ANALYSIS OF FOOTBALL PLAYERS' PERFORMANCE USING PYTHON AND DARTFISH

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Abstract: Selecting players is an essential task for a football Team Manager or Coach for every match and it should be on a comparative basis and ranking system to be followed. The players' selection varies in 11 different positions in football. The Management of a team should select 11 players for each match from the entire squad excluding substitutes[5]. The main thing is that the player selected must be completely free from injury, fatigue, mental pressure, etc. If anyone got affected or was in a situation where he cannot make the match. We should be having choices to choose for the particular position based on ranking (which is purely based on the data which we have already) based on the previous matches they played has to be analyzed using data and video analysis using python and Dartfish respectively. The best attacker, defender, and goalkeeper to be selected among the available players will be a great help. Data of the players who are all performing well and currently under Indian camp training will be collected through basic python web scraping and analysis of player performance through the events using Dartfish will be done. Using this we can increase the FIFA ranking of an Indian Football Team as well and the coach might try to get our team qualified for the world cup by improving their weak areas and concentrating on performance.

Key Words: Football Match Analysis, Dartfish Tagging, Python Coding, Team Performance Analysis, Video Analysis.

1. Introduction

Best player selection for a football world cup is nothing but predicting the players' performance according to the ranking system to find the best performer. Each player performs differently for every match[5]. Player selection is very important in the game of football world cup as exactly 11 players are selected at the beginning of the match and are fixed for the entire match unless in case of injury. Players' performance can be predicted by analyzing their past data/records apart from an economical point of view.

Football players' performance is measured in different ways. The common performance indicators that should be evaluated in a player's performance are based on their playing profile.

- Goalkeeper
- Full back
- Center back
- Holding midfielder
- Attacking midfielder
- Wide midfielder
- Strikers

Attacking play is measured based on XG, no. of strikes, number of goals, and so on. While the defensive play is measured based on no. of saves, average goals saved, etc. (including goalkeeper).

The players' recent results, however, are a key factor considered during the selection process. Attack/Defense are also taken into consideration for forecasting his success in the upcoming match in a particular venue and no of matches played as well.

Through this research, Video analysis will be done based on the events tagging for the players who performed in the friendly matches held with Bahrain and Belarus to find out the weak areas and concentrate on improving performance which will be very helpful for the players and for the coach to improve the performance.

1.2 World Ranking

Worldwide ranking is mainly updated based on the team performance and their achievements throughout the matches they have played with the comparative study of all the teams. According to that, the world ranking of Our Indian football team's trend is shown in Fig. 1.1.
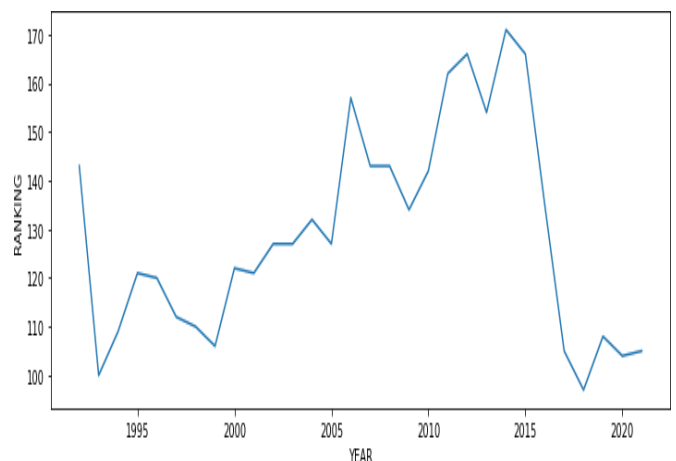

Figure 1.1: Ranking Trend

1.3 Python Web Scraping

Using web scraping the data for a particular league or the entire season can be obtained from the web page including ranking passed on the parameters and variables for defense, attacking and goalkeeping to be obtained, and we can get players with minimum appearances as well.

Figure 1.2: Web Scraping

1.4 Dartfish Analysis

Dartfish is not only a Video Analysis software that also provides Statistical data based on the event that we create tagging using the tagging panel created to segregate the events which also allows us to analyze and share videos of training sessions and matches. Also using dartfish, we can do pre-match (using training videos), post-match, Live match, opposition, and recruitment analysis as well. A video is displayed with the match footage on one of the screens with a panel of tags 1.3 and codes next to it where an analyst can instantly visualize key actions identified and underline what the action reveals.

