American Journal of Sports Science and Medicine, 2026, Vol. 14, No. 1, 13-20
Available online at http://pubs.sciepub.com/ajssm/14/1/3
Published by Science and Education Publishing
DOI:10.12691/ajssm-14-1-3

FIFA 2026 World Cup: Good Improvement of "Refereeing System", but Evaluation Method of 'Match Winner' is still by too Obsolete Method (not done by advanced AI-based CFE Method)

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Received June 21, 2026; Revised July 23, 2026; Accepted July 30, 2026

Abstract This research work is a Review and Analysis of our two previous works**:** (i) CESFM Method of evaluation proposed to FIFA in 2015 in which it was **first time** proposed to FIFA about the implementation of additional outside Referees System at a FIFA Server Room (in short, termed here by the abbreviation RSFSR) to execute a football software in a continuous way, and (ii) the AI-based CFE Method of evaluation of FIFA football games proposed to FIFA in 2018, where the CFE method is an extended version of CESFM where the football Software being executed by the outside Referees System at the FIFA Server Room (RSFSR) using an excellent AI-based CFE software to be executed on continuous basis during every real instant of the match playing time. The introduction of three Robot Referees (flying drone Referees) in CFE is also the first time proposal to FIFA in 2015, and an excellent technology for implementation during CFE software execution by the additional outside RSFSR in FIFA Server Room. The proposed AI-based CFE Method with additional outside Referees System at the FIFA Server Room can eradicate all the loopholes of the obsolete "Evaluation Method" of FIFA Football Matches being followed in this century too. FIFA itself needs to do more and more serious research work and conferences on the three most important areas of research**:** ERS, ER and ECM to reach the Football Science subject in a more appropriate way. The Robot Referee itself has the capability to nullify the huge technologies involved in 2026 FIFA World Cup matches, and an important point is that "not a single camera is required" in the AI-based CFE Method. But in a much better way the excellent objectives of FIFA can be achieved in CFE Method proposed to FIFA in 2018. The Robot Referee can be even developed by a team of college students of engineering. It is highly cost-effective. It has its in-built soft-brain with excellent capabilities to nullify the technologies and cameras FIFA has implemented in 2026 World Cup. The AI-based CFE Method can provide true justice to the "football fans", to the "football games" and to the subject "Football Science". By examples it is justified here why FIFA can not provide so.

Keywords: *RSFSR, FIFA Server Room, ERS, ER, ECM, football software, VAR, CESFM, CFE, Fuzzy, intuitionistic fuzzy, CS-Score, Robot Referee*

Cite This Article: Ranjit Biswas, "FIFA 2026 World Cup: Good Improvement of "Refereeing System", but Evaluation Method of 'Match Winner' is still by too Obsolete Method (not done by advanced AI-based CFE Method)." *American Journal of Sports Science and Medicine*, vol. 14, no. 1 (2026): 13-20. doi: 10.12691/ajssm-14-1-3.

1. Introduction

Football is the most popular and most interesting game in the world. The first official international football (soccer) game was played in 1872, between Scotland and England at Hamilton Crescent in Partick, Scotland. The match ended in a 0-0 draw and is recognized by FIFA as the first international football match. To know more in details, one could see the book [2] which is very interesting. However, the roots of the Football sport can be traced back much further.

This work is sequel to the rigorous research work reported in 2018 in the book [2] on a new advanced excellent AI method of "Evaluation" of FIFA Football games in this century. The work in the book [2] is in fact an extension of the CESFM method reported in [3] in which for the first time it is proposed to FIFA in the year 2015 for adopting a FIFA Server room outside field (for pursuing outside referees system, i.e. an ICT engineer Referee to work outside the field) for working

continuously with the FIFA Server. The outside Referee System working on FIFA Server(s) with a special AI-based football evaluation software which is called by CFE Software corresponding to the AI-based CFE Method (and CESFM software for CESFM Method). Although CESFM used outside refereeing system (FIFA server), but CESFM algorithm and method is not for the complete 90 minutes play. With the help of outside refereeing (FIFA Server), CESFM algorithm was proposed in 2015 for tie cases only. Consequently, with the same concept of outside refereeing system (FIFA Server system) the AI-based CFE method was proposed to FIFA in 2018 in the book [2] for the evaluation of the complete 90 minutes of play. In the CFE Method of football matches, a complete expected functionalities of FIFA, high quality Refereeing System, Advanced AI-based Evaluation system, Robot Referee, etc are clearly developed and proposed to FIFA in 2018.

Referees System at the FIFA Server Room (henceforth to be called in in short by the abbreviation 'RSFSR') outside the playground was first time proposed to FIFA in 2015, and then again in complete details in full length in 2018 in the book [2]. Although the author observed that the VAR of 2022 FIFA World Cup was the beginning step towards RSFSR, which is further improved by FIFA in 2026 FIFA World Cup, nevertheless still it is not the complete RSFSR that was proposed in [2,3] to FIFA.

