

Implementation of the Profile Matching Method in a Football Player Position Decision Support

Tri Pratiwi Handayani*, Rahmad A Poha, Irawan Ibrahim, Hilmasyah Ghani

Universitas Muhammadiyah Gorontalo

Correspondence Email: tripratiwi@umgo.ac.id*

Abstract

This study aims to overcome this issue by objectively determining the best positions of the soccer players through the application of the Profile Matching technique. The process consists of five steps: GAP values are first determined by comparing each player's unique traits to predetermined benchmarks. Next, compute the primary and secondary standards, establish weighted scores by utilizing the GAP values, compute the GAP values by contrasting specific player attributes with predetermined benchmarks, compute the overall scores, and order players according to their performance. A weighted combination of mental, physical, and skill criteria (30, 40%, and 30%, respectively) determines the final positions. The results demonstrate how effectively this rigorous technique scores the participants. This process offers a logical and objective approach to player selection, enhancing the precision and effectiveness of decision-making in soccer team management.

Keywords: soccer player selection, profile matching method, decision support system, gap analysis, objective evaluation

INTRODUCTION

Football is a globally beloved sport, engaging people of all ages. It involves a team of eleven players, including a goalkeeper, defenders, midfielders, and attackers, who work together to score goals and defend against the opponent. Despite its popularity, many coaches struggle to assign players to optimal positions due to a lack of standardized assessment criteria, often relying on subjective judgments rather than objective evaluations of players' abilities (Sartika et al., 2016). This subjectivity often leads to imbalanced teams, as players may choose positions based on personal preference or idolization rather than suitability, causing inefficiencies on the field.

The primary challenge for managers and coaches is identifying the ideal players for each position. Interviews with various coaches reveal that the selection process is time-consuming and often biased, with a lack of documentation on player criteria for specific positions exacerbating the problem. As Lumwartono et al. (2021) highlight, football clubs frequently face difficulties in matching player profiles to poorly defined position profiles. To address this, there is a need for a method that can objectively analyze potential players and match them to positions based on a well-defined profile.

The Profile Matching method is particularly suited for this task because it systematically compares individual player attributes against predefined standards for each position. This approach identifies the gaps between a player's current abilities and the ideal profile for a

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position, allowing for objective and precise evaluations. By quantifying these gaps and assigning weighted scores, Profile Matching ensures that the selection process is based on measurable data rather than subjective opinions. This method's structured framework makes it the best algorithm for accurately determining player suitability and creating balanced, effective teams.

In football, player positions are typically divided into four main categories: Goalkeeper, Defender, Midfielder, and Forward. Each category has specific roles and responsibilities:

1. Goalkeeper: The primary role is to prevent the opposing team from scoring by guarding the goal.
2. Defenders: They protect the team's goal from opposing attackers. Specific roles include Center Back, Full-Back, and Wing-Back.
3. Midfielders: They link the defense and the attack, often controlling the flow and tempo of the game. Roles include Central Midfielder, Defensive Midfielder, and Attacking Midfielder.
4. Forwards: Their main objective is to score goals. Positions include Striker, Winger, and Inside Forward.
5. Each of these positions requires a unique set of skills and attributes, making the precise matching of players to positions essential for team success. The Profile Matching method's ability to objectively assess and rank players based on these criteria makes it an invaluable tool for coaches and team managers. Implementing this method would not only streamline the selection process but also ensure that players are evaluated based on their true capabilities, leading to more balanced and effective teams.

METHOD

Profile matching is a method of making decisions with variables that must be the same as the standard. The profile matching process involves comparing an individual's value with a standard value to identify the difference in value, also known as the gap. The smaller the resulting gap value, the greater the chance of occupying a position (Lumwartono et al., 2021). The profile matching method has five stages, including:

1. Calculate the GAP Value

In general, the profile matching process involves comparing each criterion for each assessment in a proposed research proposal to determine the difference in scores, also known as GAP (Gains Across Product). The smaller the GAP, the higher the weight, which means a greater likelihood of eligibility and graduation priorities (Idris, 2018).

Formula: $GAP = \text{individual value} - \text{standard value}$

2. Determine the value weight

After calculating the GAP for each player, each GAP value is assigned a weight based on a conversion table. The smaller the GAP, the higher the weight assigned.

