Team Selection Strategy in IPL 9 using Random Forests Algorithm

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ABSTRACT
IPL 9 is scheduled to be held in April 2016. T20 cricket is relatively new and the strategies and techniques are evolving. This is evident in the better performances by both bowlers and batsmen in successive IPL seasons. This paper presents a detailed analysis of the data of IPL upto season 8 and overall T20 career data of players upto January 2016 to design performance indices for batsmen and bowlers in IPL 9. Categorization of players is done based on their roles in the team and the indices are determined separately for each category using Random Forests Algorithm. A heuristic is designed to enable selection of the best playing 11 out of the available team using the performance indices designed in this work. The algorithm is effective in enabling the best 11 to be selected within the constraints of the rules in the IPL tournament.

Keywords
IPL 9, Team selection, Random Forests, Heuristic

1. INTRODUCTION
Test cricket, ODI and Twenty20 (T20) are the three facets of the game of cricket. T20 is a 20 overs a side match which is usually over in 4 hours. T20 cricket was an immediate success in England where it was first introduced in 2003. It has become extremely popular especially because the short format allows one to enjoy the complete match in one evening. 20 overs (120 = 20 x 6 legal ball deliveries) are allowed in T20 matches for each batting side to score from if they have wickets. The side that scores more runs within the stipulated overs wins.

Indian Premier League (IPL), a T20 tournament, was started in 2008 by Board of Control of Cricket in India (BCCI) [1]. The IPL created eight franchises assigned to eight of the largest cities in India. The teams were franchisee driven. The players were selected through competitive bidding from a pool of available players. The BCCI has been organizing the IPL T20 cricket tournament in each year. 8 IPL tournaments have been held till date and the 9th edition in scheduled to be held beginning in April, 2016.

The use of analytical methods is very useful in cricket. Batting, bowling and fielding are the three main departments of the game. There is a huge demand for cricket related statistical studies because of the popularity of the game and the staggering amounts of money involved. These statistics give clear picture of the performance of various players. Followers of the game, especially in India, are keen followers of its statistics also.

Some studies related to cricket reported in the literature are as follows. Optimal batting strategies using dynamic programming model was developed by Clarke [2]. Alternative batting averages when batsman remains not-out in one-day cricket was proposed by Kimber and Hansford [3] and Damodaran [4]. Barr and Kantor [5] proposed a method based on batting averages and strike rates. Borooah and Mangan [6] explored batting performance for test matches. Norman and Clark [7] and Ovens and Bukeit [8] applied mathematical modeling approach to optimize the batting order of a team. Lewis [9] analyzed player performance using Duckworth/Lewis percentage values. Van Staden [10] used a graphical method to analyze batting and bowling performance in cricket. Lakkaraju and Sethi [11] described a Sabermetrics style principle to analyze batting performance in cricket. Lemmer [12-14] considered performance analysis using averages and strike rates for bowling and batting. Saikia et al. [15] evaluated the performance on all-rounders in IPL.

IPL season 9 is to start in April 2016. There is a huge buzz going around regarding the players to look for in this season of IPL. Lot of money is involved in the IPL. Every cricket fan has his own set of favorite players to watch. Before the start of the season, team evaluations and some understanding of how they stand in terms of their likelihood of winning is useful not only as a favorite pastime of the fans but also commercially.

In this work, an attempt is made to apply the well-known analytical techniques towards this end. The batting and bowling performance of players has been predicted based on their past IPL performances and overall T20 career performances. This work can help the franchises select their best 11 for the tournament in order to maximize their chances of winning. A heuristic based approach is designed for selecting the best possible playing 11 for each team. These teams are then used for predicting the match results using the results of the eighth season. Some of the results obtained from the detailed mathematical analysis are quite different from what could be expected by a cursory glance at the teams. An attempt is made is to explain these results and provide insights into the factors that affect the performance of the teams. These are useful to gain a better understanding of the underlying mechanics of T20 cricket outcomes.

The rest of the paper is organized as follows. In section 2, the statistics of previous IPL matches are examined to find the changing scenarios and trends. In section 3, the relative importance of the factors that define batting and bowling performances is determined using machine learning based approach and a composite performance index is defined. The top batsmen and bowlers are identified according to these indices. In section 4, a heuristic that attempts to maximize the batting and bowling performance of the team for selecting the playing eleven is proposed. Some conclusions and insights from this analysis are presented in section 5.