Although RSFSR is proposed in both CESFM and CFE, but CFE is a research work for evaluation of the complete 90 minutes FIFA football matches whereas CESFM is about the drawn (tie) cases only. In this work all-through we shall mainly refer to the AI-based CFE Method. The AI-based CFE Method can provide true justice to the "football fans", to the "football games" and to the subject "Football Science".

FIFA football games use the Video Assistant Referee (VAR) system to help on-field referees to correct "clear and obvious errors" and "serious missed incidents". It seems to be the beginning of our proposed FIFA Server RSFSR system in CESFM and CFE both, proposed much earlier to VAR.

2. Three Important Factors ERS, ER and ECM which FIFA needs

For excellent 'Evaluation' of a FIFA Football match, FIFA must consider the three most important factors called by **ERS**, **ER** and **ECM** as mentioned below, besides several others :

No.1. Excellent Refereeing System (ERS)
(it is a Theory)

No.2. Excellent Refereeing (ER)
(by the Referees in practical on the field during each match, by excellent implementation of ERS)

No.3. Excellent Computing Method (ECM)
(to compute the "better performer team" and thus to compute the "True Winner" team of a match).

Observing the weakness of FIFA in all the above three factors ERS, ER and ECM during all the past football matches, the author for the first time reported a detailed explanation about the weakness by proposing AI-based CFE method to FIFA in the year 2018 to improve these three key factors ERS, ER and ECM mainly (see the open proposal in [2] made to FIFA in 2018). (A small part of CFE Method was first time proposed to FIFA earlier than 2018, in 2015 in the earlier research work in 2015).

The ERS needs to be about the excellent THEORY on ER, where ER is like a Lab where PRACTICAL implementation of the ERS Theory is expected to be successfully done on the ground reality. Every referee must follow the ERS for ER on the ground reality. The latest official VAR PROTOCOL of FIFA is just a beginning of ERS, it is just few steps towards the proposal of RSFSR of CFE Method [2].

2.1. Why the Present Evaluation Method of FIFA to Find the Winner of a Football Match is too Obsolete Today?

The evaluation method of FIFA to find the "Winner" of a football match is too obsolete (including the 2026 World Cup matches). In fact there is no element of computation in FIFA method to find the Winner, it is just a declaration by FIFA that "team X is the winner".

An excellent and huge improvement is proposed in the AI-based CFE Method reported in the book [2] in 2018. In the CFE Method, the final goal score m-n of a match at the end is just one of the many important parameters (input of real time data from the ground) to compute the "better performer team" and thus to compute the "True Winner" team of a match. The AI-based CFE method says that the final goal score m-n is an important but a single discrete data, and not sufficient to compute the "better performer team" and thus not sufficient to compute the "True Winner" team of a match. The computation ECM must be by **continuous data** of 90 minutes!

The CFE Method mathematically integrates the continuous data (real time data about performance **in each and every second** of 90 minutes play) available from the playground, besides the data which is the goal score x : y at every second, to compute the **"CS Score"** of the both the teams at the FIFA-server at every one minute interval using the simple mathematical formula:-

CS(X) =1000 + PCS(X) – NCS(X) and
CS(Y) =1000 + PCS(Y) – NCS(Y).

The 'Display Board' outside the playground displays the real time CS Score of both the team X and team Y at every instant of minute till the end of the game, so that the world fans including the 22 players on the field could be aware of the latest status of the game at every moment of time. At every moment, say at kth moment, the better team of the play performance during the first k amount of time from the start of the play will have more CS Score. However at every moment the better team could change too (viz. at 12th minute of time the team X computed to be better, at 15th minute of time the team Y computed to be better, and so on even if the goal score be 0-0 or 1-1 or.),

because the AI-based CFE Method is a **continuous evaluation** method to compute the 'Better Performer' i.e. 'True Winner' **unlike FIFA Method**. CS Score is always computed correct upto three decimal places (without any rounding-off). Finally at the end of 90th minute, the CFE Software gives the final output on the basis of the accumulated CS Scores of both the team to say "Who is the better performer today" and then the authority can declare "Who is the Winner". The AI-based CFE Method provides huge justice, huge satisfaction to the world fans and also to both the team. For details of the statistic CS Score, PCS, NCS, etc one could see Section-12 in the book [2].

As per CFE Method, if a team X at the end of the game scores 1-0 against a team Y then there is no guarantee that the execution of CFE software will give the output "X is Winner, Y is Looser" in today's match. In this today's match, the CFE software will give output results in one of the following three forms:-

(i) X is Winner, Y is Looser
(ii) Y is Winner, X is Looser
(iii) Draw

The last case(iii) where the output result is "DRAW" will be a very very rare case, even such a case may not happen in a century!!! It is because of the reason that the precision of the output result of the AI-based CFE software is always upto three (or more) decimal places, for details see the book [2]. But mathematically, DRAW case is not a completely impossible case. The computing in the AI-based CFE Method is Soft-computing, strongly based upon the powerful tools Fuzzy Theory and/or Intuitionistic Fuzzy Theory.