Table 1. Gap Value Conversion Table

GAP	Weight	Information
0	4	there is no difference (Competency as required)
1	3,5	Individual competency exceeds 1 level
-1	3	Individual competency is 1 level
2	2,5	Individual competency exceeds 2 levels
-2	2	Individual competency is 2 levels
3	1,5	Individual competency is superior to 3 levels
-3	1	Individual competency is lacking at 3 levels

3. Calculate Core factors and Secondary factors

3.1 Core factor (Main Factor)

The core factor represents the primary criteria that are essential for the evaluation process. These are the main attributes or skills that are critical for the role or position. The average core factor score is calculated using the following formula

$$NCF = \frac{\sum NC}{\sum IC} \quad (1)$$

Where :

NCF: Average core factor value

$\sum NC$: Total number of core factor values

$\sum IC$: Total number of core factor items

3.2. Secondary factors (Supporting Factors)

The secondary factor includes additional attributes or skills that support the core criteria. These factors, while important, are not as critical as the core factors. The average secondary factor score is calculated using the following formula

$$NSF = \frac{\sum NS}{\sum IS} \quad (2)$$

Where:

NSF: Average secondary factor value

$\sum NS$: Total number of secondary factor values

$\sum IS$: Total number of secondary factor items

3.3 Calculate the total value of each criterion

The total score is calculated based on the core and secondary factors, which are used as evaluation criteria affecting eligibility for rewards. The formula to calculate the total score (N) incorporates both the core factor value (NCF) and the secondary factor value (NSF), with specific percentage weights assigned to each

$$N = (X)\%NCF + (X)\%NSF \quad (3)$$

Where:

N: Total value

NCF: Core factor value, representing the average score of essential criteria

NSF: Secondary factor value, representing the average score of additional, supportive criteria

(X)%: Percentage value, with 60% assigned to core factors (CF) and 40% assigned to secondary factors (SF)

3.4. Ranking

The ranking process is a continuation of the total score calculation, divided into three percentages: 30% for intelligence, 40% for work targets, and 30% for work attitude. To calculate ranking, use the following formula:

$$\text{Ranking} = (x)\% \cdot \text{NK} + (x)\% \cdot \text{NT} + (x)\% \cdot \text{NS} \quad (4)$$

Where:

NK: Intelligence Value

NT: Work Target Value

NS: Work Attitude Value

(x)%: Percentage value entered $\text{Rank} = (30\% \cdot \text{NK}) + (40\% \cdot \text{NT}) + (30\% \cdot \text{NS})$

The final outcome of the profile matching process is the ranking of candidates. Once each candidate has their final score, the ranking is determined based on the highest scores (Idris, 2018). Figure 1 shows the profile matching method flowchart, where there are steps: starting and then determining the criteria, determining the core factor and secondary factor, determining the gap, calculating the value of the core factor and secondary factor, and carrying out calculations to get the final ranking result.

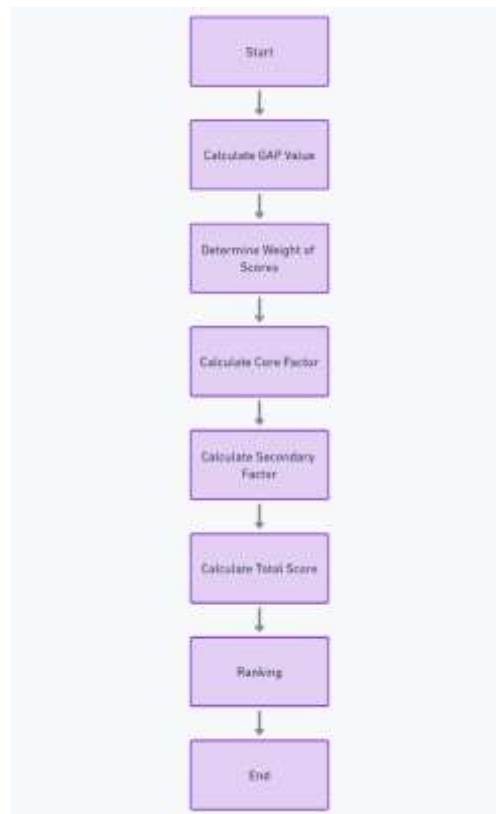


Figure 1. Profile Matching Flowchart

RESULT AND DISCUSSION

This section summarizes the evaluation of player performance based on physical, mental, and skill aspects using the Profile Matching Algorithm. The method involves collecting standard values for various player positions, converting these values, and then calculating core and secondary factors to derive a final score for ranking players.

