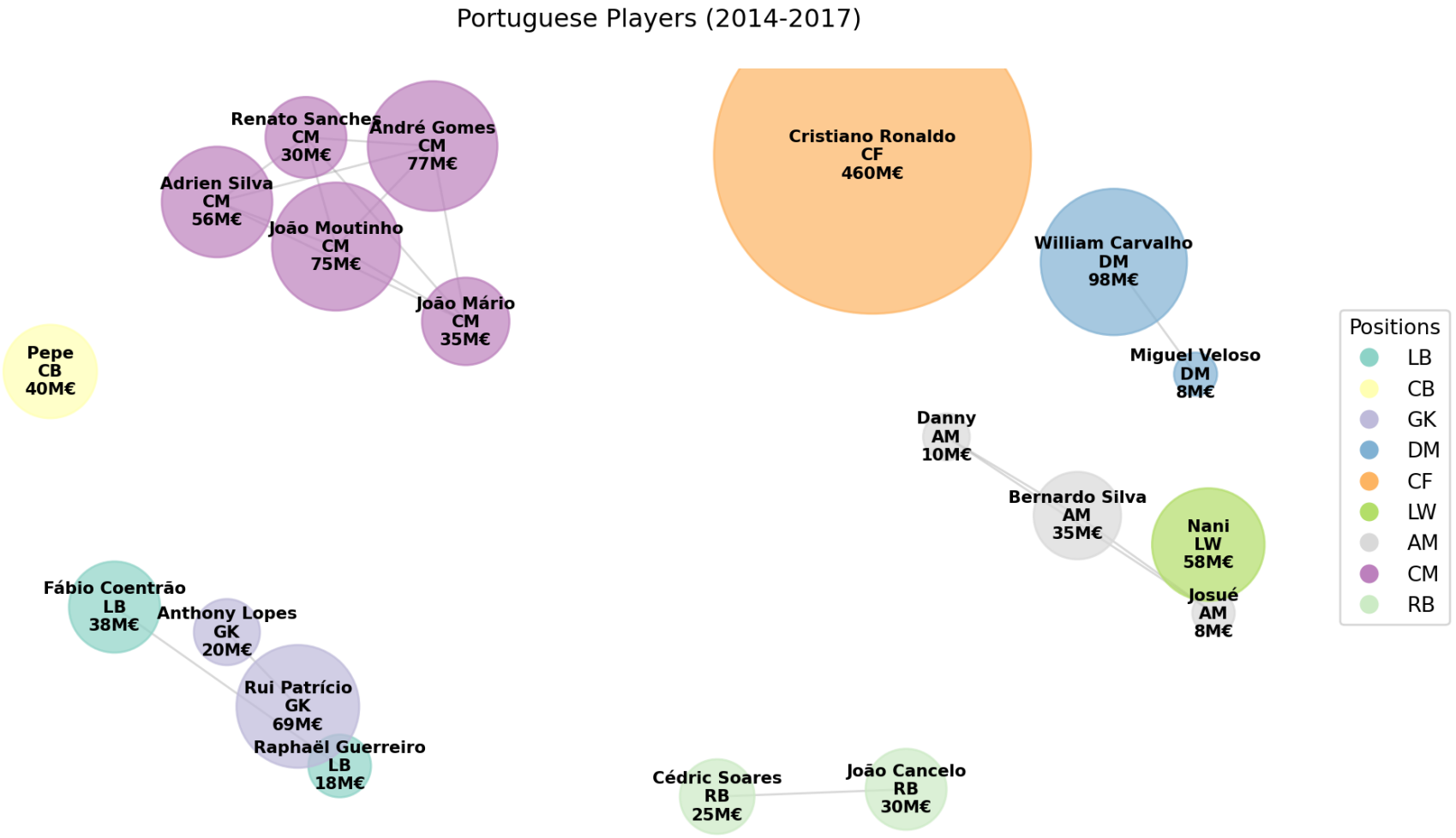
Graphical Representation (NetworkX)



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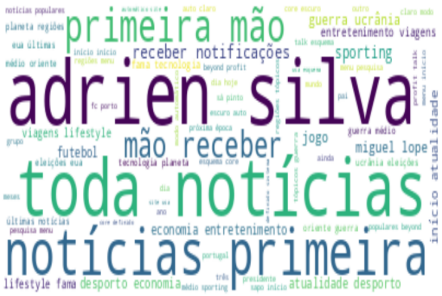
Text Processing

```
 1 from nltk.tokenize import word_tokenize
 2 from nltk.corpus import stopwords
 3 from nltk.stem import WordNetLemmatizer
 4
 5 def advanced_tokenization(text):
 6     lemmatizer = WordNetLemmatizer()
 7     if not isinstance(text, str):
 8         return []
 9     tokens = word_tokenize(text.lower())
10     stop_words = set(stopwords.words('portuguese'))
11     # Remove non-alphabetic and stopwords
12     tokens = [lemmatizer.lemmatize(t) for t in tokens
13               if t.isalpha() and t not in stop_words]
14     return tokens
15
16 # Apply advanced tokenization to content_df
17 content_df['tokens'] = content_df['extracted_text'].apply(advanced_tokeniza
```