Consider a purely hypothetical example below:-

Suppose that there is a 90-minutes football match today held between two teams 'Team-X' and 'Team-Y' of two countries.

At the end of the 90-minutes play, suppose that the following are some of the important data observed:

(i) Team-X scores 1 goal and Team-Y scores nil(0) goal.

(ii) Team-X commits 27 number of fouls but none of these 27 fouls are of red-card category, whereas Team-Y commits only one foul (not of red-card category).

(iii) Team-X commits 12 offsides, whereas Team-Y commits no offside during the 90 minutes of play.

(iv) Team-X kicked ball outside the field 21 times (on right side and left side of the field), whereas Team-Y kicked ball outside the field 3 times (on right side and left side of the field).

(v) Team-X entered into the area of the goal keeper of Team-Y twice only during the 90-minutes play, out of which the Team-X scores 1 goal. Whereas Team-Y entered into the area of the goal keeper of Team-X five times out of which 3 times were penalty kick due to foul. But Team-Y could not score any goal in 90 minutes.

In the above game, at the end of the 90-minutes of play, FIFA method will certainly declare that "Team-X is the Winner". But the AI-based CFE Method, on execution of its AI-software, may give output results in one of the following three forms:-

(i) X is Winner, Y is Looser
(ii) Y is Winner, X is Looser
(iii) Draw

Even if the output result of CFE software says "Team-X is the Winner", then too we have to say that FIFA Method has done injustice to the "Football subject" as well as to the world's "football fans". But both of the "Football subject" as well as the world's "football fans" will enjoy justice even if CFE says that "Team-X is the winner". However, in reality, depending upon all the real time continuous data from the 90-minutes play of this match, there is alternative good possibility that the output of the execution of CFE software could be "Team-Y is the winner". Here the Team-X has scored 1 goal, or it may also be true that one goal is somehow scored by Team-X. And unfortunately, with this single discrete data, FIFA has no other say except its say that "Team X is the Winner". This is the too obsolete style of decision making by FIFA to find out the Winner. However, the AI-based CFE Method has the strong merit to provide huge justice to "Football subject", "Football Game" and the world's "football fans", **unlike FIFA Method.**

The output of The CFE Method is a huge improvement of the traditional too obsolete FIFA method to compute the "True Winner". In fact, in the traditional FIFA method there is **no computation** or execution of data, because FIFA consider a very much discrete data, one and only one data, which is "the final goal score 1-0". This is one and only one data for FIFA to declare who is the winner. This is the century old method FIFA has been following, in which FIFA makes a kind of "DECLARATION" instead of any kind of COMPUTING or EXECUTION of any kind of software.

Although during the match period the Referees always perform in a 'continuous' manner in each and every match, but evaluation method of the **True Winner** by FIFA method is **not a continuous** evaluation method. It is too obsolete, because the work[2] justified by several examples that the best performer team does not always win as per existing practiced FIFA rule, because the ECM followed (till 2026 FIFA World Cup) is not a 'continuous' method. FIFA has been still following Old & Obsolete method, not the continuous evaluation method CFE proposed in [2] in 2018.

2.2. Improvement in ERS observed in FIFA 2026 World Cup

It is observed in FIFA 2026 World Cup that FIFA is improving in ERS, compared to whatever observed in 2022 FIFA World Cup. But still VAR of FIFA 2026 World Cup is not upto the mark compared to RSFSR that we proposed in the book [2] in 2018 (and also earlier proposed in [3] in 2015). A brief report about this observation is made in this work below :-

(i) see subsection-4.1 of Section-4 about : Why the VAR of FIFA which was implemented in 2022 FIFA World Cup was not upto the mark compared to our RSFSR, but a initial small part of it only.

(ii) see subsection-4.2 of Section-4 about : Why the VAR of FIFA which was further improved and implemented in 2026 FIFA World Cup was not upto the mark compared to our proposed RSFSR.

However, let us recapitulate the main key point about ECM reported in the book [2] in 2018, called by AI-based **CFE Method** (Continuous Fuzzy Evaluation Method).

Remember that it is not just about excellent Refereeing method, but about How to compute to find out the "better performer team" and hence the "True Winner" team of a match.

3. Why Fuzzy Theory and Soft-computing is Mandatorily Required in the Evaluation Method of FIFA Football Games?

Without the help of Fuzzy Theory, an excellent evaluation of FIFA football matches of 90-minutes play can never be successfully achieved, as reported in [2] with several examples.

