

# Statistical Study about Ranking of Players in IPL

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**Abstract** – Cricket is a bat and ball game played between two teams of eleven players. Measuring individual performance of players is very essential for teams to win games. In 2008, BCCI announced the launch of a franchise based Twenty20 cricket tournament called Indian Premier League, one of the biggest sporting events of the world now, which helped Indian domestic cricket players to gain vast exposure at an international level. Performance analysis of cricket players is always a vital task for the team selection; therefore, the principal purpose of this paper is to rank the players based on their performance and to find the key players in each season of IPL from 2008 to 2013 using principal component analysis. Quantifying individual player's contribution is an important task in all team sports. There are several indicators available to measure player's performance, which are based on different aspects of their contributions to the team, unfortunately these indicators are mostly related to each other in a manner that causes difficulty in constructing an overall performance measure but Principal component analysis (PCA) uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables to rank the players based on overall performance of each player.

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## INTRODUCTION

“Chase your dreams but make sure you don't find shortcuts” – Sachin Tendulkar. It is generally believed that cricket originated as children's games in the south-eastern countries of England. Cricket spread globally with the expansion of the British Empire, leading to the first international matches in second half of the 19th century. The games governing body of the international cricket council (ICC), which has over 100 members, twelve of which are full members who play test matches. The games rules are held in a code called the laws of cricketer which is owned and maintained by Marylebone cricket club (MCC) in London. The sport is followed primarily in Australia, Great Britain, Ireland, the Indian subcontinent, South Africa and West Indies. Women's cricket is organized separately and achieved the international standards. The most successful side playing international cricket is Australia having won several one-day international trophies, including five world cups more than any other country.

In India, cricket is the biggest sport and in every street of India cricket is being played. India became the member of the Elite club in June 1932 joining Australia, England, South Africa, New Zealand and West Indies. India recorded its first test victory in 1952, beating England by an innings in Madras. In 1971, they won a test series in England for the first time ever. In 1983, India were surprise winners of the cricket world cup under the captaincy of Kapil Dev. In September 2007, India won the first ever Twenty 20 world cup held in South Africa and won the 50 over cricket world cup in

2011 under the captainship of Mahendra Singh Dhoni held in India.

In 2008, BCCI announced the launch of a franchise based Twenty20 cricket tournament called Indian Premier League, one of the biggest sporting events of the world. The league's format was like that of the Premier league of England and the NBA in the United States. Each team play against each other twice in a home and away game in a round-robin format in the league phase. At the conclusion of the league stage, the top four teams will qualify for the playoffs. The winner of the second Qualifying match will move onto the final to play the winner of the first Qualifying match in the IPL final where the winner will be crowned as the Champion of the season.

Quantifying individual player's contribution is an important task in all team sports. Ranking based on their performance and quantifying the quality of each player and to find the key players in each season of IPL from 2008 to 2013 using principal component analysis. Principal component analysis (PCA) uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components.

## METHODOLOGY

### Data collection

Secondary data of all IPL matches that took place from 2008 to 2013 is considered. Details of these

matches are extracted via the Archive link at the CricInfo website ([www.espncriinfo.com](http://www.espncriinfo.com))

**Variables**

For ranking the batsmen, using the key variables are innings, runs, averages, strike rate, fours, sixes. There are several other variables that carry information about the contributions to a team by batsmen, and some of the variables may indeed be correlated. Here, we use the correlation matrix to accommodate discrepancies in the magnitude of the measurement's units of the variables. Below is a brief description of our selection for the critical variables used to quantify the quality of the players.

**Runs:** Total no of runs scored by a batsman in all innings.

**Batting average:** Total no of runs scored divided by total number of innings. If the batsman is not out, the average increases. The number overrates the performance of a batsmen with several not out cases which is the weakness of this measure.

**Batting strike rate:** The no of runs scored per 100 or the ratio of the number of runs scored and the number of balls faced by a player. Higher value of S.R indicate stronger performance as an aggressive batting style is always advantages in shorter version limited over cricket match like T20.

**Fifties:** Scoring 50 runs in an innings is known as a half-century or Fifties.

**Sixes:** Total no of sixes hit by the player in all innings.

For ranking the bowlers, here is a brief description of the critical variables used to quantify the quality of the bowlers.

