Soccer Player Transfer Study and Visualization

Hao Wang, Anqi Mao
University of Illinois at Urbana Champaign

ABSTRACT

Talented players are precious for professional soccer games, and clubs are willing to invest millions of euros on one truly talented player. Not like worldwide popular professional football games, Chinese Super League, the top competition in China, has different patterns and level of investment, and we are interested in visualizing the player investment and club performance in this game. The result suggests a non-direct relation with transfer cost and performance, however, with a significant advance in player investment does lead to a much more steady and better game result.

Keywords: professional football, Chinese Super League, player transfer, visualization.

Index Terms:

1 INTRODUCTION

Professional football, also named soccer in US, is one of the most popular sports over the world. The success of a game relies on many factors: squad, club staff, training method, club budget, and so on, among which talents of the squad is probably the most crucial one. Therefore, tons of clubs spend millions or billions a year in order to team up 30 players that not only are the most talented but also most fit of the club. Hence, it is interesting to study player investment and team performance.

Player flows among clubs is supposed to happen in two ways: 1. One club permanently have the player from another team, which is called permanent transfer. 2. The player does not change its clubs, but is loaned to another for development/study purpose, or only for a temporary use. Both loan and permanent transfer affect a team's performance in that season, so we will take both into account when measuring the team's performance.

To measure a team or a player's performance, there are many indices that give statistics in various aspects. The most straightforward index should be the rank of the competition. In different areas, there are usually different level of football competitions. For example, in China, there are League one and Chinese Super League. Chinese Super League is the top competition for Chinese football. It runs on an elimination system, consisting of 16 teams, and each year 2 teams with the least points (ranks) will be eliminated. League One is a second level competition. Each year, top 2 teams from League One will be selected to attend the Chinese Super League in the next year. In this project, we only focus on Chinese Super League, thus, whether a team from League One enters next year's Chinese Super League is also a measure of the club's performance. Other than these two, we also use competition points (Points), number of shooting (shooting), Goals (GS), Goals Against (GA), Minutes possessing the ball (Possession), Number of passing (Passing).

This project is a web application that provides visualization of competition statistics of 16 teams in the Chinese Super League from 2011 to 2017.

anqimao2@illinois.edu, haow4@illinois.edu

2 THEORY

Chinese Super League by itself, though the top competition in China, is probably limited its popularity only in China. Comparing with world famous football associations and clubs, where clubs are able to and willing to spend millions of euros for a single talented player, transfer amount in China is so much less. For this reason, we are not doing comparisons across countries, but limit our data to Chinese Super League.

To explore club transfer and club performance in multiple perspectives, four plots are chosen: line plot for showing the trend of one club's transfer and competition rank over years. Radar plot for displaying a club's comprehensive competence in terms of 6 indices of game in each season. Parallel plot for comparing multiple teams.

2.1 Line Plot

A line char displays data as a series of points connected by straight line segments. [4] The line segments and their directions are able to visualize a trend in data over time. When only considering a single club, we are interested in its performance over time, therefore, line chart is chosen here to display transfer amount and ranks over the 6 seasons.

In our project, both net transfer amount (transfer arrival – transfer departure), seasonal rank, and their trends over years are displayed. Transfer amount axis lies at the left, and the axis for seasonal rank lies at the right. The horizontal axis shows different seasons (2012 - 2017). Figure 1 is a snapshot of club Shangdong Luneng's transfer and rank changes over time. The green line is for seasonal rank, and the blue line represents transfer costs.

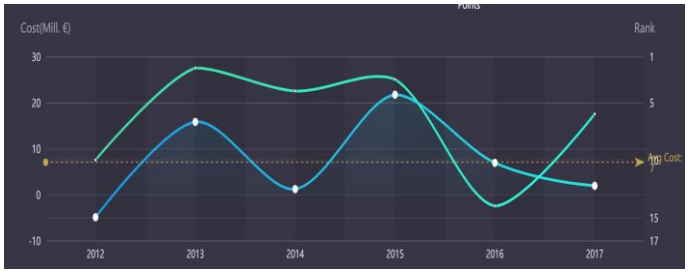

Figure 1: Shandong Luneng transfer and rank line chart.