2. CHANGING SCENARIOS AND TRENDS IN IPL CRICKET

Tables 1 to 4 show the average number of runs scored and wickets fallen in head to head clashes of each IPL item against every other team. If the statistics of seventh season and eighth season are compared it is evident that in eighth season both the batsmen and bowlers have performed better than in the seventh season as the average number of runs scored per innings have increased and so have the number of wickets that have fallen. This reflects that both batsmen and bowlers are evolving with more exposure to T20 cricket and understanding the game better. The same trend is going to continue and more mature batting and bowling performances are expected to be seen in the ninth season.

This implies that the batting attributes and bowling attributes are and their relative importance would also change as the cricketers evolve. The same set of attributes with the same relative importance cannot be continued with for performance evaluation of batsmen and bowlers in T20 cricket.

3. PERFORMANCE INDICES AND RANKING OF BATSMEN AND BOWLERS IN IPL 9

The first step is to identify the factors and their weightages for creating a Performance Index for ranking the batting and bowling performances. Deep Prakash et al. [16] develop a methodology called Deep Performance Index (DPI) in which five parameters for batsmen and five parameters for bowlers are identified for ranking the performances upto season VII. Deep Prakash et al. [17] present a category based Deep Performance Index for ranking players in different categories. This approach is extended to calculate the attributes for each category of players and the corresponding DPI for each player in this category for season IX. The details are as follows.

To assess Batting performance five indices are identified as given in table 5. Similarly in order to assess Bowling performance five indices are identified as given in Table 6.

The performance data for all the cricketers in IPL 9 in the previous IPLs and their performance data in all T20 matches are collected. Their MVPI (Most Valuable Player Index) values are also computed. Recursive Feature Elimination algorithm is then utilized to get the important features among the 10 features and their weights reflecting their relative importance.

Recursive Features Elimination using the Random Forests Algorithm [18] works as follows. In addition to constructing each tree using a different bootstrap sample of data, random forests change how the classification or regression trees are constructed. In standard trees, each node is split using the best split among all variables. In a random forest, each node is split using the best among a subset of predictors randomly chosen at that node. This strategy has been shown to perform better than many other classifiers, including discriminant analysis, support vector machines and neural networks, and is robust against overfitting [18]. It is very user-friendly because it has only two parameters (the number of variables in the random subset at each node and the number of trees in the forest) and is usually not very sensitive to their values.

The algorithm performs Recursive Feature Elimination (RFE). In this approach, the algorithm fits the model to all predictors which are the indices in the current work. Each predictor is ranked according to its importance to the model. At each iteration of feature selection, the N top ranked predictors are retained, the model is refit and performance is assessed. The value of N with the best performance is determined and the top N predictors are used to fit the final model. The predictor rankings are recomputed on the model on the reduced feature set. Resampling methods (e.g. cross-validation, the bootstrap) are used to reduce variability caused by feature selection when calculating performance. The steps in the algorithm are encapsulated inside an outer layer of 10-fold cross-validation to ensure better robustness of results and provide better estimates of performance. However, this makes the algorithm compute intensive. A consensus ranking is used to finally determine the best predictors to retain.

The features obtained in this manner and their corresponding weights are shown in Tables 8 (batting) and Table 9 (bowling). The features and their weightages are different for different categories and are according to the requirements of their respective roles. This clearly demonstrates the efficacy of the proposed approach.

A careful observation of the features of various categories clearly highlights the fact that consistent players are preferred no matter in which category they belong to. A typical T20 approach can be seen in these features as for an opener the fast scoring and hard hitting capability are the prominent features as the role of openers is to maintain the strike rate as well as to take the full advantage of the batting power play. For middle order batsmen, running between the wickets and fast scoring are the prominent features. This is due to the fact that the team wants to save wickets during the middle overs and has to also maintain the strike rate. For Finishers hard hitting and fast scoring capabilities are prominent according to their desired role in the last few overs. In inexperienced batsmen their fast scoring and running are important as most of the teams will only consider them in the lower middle order and not risk them at top of the order.