Using dartfish, we can also import external videos, which were already recorded and use that for tagging and generating reports for getting feedback regarding players and share it with the coaches, which are very useful for them to concentrate on every event.
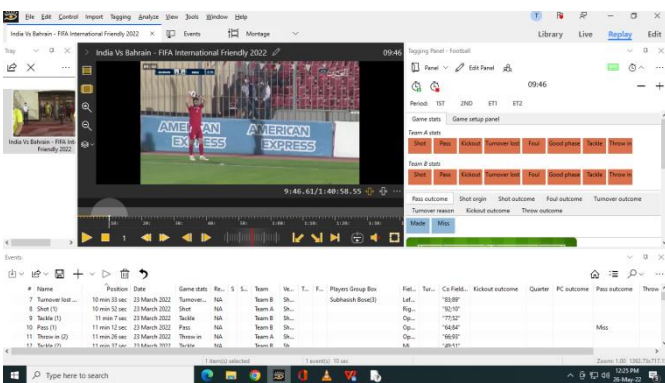

Figure1.3 Dartfish Tagging panel

1.5 Problem statement

The Indian football team remains at 105th position in the latest FIFA Rankings updated on 12 August 2021 and still, now we are struggling to get qualified for the FIFA world cup. According to the statement of our Former Indian football team captain, Bhaichung Bhutia is not impressed with the quality of the Indian Super League (ISL), stating that the league will benefit by allowing an additional foreigner in the playing eleven[10].

Figure 1.4: Press release. Credits: - The Hindu

Based on the above statement I am taking the players list who are selected from ISL and being in the training under Indian Football Team Camp. In addition, they have played a couple of matches with Bahrain and Belarus on 23 March 2022 and 26 March 2022 respectively. With the above matches, our team players could not perform well and they failed to succeed in the matches.

Figure 1.5: New article about performance in Bahrain[11]. Credits:-News Click

This project is a detailed study of the player performance through dartfish video analysis to improve them and to provide feedback through statistical data to the coach, which will help them in improving their playing style. Through that, we can attain the level of being qualified for FIFA. Using python we can do data analytics and with the data, we can analyze the players' performance, and the video can be analyzed and shared with the player/coaches for their future reference in performance improvement.

2. 2. Literature Review

2.1 A data science approach to football team player selection. (Dr. P Rajesh, Bharadwaj Dr. Mansoor Alam, Dr. Mansour Tahernezhadi Associate Professor, Researcher KLEF University, Professor Northern Illinois University)

This paper presents a data science approach to minimize the time taken in selecting a player for a team by

considering the cost and players' skill as constraints such an analysis will help an owner to create a new club. They present a statistical analysis of player performance based on abilities and skills for a new team using power BI and python pandas by minimizing the cost. In addition, I found the research gap in this paper that ranking is one of the major factors to be considered in every position of the player like attack, defense, and goalkeeping. In this paper, they have taken into account the cost and the player skills[1].

2.2 Developing a framework for professional practice in applied performance analysis. (Denise Martin, Peter G.O. Donoghue, Jonathan Bradley, et.all)
A six-step framework analysis was conducted

3.   An initial conceptual framework was devised based on well-accepted components of applied practice.

4.   A systematic review identified 90 papers relating to applied PA practice.

5.   Papers were coded to the initial framework and additional themes were recorded.

6.   Themes were analyzed and synthesized to construct a draft framework.

7.   This draft was validated by surveying 24 experienced applied performance analysts and academic experts.

8.   A revised framework is reported based on stakeholder engagement feedback.

Nine components of practice were identified; establishing relationships and defining roles, needs analysis and service planning, system design, data collection and reliability checking, data management, analysis, reporting to key stakeholders, facilitation of feedback to athletes, and service review and evaluation. Our evidence suggests that the applied Performance analyst practice is underpinned by five areas of expertise. Contextual awareness, building relationships, performance analysis, sporting expertise, technical expertise, and professional behaviors[2].

Performance analysis is a widely accepted discipline of sports science that involves the systematic analysis of actual sports performance and provides valuable input to inform the coaching process[2].

2.3 The role of databases in sport science: current Practice and future potential (Jenny Vincent, Pro Stergiou, Larry Katz Faculty of Kinesiology, The University of Calgary, Canada).

This paper discusses the nature of databases, and the role of databases in sports science including design considerations, and issues in integration.

Databases are also useful as multimedia repositories of sports information. Sports involve human movement. This can be quantified with numerical data, graphics, and audio/video recordings. Multimedia Resources in this context are exceptionally valuable, especially valuable, especially if the information can be accessed via creative interfaces that provide timely and efficient information that is tailored to each individual's unique requirement[9].