**Wickets:** The number of wickets taken by a bowler in all innings, goal is to obtain many wickets.

**Bowling Strike rate:** The average number of balls bowled per wicket taken. better bowlers have lower strike rate.

**Economy Rate:** The average number of runs conceded per over. Better bowlers have lower economic rate.

**Bowling Average:** It is the number of runs conceded by a bowler per wicket taken.

**MODELS AND TECHNIQUES**

**Principal Component Analysis (PCA)**

Principal component analysis (PCA) is a statistical procedure that uses an orthogonal transformation to

convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated variables called principal components. PCA simplifies the complexity in high-dimensional data while retaining trends and patterns. It does this by transforming the data into fewer dimensions, which act as summaries of features.

PCA is mathematically defined as an orthogonal linear transformation that transforms the data to a new coordinate system such that the greatest variance by some projection of the data comes to lie on the first coordinate (called the first principal component), the second greatest variance on the second coordinate, and so on.

Briefly, if  $X^1 = [x_1, x_2, \dots, x_k]$  is a k-vector of random variable with variance covariance Matrix  $\Sigma$  and corresponding eigenvalue- eigenvector pairs  $(\delta_1, e_1), (\delta_2, e_2), \dots, (\delta_k, e_k)$  where  $\delta_1 \geq \delta_2 \geq \dots \geq \delta_k$ , then the principal components  $p_1, p_2, \dots, p_k$  are defined by,

$$P_i = e_i^T x, \quad i=1,2,\dots,k$$

Furthermore, it can show that

$$\text{Var}(p_i) = e_i^T \Sigma e_i = \delta_i, \quad i=1,2,\dots,k$$

$$\text{Cov}(p_i, p_j) = 0, \quad i \neq j$$

$$\sum_{i=1}^k \text{Var}(X_i) = \text{trace}(\Sigma) = \sum_{i=1}^k \text{Var}(P_i) = \delta_1 + \delta_2 + \dots + \delta_k \quad (1)$$

Consequently, the proportion of total variability due to the  $i^{\text{th}}$  principal component is given by

$$T_i = \frac{\delta_i}{\delta_1 + \delta_2 + \dots + \delta_k}$$

If the first principle Component captures a substantial percentage of the total variation in the observations, it can possibly be used to discriminate between the k vectors. Indeed, if  $T_1$  accounts for most of the variation seen in the data, then there is good reason to believe that it can successfully be used for ranking purpose. For this reason, we call this technique the first principal component method in practice, it is customary to use the correlation Matrix instead of the variance-covariance Matrix when the measurement units for the component office of the text data vectors are largely dissimilar. For this reason, the correlation matrix is used in this analysis.

**Batsmen**

Top 50 batsmen in the IPL from 2008 to 2013 were included in this analysis, so that fifty total batsmen comprise this list. For each batsman we collected (6x 1) column vectors of the form  $X = (\text{Innings, Runs, ...})$

Ave, SR, Fifty, Sixes)' and using them computed the sample correlation matrix with SPSS 20.0.

Next, we obtained all eigenvalues and associated eigenvectors for the correlation matrix and identified the largest eigenvalue,  $\Delta 1=$ , as well as its corresponding eigenvector  $e = [0.]$ . The latent value was the only eigenvalue exceeding 1.0 and SPSS 20.0 reports that the first principal component  $P1=e '1 X$  accounts for % of the total variability identified in equation (1). So, it is possible to concentrate on just the First Principal Component (FPC), as it accounts for a substantial portion of the total variability. Accordingly, we choose to rank the IPL batsmen from 2008 to 2013 based on their individual scores produces by the first principal component computation.

### Bowler

Top 50 bowlers in the IPL from 2008 to 2013 were included in this analysis, so that fifty total bowlers comprise this list. For each bowler we collected (5x 1) column vectors of the form  $X = (\text{Innings, Wickets, Avg, Sr, Eco})$ , and using them computed the sample correlation matrix with SPSS 20.0.

Next, we obtained all eigenvalues and associated eigenvectors for the correlation matrix and identified the largest eigenvalue,  $\Delta 1=$ , as well as its corresponding eigenvector  $e = []$ . The latent value was the only eigenvalue exceeding 1.0 and SPSS 20.0 reports that the first principal component  $P1=e '1 X$  accounts for % of the total variability identified in equation (1). So, it is possible to concentrate on just the First Principal Component (FPC), as it accounts for a substantial portion of the total variability. Accordingly, we choose to rank the IPL bowlers from 2008 to 2013 based on their individual scores produce by the first principal component computation.