To streamline the information, we combine standard values for all positions into one summary table. These values were derived from interviews with coaches and represent the benchmark against which player performances are evaluated. The standard values are categorized into three main aspects: Physical, Skill, and Mental, with different weight percentages assigned to each aspect. These weights are then used to calculate the overall performance score for each player. The weights are Physical: 30%, Skill: 40%, Mental: 30%. Table 2 below summarizes the standard values for each position.

Table 2. Standard Value for each position

Position	Physical (30%)	Skill (40%)	Mental (30%)
Attacker	90-99	86-99	60-98
Midfield	84-99	80-99	80-99
Defender	90-98	89-98	60-96
Goalkeeper	80-99	86-97	60-88
Position	Physical (30%)	Skill (40%)	Mental (30%)

Next, the standard values for each aspect are converted into marks based on the following rules:

Very Good: 90 to 99 → 4

Good: 80 to 89 → 3

Enough: 70 to 79 → 2

Not Enough: 0 to 69 → 1

Example Calculation for Player 1

1. Calculate the GAP Value

The GAP value is the difference between the individual's attribute value and the standard value. This difference is then used to determine the performance mark based on the conversion rules. The Gap calculation is used equation 1.

2. Determine Weight of Scores

Each GAP value is assigned a weight based on a conversion table. The weight is inversely proportional to the GAP value (i.e., a smaller GAP results in a higher weight).

3. Conversion of Attribute Values to Marks

Based on the GAP values, the attribute values are converted to marks:

if $90 \leq \text{Attribute Value} \leq 99$

if $80 \leq \text{Attribute Value} \leq 89$

if $70 \leq \text{Attribute Value} \leq 79$

if $0 \leq \text{Attribute Value} \leq 69$

4. Calculation of Core and Secondary Factors

For each player, the core and secondary factors are calculated by averaging the converted marks:

$$CF = \frac{3+2+3+3}{4} = \frac{11}{4} = 2.75$$

Secondary Factor (SF):

$$SF = \frac{4+4+3}{3} = \frac{11}{3} = 3.67$$

5. Calculation of Total Physical Score

The total physical score combines the core and secondary factors with their respective weights (60% for core factor and 40% for secondary factor)

$$\text{Total Physical Score} = (0.6 \times 2.75) + (0.4 \times 3.67)$$

$$\text{Total Physical Score} = 1.65 + 1.47 = 3.12$$

This method is repeated for the Skill and Mental aspects to calculate the total score for each player (Table 3)

Table 3. Total score for each player

Player	Physical	Skill	Mental	Total
Player1	2.75	3.50	3.64	3.27
Player2	3.25	3.43	3.32	3.24
Player3	3.50	3.71	3.68	3.54
Player4	3.25	3.50	3.49	3.42

The total scores for each player represent a comprehensive evaluation of their performance across three key aspects: Physical, Skill, and Mental. Each aspect is given a specific weight, and the total score is calculated by combining the weighted scores of these aspects. The total score provides an overall measure of a player's ability, which is used to rank the players.

The total score of 3.865 for Mulis Kai indicates that he performs very well across all evaluated aspects, with strong physical, skill, and mental attributes. This score is used to rank him against other players. A higher total score reflects a better overall performance, and in this case, Mulis Kai's score of 3.865 ranks him as the top player among the evaluated group.

CONCLUSION

The evaluation of player performance based on physical, skill, and mental aspects using the Profile Matching Algorithm provides a comprehensive and systematic approach to assess and rank players. The following conclusions can be drawn from the analysis.

1. Holistic Assessment

The method combines various aspects of a player's abilities, ensuring that all relevant attributes are considered. This holistic assessment allows for a more accurate and fair comparison between players.

2. Weighted Scoring

By assigning different weights to physical (30%), skill (40%), and mental (30%) aspects, the evaluation process recognizes the varying importance of each attribute. This ensures that the final score reflects a balanced measure of overall performance.

3. GAP Analysis and Conversion

The use of GAP values to measure the difference between individual performances and standard values provides a clear indication of areas where players excel or need improvement. The conversion of these values into marks further standardizes the assessment.

4. Core and Secondary Factors

Differentiating between core and secondary attributes helps in identifying the most critical skills for each position. The calculation of core and secondary factors for each player highlights their strengths and weaknesses in key areas.

5. Ranking and Comparison

The final scores allow for a straightforward ranking of players, facilitating easy comparison. The top-ranked player, Mulis Kai, with a total score of 3.865, demonstrates superior performance across all evaluated aspects, making him the standout player in the group.

6. Actionable Insights

The detailed breakdown of scores provides actionable insights for coaches and players. Areas of improvement can be targeted based on the GAP analysis and the scores of individual attributes.

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