Among bowlers the most prominent feature which is coming is their short performance capability. Now the captains have understood how to utilize their key bowlers in short spells so in a spell if the bowler takes one or two wickets then he would be a very good asset for his captain. As we see most of the pacers are used during the initial power play overs or the late death overs, this the reason why their economy and wicket taking ability are coming prominent. In spinners their consistency is very important as they have to maintain their economy and couple of wickets as well. Pace allrounders are usually preferred by most of the teams and this season there is dominance of these players. Performance statistics show that, on their day, they have the capability to take 4 or 5 wickets which is very important for the team. Spin all-rounders are usually preferred when the key bowlers are not striking and the opponent team is scoring at very fast rate, so they have to act like a partnership breaker. Inexperienced bowlers have all the capabilities otherwise it is very unlikely that they will get a chance to play.

Using these weightages and the clustering, for each player his category based DPI has been calculated. The top Batsmen and Bowlers in each category are shown in tables 10 and 11.

4. HEURISTIC FOR SELECTING PLAYING ELEVEN FOR A MATCH

When a team of around 20-28 players is bought, the next question is to choose the best 11 for a match who fit into the needs of the team. Every team will have some strategy in mind before selecting their playing eleven. Selecting playing eleven by using the Ranking Methodology (DPI) and player

clustering methods described in detail in the previous sections can be applied with some heuristics to obtain the best playing eleven for a team.

Some constraints need to be kept in mind when selecting the playing 11.

- 1 Captain should be there in the team (Playing 11)
- 1 Wicket Keeper should be there in the team (playing 11)
- 2 Openers should be there in the team (Position 1 and 2)
- 3 Middle Order Players should be there in the team (Position 3, 4, 5)
- 2 Finishers should be there in the team (Position 6 and 7)
- At least 1 Spinner should be there in the team
- At least 2 Pacers should be there in the team
- The next best in ranking among available spinners and pacers would complete the playing 11.

    - Additional considerations are as follows.

- If the ranking of an inexperienced batsman is > 0.5 and the next available highest ranking experienced batsman is < 0.5 then, the inexperienced batsman will be taken into playing 11.
- If the ranking of an inexperienced bowler is > 0.5 and the next available highest ranking experienced bowler is < 0.5 then, the inexperienced bowler will be taken into playing 11.
- A team should not have more than 4 foreign players.
- If the difference between a foreign player's rank and an Indian player's rank in one cluster is less than the same difference in any other cluster, in case where there are more foreign players in the team, then the foreign player where the difference is large would be selected and the one where the difference is smaller would be dropped.

Using these constraints, the playing 11s of the teams are determined as given in Table 12 along with their batting and bowling DPIs. Overseas players are shown in bold.

The Comparison of batting and bowling strengths of each team is shown in Figure 1.

5. CONCLUSIONS AND FUTURE WORK

The strategy for designing the performance indices for various categories of players and the heuristic for team selection has provided valuable insights into the team selection process and the teams that have been formed appear to be the most reasonable given the choices available. Team DD could be the surprise package of this tournament without any big guns in their playing 11. GLR is a new team introduced in season IX and they still have to prove their worth. The team is led by Suresh Raina who is one of the best Indian T20 batsmen in the middle order. KKR has almost the same team that played last year with only a couple of key changes which could prove decisive. Kings XI Punjab have formed a team which can prove to be the best. They have a well- balanced and potent bowling attack. Last season's winning team MI is promising this season too. However, with too many big guns in their team they have a problem of plenty and they have many options in choosing their playing 11. RCB is one of the most promising teams this season with the best top order batsmen in the world in their lineup. A team that can chase any score and also put big totals on board, at least on paper. However, bowling appears to be the weak link in the side and could be the issue of concern. RPS is another new team introduced this season lead by MS Dhoni. Team composition looks like another CSK with exactly the same strategy and type of players. With the astute MS Dhoni leading from the front one can always presume that this team will be a handful once again. SRH is a team which has learnt from past mistakes and made a team which their fans hope can win the title. Overall there is no problem with either the batting or the bowling and the side is balanced.