## RESULTS & DISCUSSION

For the analysis we took players of IPL from 2008 to 2013 and its output are given below

### 2008

#### Top 10 Batsmen of 2008 in Normal Ranking

Name	Innings	Runs	Average	Strike Rate	50s	6s
SE Marsh	11	616	68.44	139.68	5	26
G Gambhir	14	534	41.07	140.89	5	8
ST Jayasuriya	14	514	42.83	166.34	2	31
SR Watson	15	472	47.2	151.76	4	19
GC Smith	11	441	49	121.82	3	8
AC Gilchrist	14	436	33.53	137.1	3	19
YK Pathan	15	435	31.07	179.01	4	25
SK Raina	14	421	38.27	142.71	3	18
MS Dhoni	14	414	41.4	133.54	2	15
V Sehwag	14	406	33.83	184.54	3	21

#### Top 10 Batsmen of 2008 in FPC Ranking

Name	Innings	Runs	Average	Strike Rate	50s	6s	FPC	Normal Rank
SE Marsh	11	616	68.44	139.68	5	26	2.40493	1
ST Jayasuriya	14	514	42.83	166.34	2	31	2.02166	3
G Gambhir	14	534	41.07	140.89	5	8	1.95657	2
YK Pathan	15	435	31.07	179.01	4	25	1.8352	7
SR Watson	15	472	47.2	151.76	4	19	1.73894	4
V Sehwag	14	406	33.83	184.54	3	21	1.49993	10
AC Gilchrist	14	436	33.53	137.1	3	19	1.45547	6
RG Sharma	12	404	36.72	147.98	4	19	1.25864	20
SK Raina	14	421	38.27	142.71	3	18	1.14442	23
GC Smith	11	441	49	121.82	3	8	0.98955	5

### Findings

- Gambhir and Jayasuriya have normal rankings 2 and 3, respectively, yet their FPC-rankings are just the opposite, 3 and 2.
- Gambhir scored 534 total runs with an average of 45.07 runs, and a strike rate of 140.9. He hit five-50s and 8 sixes.
- Jayasuriya scored a total of 514 runs with an average 42.83 runs, and a strike rate of 166.38. He hit two 50s and 31 sixes.
- Clearly, Jayasuriya has higher strike rate and more sixes, while Gambhir is not superior in terms of some of the variables that we considered in the analysis.
- Therefore, Jayasuriya is ranked higher than Gambhir.

#### Top 10 Bowlers of 2008 in Normal Ranking

Name	Innings	Wickets	Average	Economy	Strike rat
Sohail Tanvi	11	22	12.09	6.46	11.2
SK Warne	15	19	21.26	7.76	16.4
S Sreesanth	15	19	23.26	8.63	16.1
SR Watson	15	17	22.52	7.07	19.1
PP Chawla	15	17	22.88	8.3	16.5
JA Morkel	13	17	23.47	8.31	16.9
MS Gony	16	17	26.05	7.38	21.1
VY Mahesh	11	16	23.12	8.77	15.8
MF Maharoc	10	15	16.6	6.91	14.4
IK Pathan	14	15	23.33	6.6	21.2

#### Top 10 Bowlers of 2008 in FPC ranking

### Findings

- VY Mahesh is ranked number 8 in the Normal rankings but appears at number 5 in the list of top ten bowlers when using the FPC method.
- VY Mahesh took 16 wickets with an average of 23.12. His economy rate is 8.7, and his strike rate is 15.8.
- On the other hand, SK Warne, ranks 4th in the FPC-ranking method who ranks 2 in the normal rankings. He took 19 wickets with an

average of 21.26. His economy rate is 7.76, and his strike rate is 16.4.

4. So, Warne is better than Mahesh with respect to the strike rate variable, which is the average number of balls per wicket. It is true that a low strike rate is a desirable attribute.
5. However, Warne has a lower average, which is better since it represents the number of runs conceded per wicket. Moreover, Warne has the lower economy rate, which is the average number of runs per over.
6. This justifies that Warne should be ranked higher than Mahesh.

**2009**

**Top 10 Batsmen of 2009 in Normal Ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s
ML Hayden	12	572	52	144.81	5	22
AC Gilchrist	16	495	30.93	152.3	3	29
AB de Villies	13	465	51.66	130.98	3	12
SK Raina	14	434	31	140.9	2	21
TM Dilshan	13	418	41.8	122.58	4	13
JP Duminy	12	372	41.33	114.46	5	11
HH Gibbs	14	371	33.72	112.08	4	12
BJ Hodge	12	365	40.55	117.74	3	9
SR Tendulkar	13	364	33.09	120.13	2	10
RG Sharma	16	362	27.84	114.92	1	18