For just one example, "Not foul" is good during a play. In Fuzzy theory the "Not Foul" is also a foul with 0 amount of membership value. And any 0+ amount of foul is to be soft-decided by the Referee to declare it an official foul or not finally on the basis of the amount of foul in the fuzzy range [2-4]. Out of 90 minutes i.e. 5400 seconds of play, most of the seconds goes without any event of foul. There are many such cases in football games (see [2]) which are not crisp but fuzzy. They need to be treated using AI tools and Soft-computing mathematics. These fuzzy quantities and qualities are like micro elements in the AI-based CFE Method of evaluation of FIFA football matches proposed to FIFA in the book [2], being sequel to a small part work [3]. For details about "Why Fuzzy Theory and Soft-computing is mandatorily required in the Evaluation Method of FIFA football games", readers need to refer to [2] for details. The excellent football software "CFE Software" works at real instant of playing time in the FIFA Server room (RSFSR). Without the application of Fuzzy Theory and Soft-computing, there is a good possibility that the better team is not the Winner in a match; which may well happen in FIFA VAR system in a hidden way but will never happen in CFE Method (with RSFSR system) as justified by examples in the book[2].

4. The Weakness of VAR System (an analysis till VAR of 2022 FIFA World Cup Matches)

VAR is good, and the author observes that it is the beginning of RSFSR. But it has some weakness which we must know to do future research on VAR for the benefit of FIFA football matches. FIFA football games use the Video Assistant Referee (VAR) system to help on-field referees correct "clear and obvious errors" and "serious missed incidents". The VAR (Video Assistant Referee) protocol was officially published and written into the Laws of the Game by the International Football Association Board (IFAB) on **March 3, 2018**.

(See: https://www.theifab.com/laws/latest/video-assistant-referee-var-protocol/).

Nowhere in the above official IFAB site and nowhere of the official FIFA site, it is mentioned that the concept of 'Outside Referees System" entitled as the name 'VAR' is borrowed from the concept of the 'Outside Referees System" proposed to FIFA in 2015 and again in 2018 (see [3] and [2]). Probably the concept of 'Outside Referees System" was independently developed in the mind of IFAB/FIFA. For details of important official information about the "debut of VAR System" adopted by FIFA, one could see the FIFA official site**:**

https://www.fifamuseum.com/en/explore/fifamuseumplus/past-exhibitions/innovation-in-action/the-first-time-var-made-its-fifa-world-cup-debut-with-griezmann in order to read the FIFA's article **"The first time: VAR made its FIFA World Cup debut with Griezmann".** For more information about VAR, one could see the FIFA site: https://inside.fifa.com/innovation/standards/video-assistant-referee and also could see the FIFA videos posted therein dated 16th March 2018 about VAR and their Test Manual 2020.

Although VAR was officially written into the Laws of the Game in 2018, but its first use at a major FIFA tournament was practiced one year earlier during the 2017 FIFA Confederations Cup before making its FIFA World Cup debut in 2018. The timeline of its introduction evolved progressively.

Undoubtedly, adoption of this outside referees system VAR by FIFA made a slight improvement of the Evaluation Method of FIFA games from the obsolete evaluation method. But the totality of the VAR System happens to be just a very partial implementation (not full) of the proposed RSFSR of 2015. Evaluation of football games using VAR is just something slightly better method of the old evaluation method. But VAR needs huge improvement in this ongoing era of AI, Fuzzy Theory & Soft-computing, Data Science, etc in this century. If VAR System be improved and then extended upto the RSFSR proposed in 2015, then a huge justice can be brought to every football games and the world football fans.

An important NOTE for Readers:-

For entering into the "Inside FIFA" of FIFA to know more about VAR, one could click its dedicated site https://inside.fifa.com/ (meant for "Inside FIFA"). But the author hopes that there will be no confusion of the visitors of this site about the repeat of "Inside FIFA" inside the "Inside FIFA". Instead, the author suggests that for a good study of the VAR system of FIFA, it is better to visit directly to the following site: https:// inside. fifa.com/innovation/world-cup-2022/video-assistant-referee-var in order to avoid any confusing duplicate situation or falling in any unwanted roaming situation.

VAR uses a large number of Referees (and Assistant Referees) instead of using new advanced technologies and AI-methods. It is because VAR uses large number of relevant as well as irrelevant videos and decisions are taken by these outside Referees (and Assistant Referees) using human-evaluation method like in the traditional obsolete Evaluation method followed by FIFA. VAR uses YES/NO logic in many of the important decisions like Fouls, Red/Yellow card showing unlike CFE method using RSFSR of 2018. In VAR, 2-D Videos are recorded by large number of fixed(static) cameras, not mobile cameras. And the cameras are outside the playground unlike in the Robot Referees (flying Drone Referees) as proposed in details in Section-22 in the book [2] about its model. The intelligent Robot Referee [2] is in fact a flying Drone Referee which will have 360 degree views (3-D

views) and will work in the playground field space at a very close proximity of the ball at every moment, without any chance of collision or accident.