In continuation of this work it is proposed to create a multi-objective optimization model using Genetic Algorithms for maximizing the batting and bowling strengths simultaneously within the constraints imposed by the team selection rules in IPL 9.

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7. APPENDIX

Table 1: Batting Averages of teams in season 7 against each other

Team / Team	CSK	DD	KKR	KXIP	MI	RCB	RR	SRH
CSK	-	179	151	198	159.33	149	144.5	165
DD	131	-	163.5	139.5	142	157.5	145.5	161.5
KKR	135	163.5	-	155.5	152.5	172.5	156	153.5
KXIP	221	139.5	153.75	-	162	162.5	186	202
MI	157	149	131.5	164.5	-	151	186.5	158.5
RCB	148	166	156.5	145	142	-	130	159
RR	140.5	178.5	161	177	171	131	-	118.5
SRH	167	114	151	163	164.5	158	133.5	-

Table 2: Average Number of wickets fallen in season 7 against each other

	CSK	DD	KKR	KXIP	MI	RCB	RR	SRH
CSK	-	4.5	3.5	5.66	4	3	5.5	4
DD	7	-	5.5	8.8	4	5.5	7	5.5
KKR	5.5	3.5	-	6.5	4.5	5.5	4	3.5
KXIP	4.66	4.5	7.25	-	6.5	6.5	3.5	5
MI	7	8	6	4	-	7	4	5
RCB	5.5	3	5	8.5	5.5	-	7.5	6
RR	9	4.5	5.5	6.5	6	4.5	-	8
SRH	4.5	1.5	7.5	7.5	4	4.5	7.5	-

Table 3: Batting Averages of teams in season 8 against each other

	CSK	DD	KKR	KXIP	MI	RCB	RR	SRH
CSK	-	134.5	149.5	163	167.5	156.33	156.5	189.5
DD	134.5	-	152	144	171	141	179.5	162
KKR	150.5	159	-	171.5	168	144	190	134
KXIP	112.5	141.5	169	-	163	97	163.5	155
MI	182.75	153	169.5	165.5	-	202.5	175.5	135.5
RCB	139	50.5	147	155	213	-	157	124.5
RR	151	187.5	199	176.5	172	119.5	-	162.5
SRH	178	163	154	167.5	125	153.5	164	-

Table 4: Average Number of wickets fallen in season 8 against each other

	CSK	DD	KKR	KXIP	MI	RCB	RR	SRH
CSK	-	6.5	7.5	3	6.75	8	4.5	5
DD	6.5	-	7	3	5	7.5	5	4
KKR	6	5.5	-	7.5	5	5	9	5.5
KXIP	8	7.5	7	-	6	8	7	8
MI	5.5	7	3.5	5	-	7	5	4.5
RCB	8.66	0	5	4.5	4	-	2.5	7
RR	5.5	4.5	6	6.5	5	9.5	-	5.5
SRH	6.5	6	6.5	5.5	9	2.5	4.5	-

Table 5: Performance indices for batsmen

Attribute	Definition
Hard Hitter Score	Number of runs scored via Boundaries / Number of balls faced
Finisher Score	Strike Rate i.e. number of runs scored / number of 100 balls faced
Fast Scorer Score	Strike Rate i.e. number of runs scored / number of 100 balls faced
Consistent Score	Average i.e. number of runs scored / number of times out
Running Between Wicket Score	Number of runs not via Boundary/ Number of balls faced without boundary

Table 6: Performance indices for bowlers

Attribute	**Definition**
Economy Score	Runs Conceded / Number of Overs bowled
Wicket Taker Score	Number of balls delivered/ Number of wickets taken
Consistent Score	Runs Conceded / Number of wickets taken
Big Wicket Taking Score	Number of times four wickets or five wickets taken / Number of innings played
Short Performance Score	(Number of wickets taken – 4* Number of times four wickets – 5* Number of times five wickets taken) / (Number of innings played - Number of times four wickets or five wickets taken)