**Top 10 Batsmen of 2009 in FPC Ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s	FPC	Normal
ML Hayden	12	572	52	144.81	5	22	2.91369	1
AC Gilchrist	16	495	30.93	152.3	3	29	2.6787	2
SK Raina	14	434	31	140.9	2	21	1.67907	4
AB de Villies	13	465	51.66	130.98	3	12	1.63811	3
TM Dilshan	13	418	41.8	122.58	4	13	1.53454	5
JP Duminy	12	372	41.33	114.46	5	11	1.35333	6
HH Gibbs	14	371	33.72	112.08	4	12	1.19902	7
RG Sharma	16	362	27.84	114.92	1	18	0.94139	10
Yuvraj Singh	14	340	28.33	125.64	2	16	0.86941	12
BJ Hodge	12	365	40.55	117.74	3	9	0.85982	8

**Findings**

1. SK Raina and Hodge have normal rankings 4 and 8 respectively, yet their FPC-rankings are 3 and 10.
2. Raina scored 434 total runs with an average of 31 runs, and a strike rate of 140.9. He hit two-50s and 21 sixes.
3. Hodge scored a total of 514 runs with an average 40.55 runs, and a strike rate of 117.74. He hit three 50s and 9 sixes.
4. Clearly, Raina has higher strike rate and more sixes, while Hodge is not superior in terms of some of the variables that we considered in the analysis.
5. Therefore, Raina is ranked higher than Hodge.

**Top 10 Bowlers of 2009 in Normal ranking**

Name	Innings	Wickets	Average	Economy	Strike rat
RP Singh	16	23	18.13	6.98	15.5
A Kumble	16	21	16.52	5.86	16.9
A Nehra	13	19	18.21	6.78	16.1
SL Malinga	13	18	17.33	6.3	16.5
PP Ojha	15	18	19.33	6.5	17.8
IK Pathan	14	17	22.94	7.74	17.7
MM Patel	11	16	15.06	6.91	13
PJ Sangwan	13	15	24	7.71	18.6
DP Nannes	13	15	24.8	7.51	19.8
YA Abdulla	9	14	17.21	8.6	12

**Top 10 Bowlers of 2009 in FPC ranking**

Name	Innings	Wickets	Average	Economy	Strike rat	FPC	Normal
MM Patel	11	16	15.06	6.91	13	-1.38834	7
RG Sharma	12	11	14.63	7	12.5	-1.20781	20
A Kumble	16	21	16.52	5.86	16.9	-1.12668	2
SB Jakati	8	13	16.69	7.48	13.3	-1.01849	14
RP Singh	16	23	18.13	6.98	15.5	-0.95708	1
SL Malinga	13	18	17.33	6.3	16.5	-0.94558	4
YA Abdulla	9	14	17.21	8.6	12	-0.86832	10
A Nehra	13	19	18.21	6.78	16.1	-0.8384	3
PP Ojha	15	18	19.33	6.5	17.8	-0.49686	5
M Muralitha	13	14	18.64	5.22	21.4	-0.33748	11

**Findings**

1. RP Singh is ranked number 1 in the Normal rankings but appears at number 5 in the list of top ten bowlers when using the FPC method.
2. RP Singh took 23 wickets with an average of 18.13. His economy rate is 6.98, and his strike rate is 15.5.
3. On the other hand, MM Patel, ranks 1st in the FPC-ranking method who ranks 7 in the normal rankings. He took 16 wickets with an average of 15.06. His economy rate is 6.91, and his strike rate is 13.
4. So, MM Patel is better than RP Singh with respect to the strike rate variable, which is the average number of balls per wicket. It is true that a low strike rate is a desirable attribute.
5. However, MM Patel has a lower average, which is better since it represents the number of runs conceded per wicket. Moreover, RP Sigh has the lower economy rate, which is the average number of runs per over.
6. This justifies that MM Patel should be ranked higher than RP Singh

2010

**Top 10 Batsmen of 2010 in Normal ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s
SR Tendulka	15	618	47.53	132.61	5	3
JH Kallis	16	572	47.66	115.78	6	9
SK Raina	16	520	47.27	142.85	4	22
SC Ganguly	14	493	37.92	117.66	4	15
M Vijay	15	458	35.23	156.84	2	26
DPMD Jayaw	13	439	43.9	147.31	1	11
A Symonds	16	429	30.64	125.8	4	18
SS Tiwary	15	419	29.92	135.59	3	18
RG Sharma	16	404	28.85	133.77	3	14
NV Ojha	14	377	31.41	132.28	2	15