2.2 Radar Plot

Besides the trends of transfer costs and rank changes, we are also interested in a more detailed performance of each season. As mentioned in part one, 6 football indices are used here to measure a team's seasonal performance. According to Wikipedia, "A radar chart is a graphical method of displaying multivariate data in the form of a two-dimensional chart of three or more quantitative variables represented on axes starting from the same point". Therefore, using radar chart is a good choice here to display multi-dimensional data.

In this project, we not only show the radar plot of the six indices of a team in each season, but also display the radar plot of the previous season, thus, by clicking on a certain season, one can know how much the club has spent that year at the line plot, and see the corresponding competence difference comparing with previous season in the radar plot. Figure 2 is a snapshot of the radar plot.

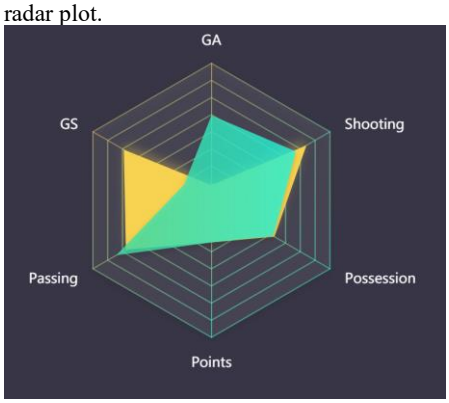

Figure 2: Changchun Yatai 2017 game indices data

2.3 Parallel Coordinate Plot

By looking at the transfer amount flow change and the rank change of one single club over time, we are able to have a sense of how the club develops over time. However, considering the factor of inflation, an increasing trend of transfer cost may not imply a club is increasing its investment on players, however, we can make a horizontal comparison with its peer clubs that year to see whether a club invests enough on players.

Parallel coordinate chart is a nice choice when comparing multiple clubs in terms of multivariate data. The project lets user to select different clubs and make a comparison about all eight variables (six match indices, transfer cost, and rank). Figure 3 shows the comparison between Dalian Aerbin and Shanghai Shenhua.

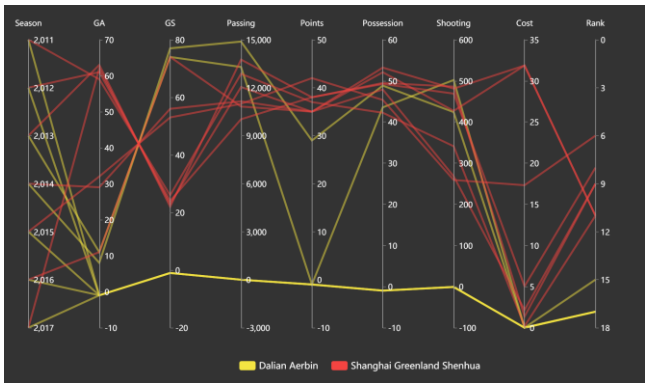

Figure 3

3 Discussion

After the visualization of team performance and transfer spent, some unexpected yet explainable patterns have shown. Basically, there are several phenomenon that have caught our eyes:

1. There usually exists a similar trend between cost change and rank change.
2. Yet increase in transfer cost does not always bring better performance, so does decrease in transfer cost
3. However, club Guangzhou Greenland Taobao, which always ranks first in Chinese Super League over the 6 years, has much higher investment in players.

The data is from a website called "transfer market". Because each season there are two teams from League One showing in the Chinese Super League, and those teams might not have a tight track of their transfer record as the normal Chinses Super League teams, so for teams not showing often in this game, there might be inaccurate data report on transfer cost. However, even if only considering the other normal 14 teams, we can discover cases where investment on players is increasing yet rank is decreasing. Because in a game there are other factors influencing the performance, like how many players are playing with injury, and whether the players have enough rest, the trend in transfer cost is not always the same as the trend in performance. However, teams with much lower player investment usually has worse performance, and for the opposite case, Guangdong Taobao, it has like 10 or more times of transfer budget than other teams, and it always ranks the first.

4 Conclusion

Based on the data we have and the visualization of team performance and transfer cost, we see that there is no direct relation between transfer cost and performance, however, a significant advance in transfer cost does help to team up a better team and lead to better game result.

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