In the two subsections below, a brief report about our observation is made**:** "Why the VAR of FIFA which was implemented in 2022 FIFA World Cup was not upto the mark compared to our RSFSR, but a initial small part of it only", and then about "Why the VAR of FIFA which was further improved and implemented in 2026 FIFA World Cup was not upto the mark compared to our proposed RSFSR".

4.1. A Comparison Study of the Outside VAR (2022 FIFA World Cup) and our Proposed RSFSR in 2018 (and 2015)

The following comparison study will provide the weakness of VAR System incorporated in 2022 FIFA World Cup matches.

Table 1. Comparison Study

Point No.	RSFSR System	VAR System (till 2022 FIFA World Cup)
1	It is a Refereeing System proposed to FIFA for huge improvement of the obsolete "Evaluation Method" of football	It is a Refereeing System in FIFA Games.
2	This is an outside Refereeing System in addition to the ground Referees.	This is an outside Refereeing System in addition to the ground Referees.
3	Proposed first time to FIFA in 2015 for implementation of CRSFM Method, and then again proposed in 2018 while suggesting the implementation of CFE Method of complete Evaluation during 90 minutes of football games.	The VAR (Video Assistant Referee) protocol was officially published and written into the Laws of the Game by IFAB on March 3, 2018. But its first use at a major FIFA tournament was practiced one year earlier during the 2017 FIFA Confederations Cup before making its FIFA World Cup debut in 2018.
4	Intelligent Robot Referees (flying Drone Referees) are proposed. No Cameras required, as a Robot Referee itself can see around 360 degree. There is no concept of Full-system or Light-system. This type of concept is fully insignificant in CFE Method using RSFSR refereeing.	Four to 42 or more number of Cameras used. Several additional human Referees and human Assistant Referees are to be used besides ground referees. Evaluation of every game must be as best as possible by a unique system, but in VAR there is concept of Full-VAR system and Light-VAR system for evaluation. Instead of considering a unified VAR, the consideration of these two types of VAR is probably insignificant and too much thoughts about nothing, unnecessary thoughts about cost-effectiveness.
5	RSFSR needs soft-computing & AI expert referees to work with FIFA Server outside ground.	VAR does not need any soft-computing & AI expert Referees (except simple traditional Referees) for working with any FIFA Server/Processor outside ground. There is no football software.
6	In RSFSR in CFE Method the activities are AI-based, Soft-computing based, mainly uses Fuzzy Theory. NOT just based upon YES/NO logic or {0, 1} logic. It works on continuous [0, 1] logic.	NO activities in VAR is AI-based. VAR is Not Soft-computing based, Not using Fuzzy Theory or any soft-computing theory. Purely based on YES/NO logic i.e on {0, 1}. Purely discrete types of all the decisions by the Referees, viz. Foul or not Foul, Penalty or No penalty, Red Card or not Red Card etc. No soft-computing data or analysis in VAR system which can see the complete length from NO(0) to YES(1) in the events of Foul or Penalty or Goal or Red Card etc.
7	AI-based dedicated powerful football software which executes at real time during the 90 minutes of play by this RSFSR refereeing system	Neither any dedicated football software developed nor needs to be developed for VAR 2022
8	In the RSFSR refereeing system, if Robot Referees (flying Drone Referees) are used then they can see the ball at each and every moment of the play from a very close proximity of the ball inside the playground field-space without any chance of collision or accident. And consequently the fuzzy or crisp data/information are collected at real instant of time of most reliable and readable nature.	In the VAR refereeing system, the cameras capture picture from distance, and not from very close proximity, not from inside the playground space. There is no question of collecting any data of fuzzy or crisp data/information, because VAR only captures videos which are transmitted to the outside Referees and Assistant Referees (as good as the social WhatsApp videos are transmitted to people for watching). The concept of using additional outside Referees by IFAB in 2018 happens to be the beginning of the concept proposed to FIFA in 2015 first time in [3] and [2]. However, it may happen that FIFA did it itself independently without following [2,3].
9	Besides being Infographic, CFE using RSFSR is based upon several AI-based & Soft-computing based advanced technologies.	VAR system purely infographic only, and the technologies used are only related to its infographic applications, regarding 2-D videos. No other technologies are required, as the evaluation method using VAR does not have any demand. It is because of the reason that, except video refereeing, all other steps are completely the same of the old Evaluation system.
10	The proposed Robot Referees (flying Drone Referee) record views continuously around 360 degree (3D-viewes) as proposed in CFE Method in 2018. During play-time, the Robot Referees can do refereeing from the playground space maintaining a very close proximity with the ball every time, even during the projectile status of the ball after being kicked by players. It can do so without any accidental collision.	VAR System records only 2-D videos and transmits to outside Referees for watching and for group decision making. However, in future FIFA may adopt 360 degree views (3-D videos) if advance technology be adopted appropriately by FIFA. The videos in VAR can not be recorded from close proximity of the ball as the cameras are fixed outside the field.
11	There is a handy small fuzzy pocket machine M with the Human Referee during his job on the playground using which the referee awards a punishment fuzzy set A of F within a maximum of ten to twelve seconds at real time to the FIFA Server.	VAR records videos only, and transmit to outside Referees.
12	In RSFSR Refereeing system used in CFE, the Winner of a match is computed by the dedicated	In VAR system, the Winner is decided just on the basis and only on the basis of m-n goal score at the end, no computation required. No dedicated football