**Top 10 Batsmen of 2010 in FPC Ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s	FPC	Normal
SK Raina	16	520	47.27	142.85	4	22	2.06345	3
JH Kallis	16	572	47.66	115.78	6	9	1.78073	2
RV Uthappa	14	374	31.16	171.55	3	27	1.72011	11
M Vijay	15	458	35.23	156.84	2	26	1.68591	5
SR Tendulka	15	618	47.53	132.61	5	3	1.55757	1
A Symonds	16	429	30.64	125.8	4	18	1.40706	7
SC Ganguly	14	493	37.92	117.66	4	15	1.24631	4
SS Tiwary	15	419	29.92	135.59	3	18	1.20355	8
RG Sharma	16	404	28.85	133.77	3	14	1.05984	9
YK Pathan	14	333	27.75	165.67	1	24	1.0431	17

**Findings**

- Sachin Tendulkar and Raina have normal rankings 1 and 3 respectively, yet their FPC-rankings are 5 and 1.
- Sachin scored 618 total runs with an average of 47.53 runs, and strike rate of 132.61. He hit five-50s and 3 sixes.
- Raina scored a total of 520 runs with an average 47.27 runs, and a strike rate of 142.85. He hit four 50s and 22 sixes.
- Clearly, Raina has higher strike rate and more sixes, while Sachin is not superior in terms of some of the variables that we considered in the analysis.
- Therefore, Raina is ranked higher than Sachin

**Top 10 Bowlers of 2010 in Normal Ranking**

Name	Innings	wickets	Average	Economi	Strikerate
PP Ojha	16	21	20.42	7.29	16.8
A Mishra	14	17	21.35	6.84	18.7
Harbhajan S	14	17	22.17	7.04	18.8
A Kumble	16	17	23.94	6.42	22.3
R Vinay Kurr	14	16	24.75	8.57	17.3
KA Pollard	12	15	18.26	7.4	14.8
M Muralitha	12	15	21.93	6.85	19.2
SL Malinga	13	15	22.93	7.02	19.6
Z Khan	14	15	25.06	7.77	19.3
DW Steyn	15	15	27.06	6.88	23.6

**Top 10 Bowlers of 2010 in FPC Ranking**

Name	Innings	Wickets	Average	Economi	Strike art	FPC	Normal
RJ Harris	8	14	16.64	7.59	13.1	-1.55488	12
DE Bollinger	8	12	17.25	6.67	15.5	-1.34919	17
KA Pollard	12	15	18.26	7.4	14.8	-1.17759	6
PP Ojha	16	21	20.42	7.29	16.8	-1.15036	1
A Mishra	14	17	21.35	6.84	18.7	-0.81304	2
Harbhajan S	14	17	22.17	7.04	18.8	-0.70463	3
M Muralitha	12	15	21.93	6.85	19.2	-0.68497	7
SB Jakati	11	13	22.38	7.65	17.5	-0.5091	13
SL Malinga	13	15	22.93	7.02	19.6	-0.48206	8
R Ashwin	12	13	22.53	6.1	22.1	-0.39619	14

**Findings**

- Ojha is ranked number 1 in the Normal rankings but appears at number 4 in the list of top ten bowlers when using the FPC method.
- Ojha took 21 wickets with an average of 20.42. His economy rate is 7.29, and his strike rate is 16.28.
- On the other hand, Pollard, ranks 3rd in the FPC-ranking method who ranks 6th in the normal rankings. He took 15 wickets with an average of 18.76. His economy rate is 7.4, and his strike rate is 16.8.
- So, Pollard is better than ojha with respect to the economic rate variable, which is the number of runs given for total balls bowled. It is true that a low economic rate is a desirable attribute.
- However, pollard has a lower average, which is better since it represents the number of runs conceded per wicket. Moreover, pollard has the lower economy rate, which is the average number of runs per over.
- This justifies that Pollard should be ranked higher than Ojha.

2011

**Top 10 Batsmen of 2011 in Normal Ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s
CH Gayle	12	608	67.55	183.13	3	44
V Kohli	16	557	46.41	121.08	4	16
SR Tendulka	16	553	42.53	113.31	2	5
SE Marsh	13	504	42	146.51	4	20
MEK Hussey	14	492	41	118.84	4	6
PC Valthaty	14	463	35.61	136.98	2	20
SK Raina	16	438	31.28	134.76	4	17
M Vijay	16	434	27.12	128.02	3	20
V Sehwag	11	424	38.54	176.66	2	18
JH Kallis	14	424	35.33	112.16	4	6

