Algorithm for Youth Soccer Players Management System: Software Engineering Approach

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Abstract

In the recent world of soccer, fostering of youth soccer players is considered as one of the most important issues so that many educational training programs are being prepared in the soccer-advanced countries. Amid the growing number of system management programs available for practical life due to the development of computer technology, an algorithm for youth soccer players management system has been proposed in this study for the improvement of Korean soccer skills.

Key Words: Management System, Algorithm, Software Engineering, soccer .

I. INTRODUCTION

Owing to the development and the universalization of internet, it has become possible to develop the systems and programs that can be applied to a specialized field [1-3].

First, enter the data necessary to develop a youth soccer players management system are entered (e.g., health records, game records, scouter data, personal data, etc.) into program's input area. Next, the list necessary to control input data should be entered into the user interface (e.g., physical condition management, player recruitment management, language/ personality education management, player release management, etc.) In the control area, the algorithm bagging suitable for the interface, survival, deep learning, and machine learning algorithms should be entered. Lastly, in the output area, the input values that have been controlled with the user interface and the resulting values (e.g, game records, player recruitments, health records, payroll records, changed items in the team, personal records, etc) are entered

II. RELATED WORK

Soccer is the biggest global sport and is a fast-growing multibillion dollar industry. The annual revenue of European football clubs alone is estimated at $27bn. Data science and analytics are being more frequently employed on both the club and national levels to improve performance, equipment, marketing, scouting, etc. In conjunction with this special issue, we will offer a machine learning challenge task where the goal is to predict the outcomes of future matches based on a data set of over 200,000 soccer matches from soccer leagues around world.

Therefore, studies such as preparing a special issue in the machine learning journal are underway [1].

One of the common Machine Learning (ML) tasks, which involves predicting a target variable in previously unseen data, is classification. The aim of classification is to predict a target variable (class) by building a classification model based on a training dataset, and then utilizing that model to predict the value of the class of test data. Some common applications for classification include loan approval, medical diagnoses, email filtering, among others.

Sport prediction is usually treated as a classification problem, with one class (win, lose, or draw) to be predicted. Although some researchers e.g., have also looked at the numeric prediction problem, where they predict the winning margin – a numeric value. In sport prediction, large numbers of features can be collected including the historical performance of the teams, results of matches, and data on players, to help different stakeholders understand the odds of winning or losing forthcoming matches. The decision of which team is likely to win is important because of the financial assets involved in the betting process; thus bookmakers, fans, and potential bidders are all interested in approximating the odds of a game in advance. Once a predicted result for the match is obtained, an additional problem is to then decide whether to bet on the match, given the bookmaker's odds. In addition, sport managers are striving to model appropriate strategies that can work well for assessing the potential opponent in a match.

Therefore, the challenge of predicting sport results is something that has long been of interest to different stakeholders, including the media. The increasing amount of data related to sports that is now electronically (and often publically) available, has meant that there has been an increasing interest in developing intelligent models and prediction systems to forecast the results of matches.

While the intimacy refers to the level of relationship determined based on the scores given to the postings (likes, dislikes) or the frequency of comments, the weight is the score given to each post. It is most likely that the posting with a higher level of intimacy or a large number of comments or sharing will appear on the user's newsfeed. The timeliness indicates the distance between the time of individual post publishing and the time of user's login. The organic reach of a certain post will be increased more when the distance becomes shorter.

The K-Nearest Neighbor (KNN) algorithm is a method of predicting a value by using the k number of most similar data among existing data. In short, it allocates uncategorized record as a record having the most similar attributes among the categorized records [6-8].

Lastly, the basic idea of a collaborative filtering algorithm is to assume that there is a user purchase pattern. The user-based method or the item-based method is mainly used for the collaborative filtering. The former (latter) is to perform a prediction based on the purchase record (purchase item) of a user similar to the target user's purchase records (purchase items) after calculating the similarity between users (items).

III. AN ALGORITHM FOR YOUTH SOCCER PLAYERS MANAGEMENT SYSTEM

As youth soccer players continuously grow and their potentials are unlimited, they can be grow into a much better player through proper management programs and systems that can provide an adequate training program and management.