	AI-based football software. It is a continuous evaluation system to compute the CS Score. In RSFSR Refereeing System, the requirement of the number of Referees is much less than the same in VAR system. But the Referees in RSFSR must be Fuzzy Referees (i.e. Referees having little awareness of Fuzzy Theory), and CFE is itself the main dedicated AI-based football software being executed in the FIFA server on continuous basis during the real time 90 minutes play of the game.	software to be executed to compute the Winner. There is no computation by any processor, but only observations and collection of purely crisp data/information physical eyes of several Referees, inside or outside the fields. Referees need not have any awareness about Fuzzy Theory, and there is no computation in any server of any AI-based software of FIFA. This is the major drawback of VAR system for true evaluation of football matches because there are huge amount of fuzzy data involved in football games, being ignored even in this century of advanced technology on AI & Soft-computing. For details, see [2].
13	Important : The better team surely will be the Winner (see [2] for details and examples). This justice is Guaranteed to the football fans as well as to the football games. The CFE method philosophically assumes that every football game is a living object having life span of 90 minutes. The CFE method using RSFSR is a complete solution for continuous and correct evaluation of FIFA football matches to compute who is the better team today, and then to declare who is the Winner today, unlike the weak method of VAR System of FIFA.	Important: There is 'No Guarantee' that the truly better team will be surely the Winner of the match (see [2] for practical examples showing this type of possibilities of injustice to happen to the football fans as well as to the football games). VAR declares the Winner (correctly or incorrectly), which can never mean which team is the better team today. It is because of the reason that VAR follows the century old obsolete method of evaluation except slight improvement made using videos.

4.2. Improvement in VAR in 2026 FIFA World Cup is observed only in ERS (but not in ECM): still VAR is not upto the mark of our proposed RSFSR of 2015 & 2018

In 2026 FIFA World Cup matches, there are few new powers for the VAR observed. These powers are mostly of punishment type, but good for Football. However, **the gravity of each of these punishment needs to be thoroughly revised** with the help of top football experts, including experts from the following areas too**:**

Psychology, Behavioral Science (Psychiatry), Medical Science, Physiotherapists, etc.

The gravity of each of these punishment must be optimal (neither more nor less), and only a team experts of all the above areas can do a group-decision making. Otherwise, in a very silent way and unknowingly, the "Football Science" as a subject of study may become compromised. The Optimality needs to be computed by FIFA using Fuzzy Optimization Techniques because besides the objective function, the most of the data involved here are linguistic data of fuzzy nature, not crisp nature.

Some of the newly introduced powers (punishment type) of VAR introduced in the 2026 FIFA World Cup matches are like:-

Countdowns for goal-kicks and throw-ins (five seconds)

(ii) Time-limited substitutions (10 seconds)
If Physio is on, then players must now stay off for one minute

(iv) about goalkeeper tactical timeouts

(v) Player covers their mouth in a confrontational situation: referee can send the player off.

(vi) Player leaves the field to protest a referee's decision: The referee can also now show a red card.

But evaluation of these situations can be much better dealt, if the concept of **Robot Referee** (flying drone), as proposed in our CFE Method, be implemented in future FIFA matches without further delay. Since the year of the first time proposal to FIFA made in 2018 (and earlier in 2015 too), some amount of beginning of the RSFSR seems to have done by introducing VAR (see official VAR Protocol document of FIFA). As mentioned in the book [2], a Robot Referee is a type of flying drone which work for continuous AI-based CFE software.

4.2.1. Characteristics of the AI-based Robot Referee

The AI-based Robot Referee proposed in the book [2] for CFE Method is such a drone:-

(i) which can fly in higher speed of the speed of a kicked ball and can land on the ground to function like our traditional classical human Referees. It is of reasonable weight, light weight. *(The Brazilian midfielder Ronny Heberson had a striking speed measured at approximately 210.9 km/hr, so far the highest speed observed in football history).*

(ii) which can see around 360 degree very easily, can twist its body even during its flying period.

(iii) which can move keeping itself at a very close proximity of the ball during play time, which is not possible by so many cameras used in FIFA 2026 matches. Consequently, there is no chance of any wrong showing of Red Card or Yellow Card to any player too.

(iv) no chance at all of any collision of it with the ball or with any player during play time.

(v) can reach on the top of the goal post, if required for refereeing, before the kicked ball makes a goal. Can easily do refereeing whether it is a goal or an offside or a foul etc.