**Top 10 Batsmen of 2011 in FPC Ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s	FPC	Normal
CH Gayle	12	608	67.55	183.13	3	44	3.82501	1
SE Marsh	13	504	42	146.51	4	20	1.31424	4
V Sehwag	11	424	38.54	176.66	2	18	1.07487	9
V Kohli	16	557	46.41	121.08	4	16	1.05848	2
MS Dhoni	13	392	43.55	158.7	2	23	1.00111	14
S Badrinath	13	396	56.57	126.51	5	9	0.76993	12
PC Valthaty	14	463	35.61	136.98	2	20	0.55631	6
SK Raina	16	438	31.28	134.76	4	17	0.41747	7
MEK Hussey	14	492	41	118.84	4	6	0.27027	5
M Vijay	16	434	27.12	128.02	3	20	0.15935	8

**Findings**

- Virat kohli and marsh have normal rankings 2 and 4 respectively, yet their FPC-rankings are 4 and 2.
- Kohli scored 557 total runs with an average of 46.41runs, and a strike rate of 121.08. He hit four-50s and 16 sixes.
- Shaun marsh scored a total of 504 runs with an average 42 runs, and a strike rate of 146.51. He hit four 50s and 20 sixes.
- Clearly, marsh has higher strike rate and more sixes, while Kohli is not superior in terms of some of the variables that we considered in the analysis.
- Therefore, marsh is ranked higher than Kohli

**Top 10 Bowlers of 2011 in Normal Ranking**

Name	Innings	Wicket	Average	Economi	Strike rat
SL Malinga	16	28	13.39	5.95	13.5
MM Patel	15	22	16.27	6.58	14.8
S Aravind	13	21	17.52	8	13.1
R Ashwin	16	20	19.4	6.15	18.9
A Mishra	14	19	18.84	6.71	16.8
DE Bollinger	13	17	19.35	7	16.5
R Sharma	14	16	17.06	5.46	18.7
Iqbal Abdull	15	16	19.06	6.1	18.7
PP Chawla	12	16	21	8.12	15.5
RJ Harris	13	16	23.87	8.12	17.6

**Top 10 Bowlers of 2011 in FPC Ranking**

Name	Innings	Wickets	Average	Economi	Strike rat	FPC	Normal
SL Malinga	16	28	13.39	5.95	13.5	-2.50942	1
MM Patel	15	22	16.27	6.58	14.8	-1.54744	2
S Aravind	13	21	17.52	8	13.1	-1.08416	3
R Ashwin	16	20	19.4	6.15	18.9	-1.02018	4
R Sharma	14	16	17.06	5.46	18.7	-0.89993	7
A Mishra	14	19	18.84	6.71	16.8	-0.89549	5
Iqbal Abdull	15	16	19.06	6.1	18.7	-0.69243	8
DE Bollinger	13	17	19.35	7	16.5	-0.60261	6
YK Pathan	14	13	18.3	6.1	18	-0.49897	15
Shakib Al Ha	7	11	15.9	6.86	13.9	-0.21498	21

**Findings**

- Sharma is ranked number 7 in the Normal rankings but appears at number 5 in the list of top ten bowlers when using the FPC method.

- Sharma took 16 wickets with an average of 17.06. His economy rate is 5.49, and his strike rate is 18.7.
- On the other hand, Mishra ranks 6th in the FPC-ranking method who ranks 5th in the normal rankings. He took 19 wickets with an average of 18.84. His economy rate is 6.71, and his strike rate is 16.8.
- So, Mishra is better than Sharma with respect to the economic rate variable, which is the number of runs given for total balls bowled. It is true that a low economic rate is a desirable attribute.
- However, Mishra has a lower average, which is better since it represents the number of runs conceded per wicket. Moreover, Mishra has the lower economy rate, which is the average number of runs per over.
- This justifies that Mishra should be ranked higher than Sharma

**2012**

**Top 10 Batsmen of 2012 in Normal Ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s
CH Gayle	14	733	61.08	160.74	7	59
G Gambhir	17	590	36.87	143.55	6	17
S Dhawan	15	569	40.64	129.61	5	18
AM Rahane	16	560	40	129.33	3	10
V Sehwag	16	495	33	161.23	5	19
CL White	13	479	43.54	149.68	5	20
R Dravid	16	462	28.87	112.13	2	4
SK Raina	18	441	25.94	135.69	1	19
RG Sharma	16	433	30.92	126.6	3	18
Mandeep Si	16	432	27	126.31	2	7