First, the game records entered into the input area are divided through promotion and relegation to improve players' skills individually. The health record data was included as the injuries during their youth have to be attended carefully. An efficient treatment can be given to them by checking their health regularly. The personal records data were entered to build their character (personality) and teach language(s).

The upright character is one of the virtues players should possess and necessary to keep good manner during the game. The language data is necessary for the communications between players who come from all over the world. The scouter data has been entered to confirm that whether the scouter's preference matches team's preference as well.

Second, the user interface was comprised of health condition management, player recruitment management, language/personality education management and player release management and other management factors.
The health condition management takes care the activities from diagnosis of youth players to surgeries/treatments/rehabilitations until play-ers return to the games. The team doctor examines player's injuries and it is necessary to distinguish the injuries as serious, requires surgery, slight, or does not require surgery. A suitable rehabilitation/training program will be provided to individual players to allow them to restore their sense of game. The management system efficiently assists the players to return to their games. The player recruitment management includes the process of managing scouters to recruit right players, negotiating with those players and completing the transfer process. The purpose of managing the scouters is to allow them to develop their insights to seek out the players the team prefers. Scouters need to set the standard for player selection with their respective teams and then negotiate the transfer fee with the player's current team. The process of recruitment is completed after the tryouts [3-8].

The language/personality education part is necessary for the communications between players and their basic knowledge. Having a good character is a basic virtue necessary not only for athletes but also for human beings. Thus, this item has been entered to allow youth players to possess a better character when they become an adult player who is expected to set an good example to young fans. Player's personality is as important as his/her skills. The language part is necessary to allow smooth communications

among the players coming from all corners of the world. This education management process assists them to avoid unnecessary hardships and have a better relationship with other players while they stay in the team. The player release and other managements are used to assess individual players skills through their game records. By adopting the promotion and relegation system, players skills are distinguished and an adequate training program will be provided to each of them. Table. 1 shows an application method of algorithm. Also, Figure 1 shows algorithm for youth soccer players.
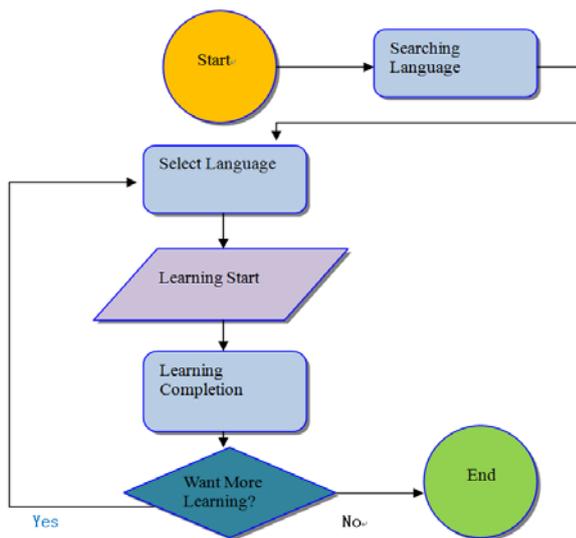
Fig. 1. Algorithm for Youth Soccer Players.

Lastly, the output part includes the results of health records, game records, personality education, changes made in the team and payroll records relevant to individual players. The health records allow the team to check whether players' healths being checked adequately and find problems from the feedbacks. The game records help the team to categorize players into 1st/2nd-string playes, or release those who do not live up to their expectations. The player recruitment assists the team to manage the transfer fees used by the team. The education management results allow the team to check whether the personality education has been effective to the players. The player recruitment or release status can be check with the change results management. The payroll management results let the team to constantly check the payments made to the players and the expenses to run entire team.

IV. CONCLUSION AND FUTURE WORK

The authors have established a general frame for the proposed system by entering the information into the program to be developed. At the same time, input data were categorized and controlled by using a user interface. Prior to running the user interface, 4 algorithms have been applied for better execution of the system. The level of completion was increased by inputs made into the output section. Authors plan to construct a better system by adding some other necessary algorithms or user interfaces after executing the system program extensively. A more efficient and useful system can be expected by including more sophisticated technologies based on the feedbacks form the experiments.

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