(vi) it has a powerful and intelligent soft-brain which can be easily trained with ESR, ECM and all the FIFA/IFAB rules every year according to requirements of FIFA to deliver ER at the ground reality and to communicate the outside Referee (RSFSR) and vice-versa.

(vii) its brain is capable of doing soft-computing locally besides crisp computing, and it is in both way communication with RSFSR in a continuous manner.

(viii) it can do parallel processing of several jobs for doing ER and for supporting ECM in RSFSR room of FIFA. Today is the day of advanced technology. An AI-based Robot Referee can be even developed by a team of UG college students of engineering branches, and **it can be**

easily made learned & trained of latest ESR as well as ECM, and of all the FIFA/IFAB rules. Certainly the proposed AI Robot Referee will not be costly, rather cost effective. **However, FIFA has to be very careful so that from the side of few naughty fans or few outside crowd, there should not be any jammer to disable the Intelligent AI Robot Referee during play time. For this, the AI-based intelligent Robot Referee may be protected by two level passwords by FIFA.**

In 2026 FIFA World Cup, there is no improvement observed in ECM proposed in the CFE Method. Still FIFA has been following the final goal score (say 1-0) to declare the Winner by one and only one discrete data, the logic which is too obsolete in this AI-era of this century. Hope FIFA will follow CFE Method in 2030 FIFA World Cup for evaluation of the winner of a match by continuous real time data of 90 minutes as proposed in CFE Method (proposed to FIFA in 2018 in the book [2], and also earlier in 2015 in [3] which is just a small portion of [2] and can be ignored if [2] is followed).

However, the 2026 FIFA World Cup introduces new ERS & technology, deploying advanced AI, "Ref Cams," and 3D data modeling to enhance accuracy and transparency. These systems speed up officiating decisions and provide both referees and teams with unprecedented evaluation tools. But the big demerits of these implementation are the following:-

(i) FIFA used a large number of cameras in 2026 FIFA World Cup, which are fixed outside the ground field. No camera can move, can enter into the ground physically.

(ii) the cameras are not mutually friendly, because they are neither mutually interlinked nor mutually communicable but all these cameras just transmit reports i**ndependently** to the outside FIFA Server Room.

(iii) the cameras do not have any soft-brain to do some amount of computations or executions locally and independently

(iv) to cover the complete area of the playground, FIFA installed so many cameras. Nevertheless they together even can not cover 360 degree of the region

The above ERS used in 2026 FIFA World Cup are just somehow some solution done by FIFA. All the above demerits are in-built solved in our proposed AI-based CFE Method, because of the excellent capabilities of Robot Referee which just as one single entity can do a lot of jobs including all the above stated jobs done by a large number of cameras. Out of these cameras, no camera can itself process any amount of processing or computing except communicating to outside Referees of VAR. In our CFE Method, not a single outside camera is required in football matches as the Robot Referee itself can see 360 degree around and it has a brain inbuilt inside which can do parallel processing. See the functions of Robot Referee mentioned in this subsection earlier.

Each and every item of the technology implementation in 2026 World Cup by FIFA can be easily done by CFE Method with Robot Referee with very less complexity of technologies. In fact these are much-a-do with huge technology involvement which is not optimal at all, and all the objectives can be easily implemented if CFE Method with Robot Referee system (RSFSR) be completely adopted, instead of doing partial exercise. For few examples, consider the following three points:-

No.1

Enhanced Semi-Automated Offside Technology (SAOT) implemented by FIFA in 2026 is a very easy job of Robot Referee due to its beautiful in-built brain & architecture. So much do by FIFA is not required (see subsection 4.2.1 above).

No.2

Referee Body Cameras (Ref Cam), at all, not required in the CFE Method using the Robot Referee due to its own beautiful in-built intelligent brain & processor.

No.3

3D Player Avatars can be summarily rejected because its objective is well met in the CFE Method using the Robot Referee due to its beautiful in-built intelligent brain & processor architecture.

Regarding the implementation of "Connected Smart Match Ball", the scientifically big demerit will be clear if we carefully listen to the voice of the 'complete volume of air' trapped inside the ball. The air inside the ball is saying that : **Hello, I am not in a spherical shape inside the ball, please do not ignore the shape of my volume at least.** Even if you use some kind of Physics and technology to try to keep the ball balanced from outside, a non-spherical air pocket or uneven air distribution can disturb the balance of a football, causing it to wobble, curve unpredictably, in particular when it be in a high speed flying mode. Most dangerous point is that the amount of balance will continuously vary during play time, as the voice of the air says the reasons. We must try to listen to the voice of the air trapped inside. We can not ignore it's voice. **In fact in Robot Refereeing method, such kind of ball is not required at all**, because the objective will be 100% achieved in Robot Refereeing (as the Robot Referee has its own in-built intelligent brain & architecture). The implementation of "Connected Smart Match Ball" by FIFA is 'much-a-do' about nothing. Because, the purpose is 100% auto in-built solved in our proposed Robot Refereeing system (see the functionalities of Robot Referee mentioned in subsection 4.2.1 above). The huge amount of technology adopted by FIFA in 2026 can be reduced by almost 100% if FIFA adopts the CFE Method using the proposed Robot Referee. The objectives of FIFA for adopting these amount of technologies are excellent, but adoption of so much technology is certainly "much-a-do". The author feels that FIFA must do more regular international conferences inviting technology experts and football experts, before approaching any company or industry for such huge amount of technology. And only then, the optimal decision making and planning about the necessity of adopting technologies can be successfully done, because all the objectives of FIFA (regarding 2026 FIFA World Cup matches) are in-built met and solved in the AI-based CFE Method where Robot Referee system is proposed.

