

PUBG GAME DATA ANALYSIS AND PREDICTION

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Introduction

In a PUBG game, up to 100 players start in each match (matchId). Players can be on teams (groupId) which get ranked at the end of the game (winPlacePerc) based on how many other teams are still alive when they are eliminated. In game, players can pick up different munitions, revive downed-but-not-out (knocked) teammates, drive vehicles, swim, run, shoot, and experience all of the consequences – such as falling too far or running themselves over and eliminating themselves. Different game behaviors will lead to different final rankings, so the main purpose is to build a model to predicts players’ finishing placement based on their final stats, on a scale from 1 (first place) to 0 (last place).

PUBG Game Data Analysis aims to make A game team data know which game actions that make game teams get higher rank than others

PUBG win place prediction aims to help Players can also estimate their final ranking based on the current situation and make strategic decisions in advance (such as running away or fighting) Hence, the outlying aspects mining is also referred to *outlier interpretation* or *object explanation*.

In this paper, we extend the task of *outlying aspects mining* to the *group* level, formalize the research problem of *group outlying aspects mining*, and propose a novel algorithm named GOAM to solve the *group outlying aspects mining* problem.

Group Outlying Aspects Mining

- It aims to *identify a subset of aspects (or subspace) which makes the query group, rather than the single object, obviously different*. What we are interested in the task of *group outlying aspects mining* is to explain which aspects make the query group distinctive different from the other groups.
- Group Outlying Aspects Mining, Outlying Aspects Mining* and *Outlier Detection* are different with each other.



Group Outlying Aspects Mining



Outlying Aspects Mining



Outlier Detection

GOAM Algorithm

We propose the *GOAM* algorithm to solve the research problem of *Group Outlying Aspects Mining*. The *GOAM* algorithm includes three major steps.



Group Feature Extraction Let f_1, f_2, f_3 represent three features of G_q . We count the frequency of each value for one feature. Then use the histogram to represent each feature. Similarly, we can extract other features for each group.



Histogram of G_q on f_1



Histogram of G_q on f_2



Histogram of G_q on f_3

Outlying Degree Scoring In this step, we first calculate the *earth mover distance* (EMD) of one feature among different groups. The earth mover distance reflects the minimum mean distance between groups on one feature. So, we utilize the EMD to measure the difference between groups of each feature.

GOAM Algorithm

Second, based on the *earth move distance*, we calculate the outlying degree.



where G_q is the query group, n is the number of compare groups, and h_{k_s} is the histogram representation of G_k in the subspace s .

Outlying Aspects Identification In this step, based on the value of outlying degree we will identify the group outlying aspects. If a feature’s outlying degree is greater than a threshold, the more likely the feature is group outlying aspect. When the dimensionality of features is high, we adopt a stage-wise candidate subspace construction strategy to alleviate the exponential explosion.

Experiment

Synthetic Dataset contains 10 groups and 8 features. Each group consists of 10 members, and each member has 8 features.

Method	Truth Outlying Aspects	Identified Aspects	Accuracy
GOAM	$\{F_1\}, \{F_2F_4\}$	$\{F_1\}, \{F_2F_4\}$	100%
Arithmetic Mean based OAM	$\{F_1\}, \{F_2F_4\}$	$\{F_4\}, \{F_2\}$	0%
Median based OAM	$\{F_1\}, \{F_2F_4\}$	$\{F_2\}, \{F_4\}$	0%

It can be observed that the GOAM method can identify the trivial outlying features and non-trivial outlying subspaces correctly and is obvious from the table that the accuracy of GOAM is the best, which is (100%).

NBA Dataset was collected from Yahoo Sports website (<http://sports.yahoo.com.cn/nba>). The data include all teams from the six divisions, and each player in the team has 12 features.

Teams	Trivial Outlying Aspects	NonTrivial Outlying Aspects
Cleveland Cavaliers	$\{3FA\}$	$\{FGA, FT\% \}, \{FGA, FG\% \}$
Orlando Magic	$\{Stl\}$	None
Milwaukee Bucks	$\{To\}, \{FTA\}$	$\{FGA, FTA\}, \{3FA, FTA\}$
New Orleans Pelicans	$\{FT\% \}, \{FTA\}$	$\{FTA, Stl\}, \{FTA, To\}$



New Orleans Pelicans on FT%



New Orleans Pelicans on FTA

New Orleans Pelicans has more players with lower {free throw percentage}, {free throws attempted}.

Conclusion

Problem Definition Formalize the problem of Group Outlying Aspects Mining by extending outlying aspects mining.

GOAM algorithm Propose GOAM algorithm to solve the *Group Outlying Aspects Mining* problem.

Strategies Utilize the pruning strategies to reduce time complexity.

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