Table 7: Categories of IPL cricketers

Nomenclature	Batting Positions	Criteria
Openers	1-2	Batsmen who have scored more than 500 runs with Strike Rate more than 100 and played in at least 25 matches in T20
Middle order	3 – 5	
Finishers	6 – 7	
Inexperienced	1 – 7	Those batsmen who do not satisfy above criteria
Specialist Bowlers - Pacers	8 – 11	Have bowled more than 30 overs in T20 but do not satisfy criteria for batsmen
Specialist Bowlers - Spinners	8 – 11	Have bowled more than 30 overs in T20 but do not satisfy criteria for batsmen
Inexperienced Bowlers	8 – 11	Those bowlers who do not satisfy above criterion
All-rounders – pace	Any	Played at least 25 matches and scored at least 500 runs and bowled at least 30 overs in T20 international cricket
All rounders - spinners	Any	Played at least 25 matches and scored at least 500 runs and bowled at least 30 overs in T20 international cricket

Table 8: Selected Batting Indices for various Categories and their calculated weightages for season

Sl.No	**Category**	**Indices and Corresponding Weights**
1	Opener	T20_Consistency(0.2638), IPL_Consistency(0.2027), T20_FScore (0.1865), IPL_FastScorer(0.1856), IPL_HHScore(0.1612)
2	Middle Order	T20_Consistency (0.3389), IPL_Consistency (0.2923), T20_RBWIndex (0.2040), IPL_FastScorer (0.1646)
3	Finisher	IPL_Consistency(0.6756), T20_Consistency(0.2204), IPL_HHScore (0.0752), IPL_FastScorer (0.0286)
4	Inexperienced	T20_Consistency(0.4627), T20_RBWIndex(0.3326), IPL_FastScorer (0.0929), T20_Fscore(0.0540), IPL_RBWIndex(0.0234)

Table 9: Selected Bowling Indices for various Categories and their calculated weightages for season 9

Sl.No	**Category**	**Indices and Corresponding Weights**
1	Pacer	IPL_ShortPerformance (0.266), IPL_Economy (0.237), IPL_Consistency (0.2069), IPL_WicketTaker (0.1746), IPL_BigWicketTaking (0.1144)
2	Spinner	IPL_ShortPerformance (0.311), IPL_Consistency (0.211), IPL_WicketTaker (0.189), IPL_Economy, IPL_BigWicketTaking (0.126)
3	Pace Allrounder	T20_ShortPerformance(0.2938), IPL_BigWicketTaking (0.2544), T20_Consistency (0.2367), IPL_ShortPerformance (0.2153)
4	Spin Allrounder	IPL_ShortPerformance(0.4902), T20_ShortPerformance(0.2487), T20_Economy (0.2405), T20_Consistency(0.020)
5	Inexperienced	T20_WicketTaker (0.3413), T20_Consistency (0.2751), T20_ShortPerformance (0.2704), T20_Economy (0.0925)

Table 10: Top ten Batsmen in each category in season 9 and their corresponding DPI

Sl.No	Category	Batsmen and Corresponding DPI
1	Opener	C.Gayle [0.984], S.Marsh [0.886], S.Watson [0.802], D.Warner [0.794], B.McCullum [0.76],Q.De Kock [0.732], L.Simmons [0.682], A.Finch [0.654], R.Uthappa [0.616], S.Dhawan [0.542]
2	Midddle Order	D.Miller [0.947], MS Dhoni [0.896], K.Polllard [0.843], S.Raina [0.839] ,AB De Villiers [0.827], K.Peterson [0.818], JP.Duminy [0.806], R.Sharma [0.737], Y.Pathan [0.726], V.Kohli [0.7151]
3	Finisher	A.Russell [0.959], A.Morkel [0.923] , J.Faulkner [0.807], I.Pathan [0.801], R.Jadeja [0.798], M.Marsh [0.763], S.Binny [0.675], T.Perera [0.606], A.Reddy [0.546], GS.Mann [0.534]
4	Inexperienced	N.Rana [0.888], K.Pandya [0.8], S.Khan [0.752], J.Sharma [0.728], B.Aparajit [0.642], D.Hooda [0.587], U.Sharma [0.582], D.Punia [0.570], A.Nath [0.505], P.Sahu [0.496]

Table 11: Top ten Bowlers in each category in season 9 and their corresponding DPI