Word Clouds

Adrien Silva Central Midfield



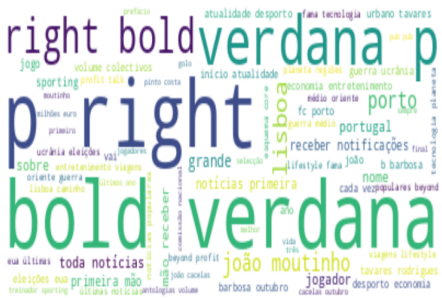
André Gomes Central Midfield

Bernardo Silva Attacking Midfield

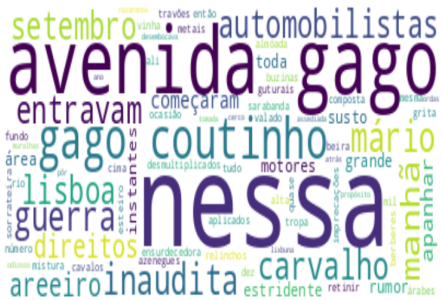
Cristiano Ronaldo Centre-Forward

Cédric Soares Right-Back

João Moutinho Central Midfield

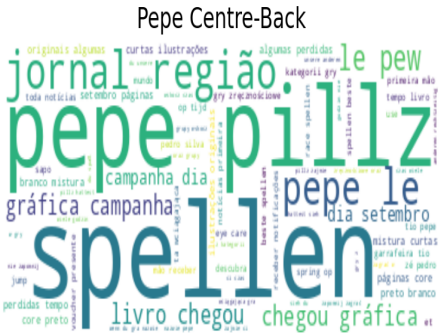


João Mário Central Midfield



Nani Left Winger

Pepe Centre-Back



Rui Patrício Goalkeeper

William Carvalho Defensive Midfield

Summary

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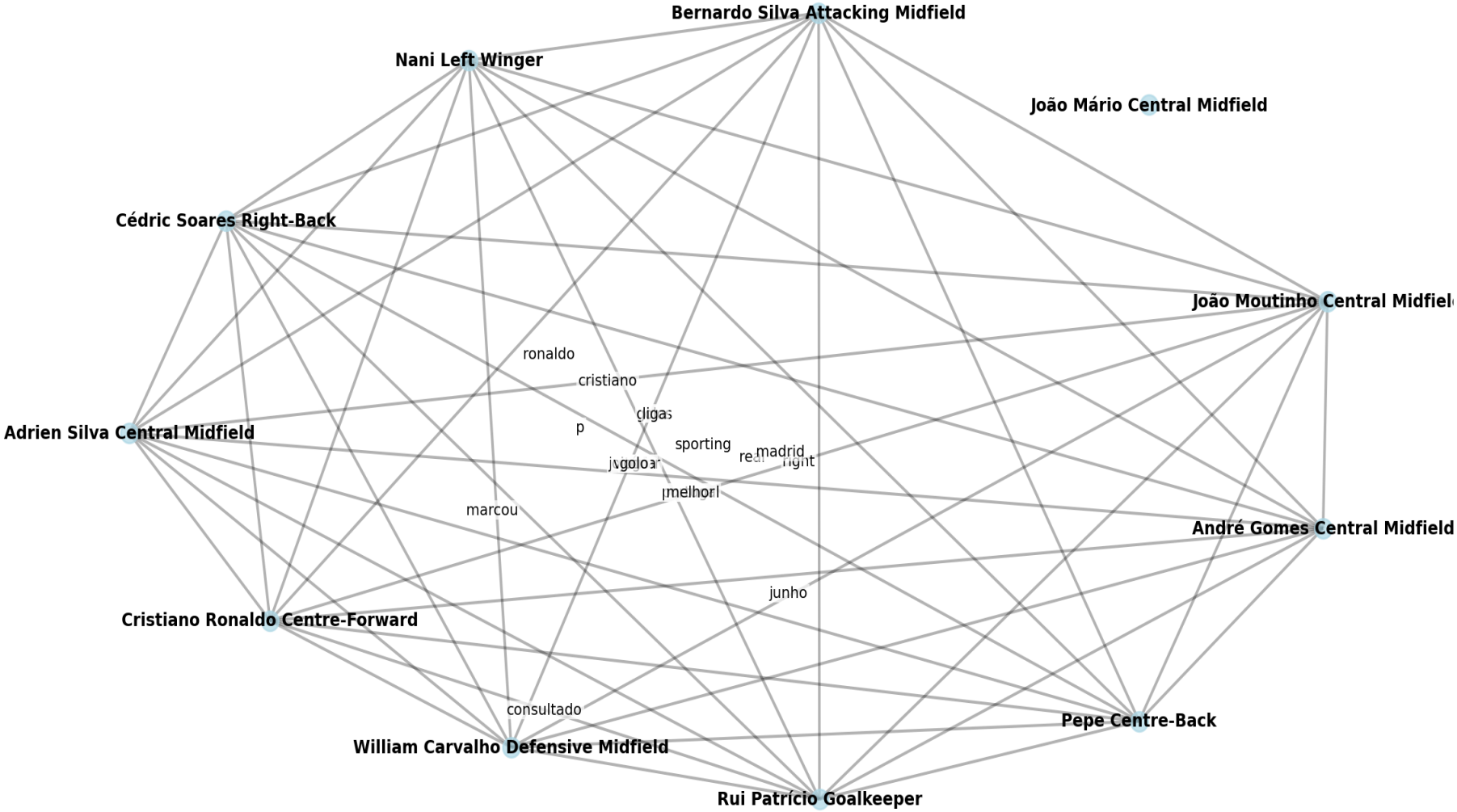
Connections Between Players by Shared Keywords