3. Proposed Work

Video analysis of the entire match played by our Indian team with Bahrain and Belarus is to be analyzed by tagging events that occur in every movement of the player, the event-wise data will be shared on Dartfish TV, and the statistical report for improving the players' performance will be generated[9].

This will be very helpful for the player to improve their game and for the coaches to improve and coach on their weak areas and the gaming skills be improved.

3.1 Data collection (Web Scraping)

Using data of the players under Indian Football Camp will be collected using python web scraping. Using that particular season's video to be downloaded and the match will be analyzed and shared on the Dartfish TV. Using Dartfish TV, we can save the player-wise data by creating a login with Dartfish and the same data can be useful for coach/player for further performance improvement.

3.2 Video Analysis

High-quality videos of the matches will be downloaded from YouTube and the player-wise data will be analyzed by creating a Tagging panel. The video data will be uploaded to the Dartfish TV.

4. Analysis Process

The ranking trend of our Indian team in worldwide football has been drawn in a graphical view using python code, which is shown in figure 4.1.

Figure 4.1 Indian Football Team Ranking using Python Code.

4.1 Tagging Panel for Football

To segregate event-wise data that occurs in a match we need to create a tagging panel based on our requirements. Before that, a need occurs to find a search on a list of events that require analyse[7].

Figure 4.2: Dartfish setup panel

The above Figure 4.2 is the tagging panel setup wizard, which is one of the main functionality dartfish, provides us in tagging players' events, which is the keyword button, team manager tool, and various other zone tools as well.

Figure 4.3: Dartfish Tagging Panel

The above Figure 4.3 is the main area where the tagging of events occurs; here we have segregated based on the events of the match. Some of the major events are shot, kick out, turnover lost, foul, tackle and throw in.

To get the event data in excel and short videos using the tagging panel, I have selected the friendly matches that were held with Bahrain and Belarus on 23rd March 2022 and 26 March 2022 respectively. With these above matches, our team players could not perform well and they failed to succeed in the matches.

4.2 List of players in India Vs Bahrain match on 23 March 2022

Indian Team	Bahrain Team
Player Name	**Player Name**
Gurpreet Singh Sandhu	Sayed Mohammed Jaffer
Pronay Holder	Mohammed Al-Hardan
Subhasish Bose	Kamil Al Aswad
Sandesh Jhingan	Waleed Al Hayam
Pritam Kotal	Abbas Ayyad
Rahul Bheke	Amine Benadi
VP Suhair	Mohammed Marhoon
Danish Farooq Bhat	Mahdi Abduljabbar
Manvir Singh	Jasim Al-Shaikh
Liston Colaco	Mahdi Al-Humaidan
Rahim Ali	Abdulla Al-Haza'a
Substitutes	**Substitutes**
Mohammed Yasir	Ali Madan
Anwar Ali	Abd Al Aziz Al Sheikh
Aniket Jadav	Abdulwahab Al Malood
Roshan Singh Chingakham	Ali Haram
Anirudh Thapa	Abdullah Duaji Al Hashash

Figure 4.4: India VS Bahrain Players List

4.3 List of players in India Vs Belarus match on 26 March 2022

Indian Team	Belarus Team
Player Name	**Player Name**
Naorem Roshan Singh	Evgeni Yablonski
Akash Mishra	Roman Begunov
Brandon Fernandes	Max Ebong
Gurpreet Singh Sandhu	Egor Khatkevich
V.P. Suhair	Gleb Shevchenko
Anirudh Thapa	Ruslan Yudenkov
Manvir Singh	Ivan Bakhar
Ruivah Hormipam	Vladislav klimovich
Anwar Ali	Pavel Sedko
Seriton Fernandes	Roman Yuzepchuk
Sandesh Jhingan	Zakhar Volkov
Substitutes	**Substitutes**
Aniket Jadav	Valery Gromyko
Mohammed Yasir	Dmitry Bessmertny
Pritam Kotal	Artyom Bykov
Danish Farooq Bhat	Danila Nechayev
Chinglesana Singh	Dzmitry Padstrelaw
	Andrey Solovey

Figure 4.7: India VS Belarus Players List

5. Results and Discussion

As a result of the analysis done using Python and Dartfish, It has been found that the friendly matches played with Bahrain and Belarus were not up to the mark because our ball possession and the passing accuracy and shots taken on the Goalpost is very less and we need to concentrate on all the key events which are being shared in the Dartfish TV, further the coaches/players can utilize these video events segregated based on events using Tagging each match. This will help the coaches to improve the performance of the players' weak areas and they can train better where they are lagging. In addition, statistics of the entire team are given below, and a match summary on an event basis is attached to Appendix.