**Top 10 Batsmen of 2012 in FPC Ranking**

Name	Innings	Runs	Average	Strike rat	50s	6s	FPC	Normal
CH Gayle	14	733	61.08	160.74	7	59	3.63913	1
G Gambhir	17	590	36.87	143.55	6	17	1.21328	2
CL White	13	479	43.54	149.68	5	20	1.14981	6
V Sehwag	16	495	33	161.23	5	19	1.08359	5
S Dhawan	15	569	40.64	129.61	5	18	0.93617	3
KP Pieterse	8	305	61	147.34	1	20	0.60475	26
AB de Villier	13	319	39.87	161.11	3	15	0.46652	25
AM Rahane	16	560	40	129.33	3	10	0.42541	4
DJ Bravo	16	371	46.37	140.53	0	20	0.18636	15
F du Plessis	12	398	33.16	130.92	3	17	0.07575	13

**Findings**

- CL White and Dhawan have normal rankings 6 and 3 respectively, yet their FPC-rankings are 3 and 5.
- White scored 479 total runs with an average of 43.54runs, and a strike rate of 149.68. He hit five-50s and 20 sixes.

- Shikhar Dhawan scored a total of 569 runs with an average 40.64 runs, and a strike rate of 129.61. He hit five 50s and 19 sixes.
- Clearly, white has higher strike rate and more sixes, while Dhawan is not superior in terms of some of the variables that we considered in the analysis.
- Therefore, White is ranked higher than Dhawan.

#### Top 10 Bowlers of 2012 in Normal Ranking

Name	Innings	Wickets	Average	Economy	Strike rate
SP Narine	15	24	13.5	5.47	14.7
SL Malinga	14	22	15.9	6.3	15.1
UT Yadav	17	19	23.84	7.42	19.2
R Vinay Kumar	14	19	25.26	8.59	17.6
DW Steyn	12	18	15.83	6.1	15.5
P Awana	12	17	21.88	7.91	16.5
Z Khan	15	17	26.64	7.55	21.1
KA Pollard	14	16	21.87	7.98	16.4
PP Chawla	16	16	26.18	7.35	21.3
M Muralitha	10	15	17.33	6.5	16

#### Top 10 Bowlers of 2012 in FPC ranking

name	Innings	Wickets	Average	Economy	Strike rate	FPC	Normal
SP Narine	15	24	13.5	5.47	14.7	-1.93655	1
SL Malinga	14	22	15.9	6.3	15.1	-1.48527	2
DW Steyn	12	18	15.83	6.1	15.5	-1.37984	5
BW Hilfenh	9	14	16.64	6.85	14.5	-1.18544	14
M Muralitha	10	15	17.33	6.5	16	-1.0879	10
P Awana	12	17	21.88	7.91	16.5	-0.39699	6
A Ashish Re	9	11	21.54	8.72	14.8	-0.18826	20
KA Pollard	14	16	21.87	7.98	16.4	-0.17245	8
Azhar Mahr	11	14	23.5	7.71	18.2	-0.06201	15
MM Patel	12	15	24.46	7.86	18.6	0.07776	11

#### Findings

- Steyn is ranked number 5th in the Normal rankings but appears at number 3 in the list of top ten bowlers when using the FPC method.
- Steyn took 18 wickets with an average of 15.83. His economy rate is 6.1, and his strike rate is 15.5.
- On the other hand, Muralitharan, ranks 5th in the FPC-ranking method who ranks 10th in the normal rankings. He took 15 wickets with an average of 17.33. His economy rate is 6.5, and his strike rate is 16.6.
- So, Steyn is better than Muralitharan with respect to the economic rate variable, which is the number of runs given for total balls bowled. It is true that a low economic rate is a desirable attribute.
- However, Steyn has a lower average, which is better since it represents the number of runs

conceded per wicket. Moreover, Muralitharan has the lower economy rate, which is the average number of runs per over.

- This justifies that Steyn should be ranked higher than Muralitharan.

#### 2013

#### Top 10 Batsmen of 2013 in Normal Ranking

Name	Innings	Runs	Average	Strike rate	50s	6s
MEK Hussey	17	733	52.35	129.5	6	17
CH Gayle	16	708	59	156.29	4	51
V Kohli	16	634	45.28	138.73	6	22
SK Raina	17	548	42.15	150.13	4	18
SR Watson	16	543	38.78	142.89	2	22
RG Sharma	19	538	38.42	131.54	4	28
KD Karthik	19	510	28.33	124.08	2	14
AM Rahane	18	488	34.85	106.55	4	11
R Dravid	17	471	29.43	110.82	4	5
MS Dhoni	16	461	41.9	162.89	4	25