S.No	Category	Bowler and Corresponding DPI
1	Pacer	L.Malinga [0.986], M.Starc [0.920], N.Coulter-Nile [0.911], S.Sharma [0.90], M.Sharma [0.849], M.McClenaghan [0.842], A.Nehra [0.838], B.Kumar [0.794], M.Johnson [0.793], RP.Singh [0.769]
2	Spinner	S.Narine [0.925], I.Tahir [0.904], B.Hogg [0.872], A.Mishra [0.841], Y.Chahal [0.809], R.Ashwin [0.790], A.Patel [0.740], I.Abdulla [0.741], S.Jakati [0.682], P.Tambe [0.640]
3	Pace Allrounder	C.Morris [0.908], J.Faulkner [0.905], D.Wiese [0.833], D.Bravo [0.830], R.Vinay Kumar [0.760], A.Reddy [0.734], T.Perera [0.634], I,Pathan [0.668], A.Morkel [0.633], K.Pollard [0.626]
4	Spin Allrounder	S.A.Hasan [0.985], H.Singh [0.931], P.Chawala [0.846], K.Sharma [0.811], P.Negi [0.698], Y.Singh [0.640], R.Jadeja [0.633], Y.Pathan [0.609], F.Du Plesis [0.582], JP.Duminy [0.499]
5	Inexperienced	M.Ashwin [0.936], M.Stoinis [0.885], KC Cariappa [0.859], J.Shah [0.853], M.Singh [0.839], B.Aparajit [0.704], S.Gopal [0.688], A.Nath [0.684], D.Punia [0.626], S.Lad [0.568]

Table 12: Playing eleven of each team according to the heuristics approach

Team	Player[Batting,Bowling]
Delhi Daredevils	S.Iyer [0.5361,0], **Q.De Kock** [0.743,0], K.Nair [0.299,0], S.Samson [0.403, 0], **JP.Duminy** [0.806,0.499], **C.Morris** [0.216,0.908], P.Negi [0,0.6984], **N.Coulter Nile** [0,0.911], A.Mishra [0,0.841], M.Shami [0,0.439], Z.Khan [0,0.748]
Gujarat Lions Rajkot	**B.McCullum** [0.760,0], **A.Finch** [0.505,0.684], S.Raina [0.839,0.454], D.Karthik [0.346,0], **D.Bravo** [0.561,0.830], **J.Faulkner** [0.807,0.905], R.Jadeja [0.798,0.635], D.Kulkarni [0,0.769], P.Sangwan [0,0.570], P.Tambe [0,0.64], S.Jakati [0,0.6825]
Kolkata Knight Riders	R.Uthappa [0.616,0], G.Gambhir [0.449,0], M.Pandey [0.388,0.507], **C.Lynn** [0.506,0.306], Y.Pathan [0.7262,0.6099], **A.Russell** [0.959,0.321], Suryakumar Yadav [0.367,0.488],P.Chawala [0.403,0.846], **M.Morkel** [0,0.767], **S.Narine** [0,0.925], U.Yadav [0,0.584]
Kings XI Punjab	**S.Marsh** [0.886,0], M.Singh [0.459,0.839], **D.Miller** [0.947,0], W.Saha [0.531,0], **G.Maxwell** [0.574,0.235], GS Mann [0.534,0.383], R.Dhawan [0.377,0.339], **M.Johnson** [0,0.793], A.Patel [0,0.743], M.Sharma [0,0.849], S.Sharma [0,0.90]
Mumbai Indians	Parthiv Patel [0.217,0], R.Sharma [0.737,0.24], A.Rayudu [0.444,0], **C.Anderson**[0.594,0.195],**J.Buttler** [0.407,0], **K.Pollard** [0.843,0.626], H.Pandya [0.432, 0.221], H.Singh [0.517,0.986], J.Bumrah [0,0.405], **M.McClenghan** [0,0.848], J.Suchith [0,0.583]
Royal Challengers Bangalore	**C.Gayle** [0.984,0.433], **S.Watson** [0.802,0.580], V.Kohli [0.715,0.148], **AB De Villiers** [0.827,0], K.Jadhav [0.422,0], S.Binny [0.675,0.2591], S.Khan [0.752,0], **M.Starc** [0,0.92], Y.Chahal [0,0.809], H.Patel [0,0.676], V.Aron [0,0.634]
Rising Pune Supergiants	A.Rahane [0.503,0], **F.Du Plesis** [0.533,0.582], **K.Peterson** [0.818,0], S.Tiwary [0.609,0], MS.Dhoni [0.896,0], **M.Marsh** [0.763,0.475], **A.Morkel** [0.923,0.633], R.Ashwin [0,0.79], RP Singh [0,0.769], M.Ashwin [0,0.936], A.Dinda [0,0.606]
Sunrisers Hyderabad	S.Dhawan [0.542,0], **D.Warner** [0.794,0],**K.Williamson** [0.264,0.384], Y.Singh [0.604,0.640], **M.Henriques** [0.558,0.553], A.Tare [0.419,0], A.Reddy [0.546,0.734], K.Sharma [0.529,0.811], B.Kumar [0,0.794], A.Nehra [0,0.838], **T.Boult** [0,0.739]