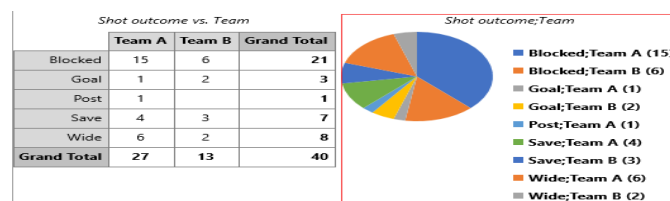| Shot outcome vs. Team	Team A	Team B	Grand Total
Blocked	15	6	21
Goal	1	2	3
Post	1		1
Save	4	3	7
Wide	6	2	8
Grand Total	27	13	40

Figure 5.1 Shot Outcome Vs Team

The above Fig. 5.1 shows the match of the India and Bahrain team's Shot outcome. And the below image

shows the total passes taken by our team along with the made and missed pass data which is graphically represented for the players and coaches to work on. In addition, it shows the shot outcomes of the team India and Belarus. Likewise, all the data has been gathered and the video be shared on Dartfish TV event-wise and player-wise can be done.
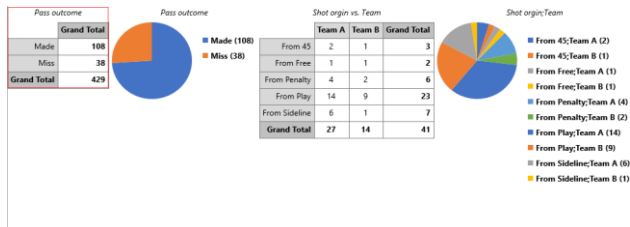

Figure 5.2 Match 2 Game stats

5.1 Sharing Events on Dartfish TV Channel

The below screen of Figure 5.3 and Figure 5.4 shows the sharing screen and playlist management screen on Dartfish TV which is the final stage where a Performance analyst shares the feedback and the work done using Dartfish Tagging[6].
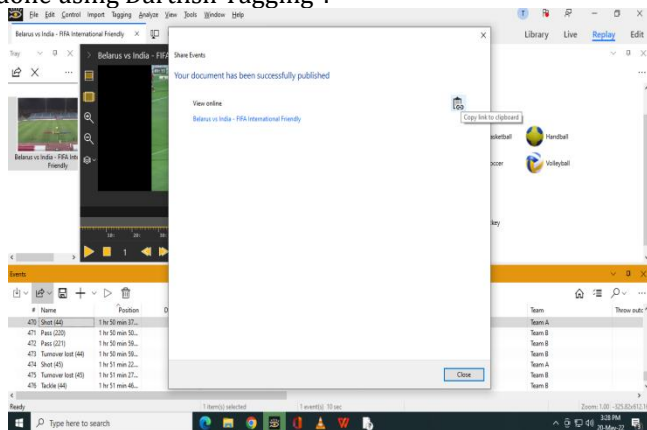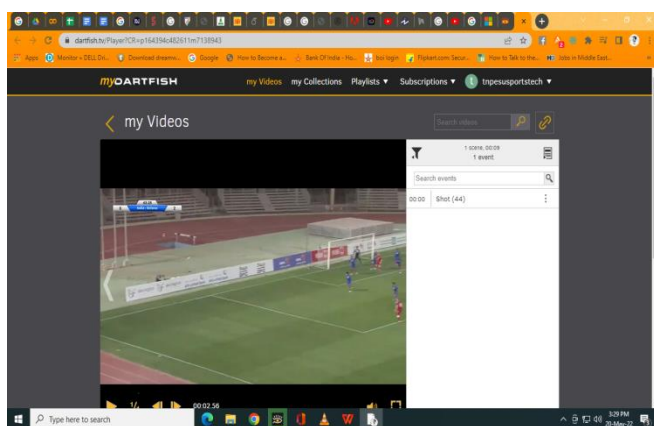

Figure 5.3 Sharing Screen

Figure 5.4 Dartfish TV account and output screen

6. Conclusion and Future Work

Data of the players from the Indian camp have been collected using the Python web scraping and the players who are involved in the match lineup have been collected. In addition, the video of the friendly match has been analyzed with the help of Dartfish and the Statistical data has been generated the same can be used by coaches and players to improve the performance of teams and individuals. As a drawback of the matches analyzed, It was found that the cameraman who recorded the entire match didn't focus on the Jersey number and it's not clear and it should be made clear in the future, which raises an issue that a Performance\Video analyst can't create player-wise event data. In addition, to improve player performance further using our Dartfish Software we can use high-performance analysis techniques with the same.

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