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Costing of IPL players depends on performance - An exemplary for Multi - Criteria Decision Making Procedure

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Abstract:

Cricket is a global sport played around in 100 countries. The game players should be the best performers with the best in physical fitness and should be without any injury. As cricket is fond of many viewers in all countries, hence a new norm IPL has been introduced in 2008. IPL the Indian Premier League is the latest Twenty20 Cricket League which has been practicing for the past three years i.e, 2008. The IPL varies from the regular norms which are been followed in the regular Cricket World. The team owners could select the talented players for their team by following the auction process. Maximum 4 foreign players would be allotted for each and every IPL cricket team. Though the overall wage cap For the IPL cricket players is about $5 Millions, the organization has to spend a minimum of $3.3 millions on the players depending on the amount of salary allotted salary cap.

This paper aims to inquire the extent to which the player costings based on their performances. IPL and Cricket are being the favourite sports of many, because of huge following to these global sport there are many systems been proposed to make decisions. The outcomes or the results can also be assured by going for the comparative analysis with the dataset prescribed here (K-NN, SVM, Linear Regression), compare the results with respect to these algorithms. Among these algorithms, our algorithms give the outcomes with the highest accuracy. Our proposed system will give you more desirable results than the present existing systems.

Key Words - *IPL, Multi-criteria Decision Making, Wage Cap, Global Sport*

I. Introduction:

Cricket world's popular outdoor sport. IPL is the latest gaming which has been introduced into the gaming field[1]. Ever players and the team owner aims to get the best results by choosing best player for their respective team. One can choose the best layer for their team by MCDA. The MCDA can be done based on the present existing systems .The Multi-Criteria Decision Analysis (MCDA) was introduced in

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the early 70's which helped to make promising decisions to get favorable results. These decisions based both on the quantitative and qualitative performances. MCDA helps to make the hand-picked selection from a minimal number of alternatives. As per Kavita Devi et al, the MCDA involves both sorting and ranking. The existing systems show many MCDA forms like the “Technique for Order Preference by Similarity to Ideal Solutions (TOPSIS), Simple Additive Weighting Model (SWA)”. Based on the present system we have proposed a new system with more efficacy which helps to give better results than the existing ones [2].

Apparently the history says that Cricket has been originated from South-east England in the mid of the 16th Century. Later this sport expanded globally with great grace with the enlargement of the British Empire which leads this sport to be first international matches around the 19th century. The Marylebone Cricket Club (MCC) located in London uses the “Laws of Cricket" as a code that helps in maintaining and owning the rules of the Cricket. A total of 100 members of players have been allotted to The International Cricket Council (ICC). Cricket s one of the main sport which has been primarily followed in many countries such as the Indian Subcontinent, Australia, The UK, West Indies, etc. Like Cricket the Women's Cricket has its organization ruling and maintaining the sport. Australia is known to be the most successful player in International Cricket. Australia has won 7 One Day International Trophies, 5 World Cups. Australia has been top-rated among the Cricket than the other countries [3].

The gaming system has two side batting and bowling played by two different teams. Each team captains go for the tossing of a coin. The team with the successful toss go for (First inning)batting and the other team will be doing bowling. Each phase of the Cricket match is called as innings. The team which bats have to score runs and the opposite team doing bowling should go for fielding (restrict the batsmen's score). Depending upon the match the number of innings varies. After completion of the first innings the team positions changes. For instance, a match with four innings would be played in 4 days, depending upon the length of the innings the duration of the game (number of days) increases or changes. In the match (Batsmen) if gets injured a substitute runner can continue the game. But this does not apply to international cricket. The team with the highest runs and score would be declared as the winning team, and the team player who's done a good performance with the best score would be awarded as Man-of the match. When it comes to the losing team that depends on various factors such as if the team loses the match with the minimum number of runs, then the team would be known to be "lost by n runs”. Whereas the winning team would be known as "Won by n Wickets". In Cricket the number of runs matters for both the Winning and the losing team will go for bowling [4].

II. Literature Survey:

In [5], A method of predicting the upcoming match of Cricket player by applying the Machine Learning Algorithms, Statistical Data collected from the trusted sports websites of the players. In this manner, the data is been converted to the numerical value which helps in extracting the favorable attribute.

In [6], The technique of Artificial Intelligence and Bayesian Classifiers in Machine Learning which would help in estimating the victory in the game, which has been specifically implemented in the One Day International Cricket Sport (ODI). Taking these factors into consideration CricAI tool has been proposed to estimate the victory results in the ODI Sport.

In [7], A study with the implementation of Decision Trees, Multilayer Perceptron Network and CricAI results with respect to the pregame attributes example Venue, innings which help in the estimation of the outcome or result.