5. FIFA Ranking of 2026 Teams

Assuming that [5] is a reliable source, it is understood that FIFA ranks football teams using the FIFA/Coca-Cola World Ranking system, and/or Elo rating system which is based on the SUM model. This method adds or subtracts points won or lost for each individual game rather than

averaging points over a given time period. But it is surely an obsolete method of ranking, because FIFA adopts purely crisp type of computation assuming that there is **"no fuzziness"** in the core parameters considered for ranking of football teams.

In a tournament, one team (say club-X) as per FIFA rules may have won 18 matches in total, which is the highest in this tournament by any team. In our proposed AI-based CFE Method, it does not necessarily mean that team-X is the best team among all. Even it may happen that one team (say club-Y) may have scored 26 goals in total in this tournament, which is the highest in this tournament by any team. In our proposed AI-based CFE Method, it does not necessarily mean that team-Y is the best team among all.

Even in our proposed CFE philosophy, the champion team (champion as per FIFA rule) may not sometimes happen to be of 1st Rank in the CFEranking.

The strength of our proposed "Ranking Method" in AI-based CFE System over the existing ranking method of FIFA can be realized in details by the ranking theory and a simple example presented in Section-21 in book [2], an open proposal to FIFA proposed in 2018.

6. Conclusion

The work [3] first time proposed in 2015 about implementation of FIFA Server, about additional outside Referees System at the FIFA Server Room (which we call here by the term RSFSR) and about a dedicated football software for execution. However, the AI-based CFE Method proposed in 2018 is a complete solution about the evaluation method of 90-minutes play. The AI-based CFE Method can provide true justice to the "football fans", to the "football games" and to the subject "football science", by much more amount than today's FIFA method as justified by a hypothetical example here.

The VAR system strictly followed the official protocol established by the International Football Association Board (IFAB) beginning in 2018. VAR happens to be just only one step (one small beginning step) out of several steps proposed in RSFSR [2,3], as VAR considers only the videos for final decision without any use of the present day advanced AI and fuzzy evaluation method by soft-computing. The CFE software linked with RSFSR does consider every mode of unstructured or semi-structured or structured data and information. However, it is expected that FIFA/IFAB will have AI-experts in future to enter into depth of the Fuzzy Theory to implement more of the RSFSR (proposed first time to FIFA in 2015 and then in 2018) and the AI-based CFE Method. The so many new addition of subsystems like VOR, OFR, etc and the new subsystems for video recording viz SAOT, GLT etc of VAR system adopted by FIFA/IFAB will become insignificant and unnecessary if the CFE with RSFSR be adopted by FIFA in 2030 World Cup matches. The CFE Method is so transparent that even will become convinced that today the team is surely not the better team. We fans are in doubt whether the VAR processing of Red card for Switzerland's Embolo in 2026 World Cup Quarterfinal against Argentina was right or wrong. If wrong, then question arises: how VAR can commit a mistake of so high gravity? Surely this high gravity mistake in refereeing will never happen in CFE system by AI Robot Refereeing. The FIFA ranking method of football teams in 2026 World Cup or in any previous FIFA tournaments is an obsolete method because FIFA adopts purely crisp type of computation assuming that there is **"no fuzziness"** in the core parameters considered for ranking of football teams. In this century of AI-era, the author suggests that all the FIFA/IFAB officials (including Hon'ble Members of BOD, TSC, FAP, TAP, AGM/ABM, ESO of IFAB) need to be aware of Zadeh's Fuzzy Theory[4] & Soft-computing methods to deliver excellent quality decisions in all future rules of Football games, so that more amount of justice can be given to 'Football Science'. The most important point to be noted in this century that that the AI-based CFE Method can provide **true and high amount of justice** to the "football fans", to the "football games" and to the subject "Football Science". And even "both the teams" at the end of every football match will feel to have got huge justice today, will feel by heart that "Yes, the better team has won today". By presenting examples in this work, it is justified here why FIFA can not provide so high level of justice or satisfaction to the looser team.

ACKNOWLEDGEMENT

The author is thankful to both the Referees for their valuable comment for improvement of the manuscript.

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