Bernardo Silva Attacking Midfield
Nani Left Winger
João Mário Central Midfield
Cédric Soares Right-Back
João Moutinho Central Midfiel
ronaldo
cristiano
liga
p
sporting
madrid
goloa
melhorl
marcou
André Gomes Central Midfield
Adrien Silva Central Midfield
junho
Cristiano Ronaldo Centre-Forward
consultado
Pepe Centre-Back
William Carvalho Defensive Midfield
Rui Patrício Goalkeeper

Neural Network for Market Value Prediction

	Player	tokens	Market value
0	Adrien Silva Central Midfield	[sapo, início, início, atualidade, desporto, e...	56000000
1	André Gomes Central Midfield	[sapo, início, início, atualidade, desporto, e...	77000000
2	Bernardo Silva Attacking Midfield	[vésperas, estreia, rúben, amorim, treinador, ...	35000000
3	Cristiano Ronaldo Centre-Forward	[cristiano, ronaldo, página, apresenta, trecho...	460000000
4	Cédric Soares Right-Back	[confimação, saída, nuno, coelho, surge, possi...	25500000

Predictor

```
class PlayerValuePredictor:
    def __init__(self):

        # Create pipeline with Portuguese-specific TF-IDF
        self.pipeline = Pipeline([
            ('tfidf', TfidfVectorizer(
                max_features=1000,
                ngram_range=(1, 2),
                min_df=2
            )),
            ('scaler', StandardScaler(with_mean=False)),
            ('model', RandomForestRegressor(
                n_estimators=500,
                max_depth=None,
                min_samples_split=3,
                min_samples_leaf=2,
                max_features='sqrt',
                random_state=126784
```

Usage Example

Radio Cadena Voces @RCVHonduras

Portugal se impuso este sábado por 3-0 a Turquía y se clasificó para los octavos de final de la Eurocopa 2024 como primera del Grupo F, gracias a un gol de Bernardo Silva, otro de Samet Akaydin en propia puerta y un tanto de Bruno Fernández. #RCVNoticias

rcv.hn pic.x.com/wK0Vn2PLAK

```
1 text = 'Portugal se impuso este sábado por 3–0 a Turquía y se clasificó par
2 new_keywords = predictor.preprocess_portuguese_text(text)
3 predicted_value = predictor.predict(new_keywords)
4 print(f"\nPredicted value for new player: ${predicted_value:,.2f}")
```

```
Predicted value for new player: $65,251,703.39
```

Conclusions

- Advanced text processing & sentiment analysis
- Visualizations of player connections
- Market value trend prediction

Future Research Directions

- Potential for real-time market value predictions
- Expansion to other football leagues and languages
- Integration with broader sports analytics systems

References

- Sozen, Y. (2023). Predicting Football Players Market Value Using Machine Learning
- Transfermarkt Documentation
- Arquivo.pt API Documentation