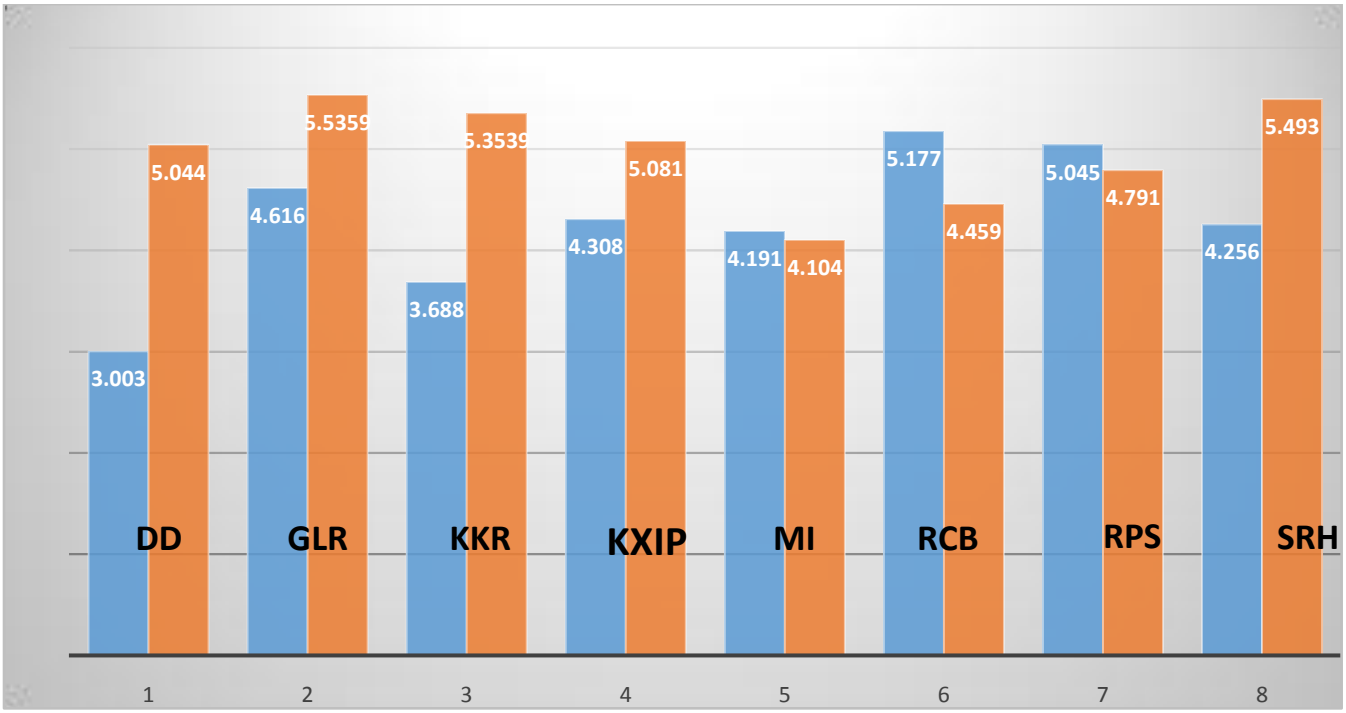

Fig 1: Comparison of Batting and Bowling strengths of each team in IPL -9