#### Top 10 Batsmen of 2013 in FPC Ranking

Name	Innings	Runs	Average	Strike rate	50s	6s	FPC	Normal
CH Gayle	16	708	59	156.29	4	51	2.39625	2
MEK Hussey	17	733	52.35	129.5	6	17	1.45348	1
V Kohli	16	634	45.28	138.73	6	22	1.25591	3
DA Miller	12	418	59.71	164.56	3	24	0.95447	14
MS Dhoni	16	461	41.9	162.89	4	25	0.86651	10
SK Raina	17	548	42.15	150.13	4	18	0.77583	4
RG Sharma	19	538	38.42	131.54	4	28	0.76523	6
KA Pollard	18	420	42	149.46	3	29	0.65811	13
SR Watson	16	543	38.78	142.89	2	22	0.38688	5
AJ Finch	14	456	32.57	135.71	4	16	0.02845	11

#### Findings

- Chris Gayle and Hussey have normal rankings 2 and 1 respectively, yet their FPC-rankings are 1 and 2.
- Gayle scored 708 total runs with an average of 59 runs, and a strike rate of 156.29. He hit four-50s and 51 sixes.
- Mike Hussey scored a total of 733 runs with an average 52.35 runs, and a strike rate of 129.5. He hit six 50s and 17 sixes.
- Clearly, Gayle has higher strike rate and more sixes, while Hussey is not superior in terms of some of the variables that we considered in the analysis.
- Therefore, Gayle is ranked higher than Hussey.

**Top 10 Bowlers of 2013 in Normal Ranking**

Name	Innings	wickets	Average	Economi	Strike rat
DJ Bravo	18	32	15.53	7.95	11.7
JP Faulkner	16	28	15.25	6.75	13.5
Harbhajan Si	19	24	19	6.51	17.5
MG Johnson	17	24	19.12	7.17	16
R Vinay Kum	16	23	21.43	8.19	15.6
SP Narine	16	22	15.9	5.46	17.4
A Mishra	17	21	18.76	6.35	17.7
MM Sharma	15	20	16.3	6.43	15.2
SL Malinga	17	20	23.4	7.16	19.6
DW Steyn	17	19	20.21	5.66	21.4

**Top 10 Bowlers of 2013 in FPC Ranking**

Name	Innings	Wickets	Avarege	Economi	Strike rat	FPC	Normal
DJ Bravo	18	32	15.53	7.95	11.7	-1.98003	1
JP Faulkner	16	28	15.25	6.75	13.5	-1.61152	2
Harbhajan Si	19	24	19	6.51	17.5	-1.08042	3
SP Narine	16	22	15.9	5.46	17.4	-1.07132	6
MG Johnson	17	24	19.12	7.17	16	-0.89003	4
MM Sharma	15	20	16.3	6.43	15.2	-0.82722	8
A Mishra	17	21	18.76	6.35	17.7	-0.71941	7
R Vinay Kum	16	23	21.43	8.19	15.6	-0.42113	5
DW Steyn	17	19	20.21	5.66	21.4	-0.29763	10
SL Malinga	17	20	23.4	7.16	19.6	-0.03206	9

**Findings**

- Narine is ranked number 6th in the Normal rankings but appears at number 4th in the list of top ten bowlers when using the FPC method.
- Narine took 16 wickets with an average of 15.9. His economy rate is 5.46, and his strike rate is 17.4.
- On the other hand, Johnson, ranks 5th in the FPC-ranking method who ranks 4th in the normal rankings. He took 17 wickets with an average of 19.22. His economy rate is 7.17, and his strike rate is 16.
- So, Narine is better than Johnson with respect to the economic rate variable, which is the number of runs given for total balls bowled. It is true that a low economic rate is a desirable attribute.
- However, Narine has a lower average, which is better since it represents the number of runs conceded per wicket. Moreover, Johnson has the lower economy rate, which is the average number of runs per over.
- This justifies that Narine should be ranked higher than Johnson

**CONCLUSION**

To summarize, a simple yet straightforward method for analyzing the overall performance of IPL players from 2008 to 2017 is the proposed method based on principal component analysis. It is transparent and can be directly applied to the type of correlated data

routinely found in cricket as well as in other team Sports. Comparison of PCA method with leading run scorers and leading wicket takers normal ranking list gives different ranking based on considering overall performance. The ability of the first principal component method to consistently capture a significant proportion of variability in the cricket athletic performance is the key strength of the proposed method, which offers a transparent alternative or serves as an additional measure.

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