In [8], An application with the feature of scheduling the sports (Other games and Cricket) at given a particular time has been generated. This application uses the attributes of the climatic information, R Programming to analyze the mean and the variance of the data. Also the algorithms like Random Forest, Naive Bayes, SVM. This will help to organize or to assign the sport (Cricket) at a particular venue without any inconvenience like the rains or other interruptions.

In [9], Application of TOPSIS (Technique of MCDM-A Mathematical Analysis) to estimate the positive outcomes of a Cricket match irrespective of complexity. This application in reference with the fall-outs of the previous matches helps in performing the modifications in the application software to give away the victory result over the match.

In [10], the aim of the paper is to select the rising players of the match (Batting and Bowling), a match with the best players helps to achieve easy victory. To select the best player for the team comparative analysis have been made with using the attributes as the Machine Learning Techniques analyzed with the international cricket council rankings to choose the rising or best player depending on the previous performances of the player can be estimated for the forthcoming matches.

In [11], these methods of predicting the score of the first innings considering the Current run rate, number of wickets fallen, batting team, bowling team and the venue of the match. The other method is to analyze the outcome of the match of the second innings. Both methods use the Linear Regression Classifiers and Naives Bayes Classifiers to help in predicting the possible outcomes of the match.

III. Proposed System:

We have proposed a latest system which can forecast the results of the match beforehand the match begins. To foresee the results is quite a complex method to estimate the champion winner. The T20 is one of the popular formats of Cricket which helps to foresee the players until the last ball. Many of the analytical works analyse the results by performing using the regression and classifications. But with these algorithms there is the classification problem as per the literature survey. Hence we have proposed a latest system by applying classification algorithms on cricket data-set, also analysed from the literature survey which helped us to evaluate the outcomes and to choose the most unique model that gives great results with more accuracy.

We have proposed an intelligent representation to estimate the outcome of the match with respect to the toss winner and the home ground models respectively. The team which has won the toss will decide whether to bat or field by contemplating various factors such as the pitch, outfield, and weather. Every team is it who won the toss or the opposite team aims to win the match. But the team with the toss will have the option of choosing to bat or to field depending upon various factors favorable for victory. In this paper we have proposed two different models representing the impact of home ground and the effect of toss decision. Before going into the project first we remove all the incomplete records of the input dataset and shall pre-process the data so there would be no lost or mislaid values or attributes in the dataset. If there is no match among the data and the results we would omit such values from the classification. Especially we will omit the feature that has no impact over the performances by implementing the feature selection during the training session.

There are different features that are taken into consideration of the match among them, the match date, venue, and Match ID are been excluded in advance to the training session with respect to the machine learning techniques also further more details explained in fig.1.

During this session the input dataset is been pre-processed, the data will be split into two different features as the attributes related to the "Home Ground' and the other is the "Toss decision feature'. As soon as the dataset has been split, a variety of algorithms will be implemented on the above mentioned two attributes, so we can retrieve the predictive representations from the results of the match. The ten-fold cross-validation with the stratification has been derived with the testing methods. Therefore to analyze the forecasting upcoming matches results these machine learning algorithms have been applied. Here we have implemented a wide range of models such as Naive Bayes, Random Forest, Model Decision Tree, and the K-nearest neighbors so we could get accurate results[12].

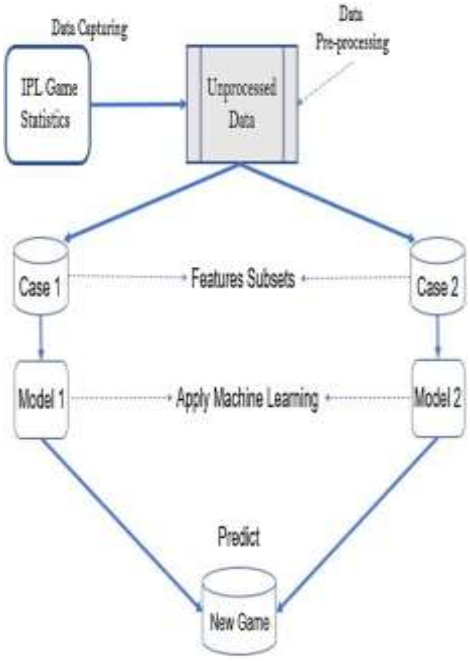

Fig1. Applying ML Techniques To Process Data

IV. Results and Discussion:

The machine learning tool with the automated intelligence techniques says WEKA (Waikato Environment for Knowledge Analysis) has been implemented overall experiments that have been performed in this research.The visualization tool Tableau has been implemented in the research so, the IPL data insights can be visualized[29]. These experiments were conducted on Windows 10, with 8 GB Ram, 64-bit OS, and Intel i5, 6th generation processor. The predictive models from the machine learning algorithms have been derived by the application of various metrics such as the classification accuracy, Precision and Recall depending upon the confusion metrics analysis. As discussed above we have implemented the ten-fold cross-validation with stratification as a testing system to get the outcomes.

The main motive of the prediction of the match results in the above first model is to analyze the effect of the home ground benefits. The "Result" in this research has been retrieved depending upon the winning team, i.e Home Team (Team 1), while the team playing the game on the home ground. For instance the frequency of winning the team "Chennai Super King" when the match conducted at the home ground Chennai. By the means of classification, the "Result" prediction is the main target outcome of the experiment. In this procedure, each team is assigned with the particular city as the home ground for the respective tournament. In every tournament, a combination of two teams will be playing the match in two sessions one at the home ground of team 1 and the other round of a match at the other team i.e 2nd team respectively. If the math is conducted in the foreign countries the match will be conducted as same as the respective home grounds of the teams. But there are some exceptions for some Teams such as the Kings XI Punjab whose original home ground is Mohali, apart from that they are denoted with different home grounds, for such exceptions the venue is not stable i.e, the home ground.

Depending upon the Fig.1 the Naive Bayes attribute is the best model to analyze and predict the outcome or the winner. The Naive Bayes gives relatively low accuracy which is about 57%, also the Random Forest 54% and the Model Trees 56%; KNN with the least accuracy 52% algorithms give away low accuracy results respectively. Based on the above accuracy level we can say that the applied machine learning techniques weren't able to produce or improve the predictive accuracies.

The predictive results may be improvised with the help of Machine Learning with the help of the pre-game data. Besides that, at this particular stage, it cannot be accepted if there is any missing variable in the dataset. The lack of variables is one of the major limitations of this study. Whereas the machine learning techniques could be made more beneficial by implementing the live data streaming and with the statistics of the players. Also, the prediction of the final result score in the first innings can be made more accurate by considering the run rate per over. When it comes to the second innings one has to consider the actual run rate and the required run rate the final score of the result can be predicted. Furthermore, many models can be built for the other formats of cricket like the Test Cricket and the ODI Series. Conclusively, in the near future we aim to develop a classification system which is based on the deep learning, which helps to collect vast useful features that possibly develop the predictions with more

accuracy while the game is happening. The outcomes of the cricket innings with respect to different algorithms explained in fig. 2.

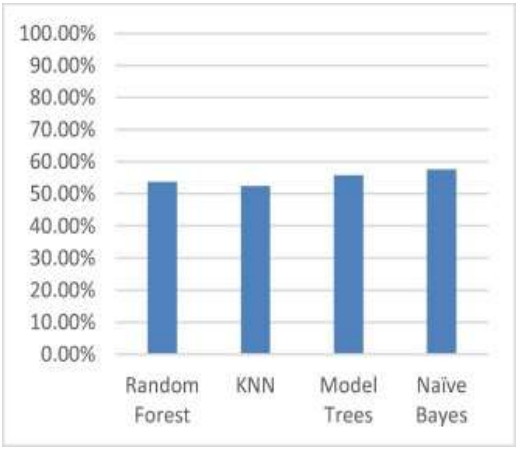

Fig.2. The outcomes of the cricket innings with respect to different algorithms

V. Conclusion And Future Work

To analyse and to predict the results in Cricket in particular is definitely a challenge and its very complex to choose the right one. But with the help of our proposed systems we can analyse the results with more accuracy. This would definitely help to take the decision with more accuracy. For future work, we have plan to expand our work using more information attributes from the literature survey related to the previous match scores of the selected and opponent team. So our system can predict the accurate outcomes in the outdoor sport like cricket.

Implementation of machine learning algorithms with respect to the previous historical data, performances of the player, pre-game conditions and other parameters favorable for the multiple stakeholders to analyze the Cricket sport. It's very challenging to predict the outcome for the T20 as the situation changes for every ball. So to predict the possible outcome of the T20 we have proposed the machine learning technology. In this procedure, we have divided the streaming into two features like the Home Team and the Toss winner decision feature. By taking into consideration the run rate per over and the data and statistics to determine the probability of winning of each team depending upon the running rate respectively. Similarly, for other crickets like the Test Cricket and the ODI Series, equal models can be built. Further in the future, we intend to develop a new classification system depending upon the extensive learning to seize more useful features that can help in developing the accuracy of prediction and estimation of the game or match which is in headway.

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