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Form - A new cricket statistics

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Abstract: Traditionally, evaluation of individual player performances in one-day cricket and T -20 has been based on measures such as batting and bowling averages, and strike and economy rates. Whenever a player's performance statistics are quoted, there is nearly always some verbal qualification that is necessary in order to place the statistics into context. We have found a new statistical measure –FORM, which measures the form of a player. We have used what is known as an *exponentially decaying average (EDMA)*. In this statistic, every score is considered in the calculation, but as you go back in time, each score is discounted by a certain percentage. This means recent score is given highest importance and past scores are given less weightage. Simple logic of short term EDMA and long term EDMA is used for calculating FORM. FORM of individual players is vital as the success of the team depends on the number of players who are in form. It can be used to estimate the total team score.

Keywords: Moving Average, Weighted Moving Average, Exponentially Decaying Averages

1. Introduction

Traditionally, evaluation of individual player performances in one-day cricket and T -20 has been based on measures such as batting and bowling averages, and strike and economy rates. Use of Statistics in sports is not new and cricket is a sport in which statistics features heavily. Cricket has recently experienced a highly-successful intervention from the field of Operational Research in the form of the 'Duckworth-Lewis' method of adjusting target scores in one day matches (Duckworth & Lewis, 1998) which was subsequently adopted by the International Cricket Council (Duckworth & Lewis,2004). Player performance remains of significant interest to cricket team selectors and coaches who are trying to build winning teams from a fixed pool of players or within a limited budget, and this imperative to win will probably lead to developments in the use of cricket statistics – at least among cricket professionals. Measuring cricketers only through their averages is liable to give skewed and unreliable results.

Barr G.D.I. and Kantor B.S. (2004) has discussed a criterion for comparing and selecting batsman in limited over cricket and Kimber A.C. and Hansford A.R. (1993) has given a Statistical Analysis of Batting in Cricket. But it is recognized, within the game of cricket, that such measures have severe limitations in assessing the true performances and abilities of players.

Lewis A.C. (2006) has tried to develop a fairer measure of player's performance in one-day cricket. This measure still does not evaluate the consistency of the batsman.

Lemmer H. H. (2004) in his paper has shown the importance of batsman's consistency. He has discussed the consistency coefficient and also illustrated its importance by showing that a batsman with a high consistency coefficient has a better chance to get a good score than one with a low consistency coefficient. He has also shown how the consistency curve can be used to assess the present form of a batsman. He by making use of a data set consisting of the statistics of a large group of one-day international players, these three measures will be combined into a single measure that can be used to assess the performance of a batsman and to compare different batsmen with each other. A classification scheme with ten classes according to which batsmen can be classified will be given. The best batsmen are those who fall into class one. The same procedure will be used to find a formula for batting performance and a classification table for Test players. Whenever a player's performance statistics are quoted, there is nearly always some verbal qualification that is necessary in order to place the statistics into context.

David Harper (2009) has explained the use of exponentially

weighted moving average in the finance domain particularly on stock market data. Chris P. Tsokos (2010) has discussed K-th Moving, Weighted and Exponential Moving Average for Time Series Forecasting Models.

2. Methodology

In current scenario, runs scored in the innings in which batsman remains not out are considered in the total runs scored by the batsman but while calculating the average that innings is not considered in total number of innings. This actually overestimates the batsman's performance. And if not out runs are considered as out runs, it underestimates the batsman's performance.

To overcome this drawback of existing average, we have considered a new logic for the average.

If not out runs > = average then consider not out runs in his total runs and

If not out runs < average then consider average in his total runs.

This logic will solve the problem of overestimation or under estimation.

To illustrate this logic of new batting average let us consider runs scored by a batsman new to international cricket in ten innings : 25, 15, 55*, 25, 32*, 6, 65, 89, 12, 21. * represent that the batsman is not out in that innings.

Table 1. *Calculation of new batting average.*

Innings	Runs	Runs to be added in total runs	Cumulative Runs	New batting Average
1	25	25	25	25.00
2	15	15	40	20.00
3	55	55	95	31.67
4	40	40	135	33.75
5	32*	34	169	33.80
6	6	6	175	29.17
7	65*	65	240	34.29
8	89	89	329	41.13
9	12*	41	370	41.11
10	21	21	391	39.10

Here in Table 1 you can see that in fifth innings he has scored 32 runs and was not out. Upto four innings his batting average was 33.75. As his runs (32) < his batting average (33.75), runs that will be added in his total runs will be 34 after rounding off to nearest integer. While in seventh innings he scored 65 runs and was not out and upto 6 innings his batting average was 29.17. As his runs (65) > his batting average (29.17), runs that will be added in his total runs will be 65.

The batsman is evaluated on the basis of their batting average only or at most their strike rates. But in this batting average simple average is used which gives equal weightage to runs scored in all innings. But for calculating Form of a batsman, latest score should be given more weightage and weights decreases for the past innings. This can be done with the use of *exponentially decaying average*. In this statistic, every score is considered in the calculation, but as you go back in time, each value is discounted by a certain percentage.

Exponentially decaying Moving Averages (EDMA) are widely used in financial mathematics to track the recent average behavior of stocks. EDMA's are generally used in systems where the first seen value is of little importance compared to the last seen value. So we calculate the average by assigning different weights to the moving average scale. But the underlying awesomeness of EDMA is that it decays exponentially.

Simple avg. = Sum of samples / Number of samples.

EDMA = (current EDMA.) * k / sample * (1.00 – k)

There are several implementations of EDMA of which this is one. Here k = decay factor or constant smoothing factor.

Many times you might have heard commentators saying this batsman is in form or is not in form. But form of a batsman was never quantified. For the first time we are developing a statistics which will quantify FORM of a batsman. These statistics can be used as other statistics like batting average, strike rate etc i.e. at a particular point of time.

FORM of individual players is vital as the success of the team depends on the number of players who are in form. FORM can also be used in predicting the performance of the team. In this paper we have considered batsmen FORM only but similar work can be done for bowlers and wicket-keepers. For calculating the FORM of a batsman we have considered five (short term) and eleven matches (Long term) exponentially decaying moving averages of runs scored. The not-out scores are replaced by the average till that match or the not-out runs whichever is higher.

The FORM of a batsman is given as:

FORM= (Short term EDMA) / (Long term EDMA)*100

We have considered FORM in terms of percentage. So, 100 will be considered as a Base of comparison.

3. Results & Discussion

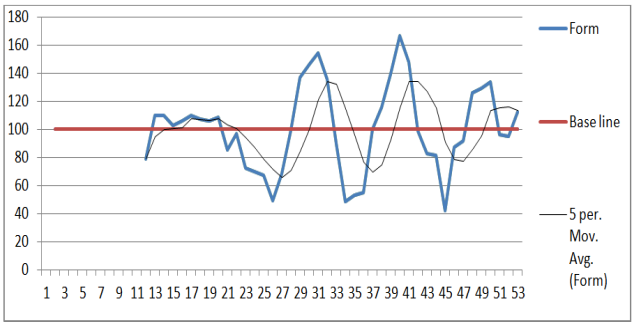
To illustrate how FORM can be calculated we have taken the data of runs scored by Sachin in last 50 innings from *www.cricinfo.com* website. Here we will assume 4 % decay rate and 5 matches and 11 matches exponentially decaying moving average as short term and long term exponentially decaying moving averages respectively.

Table 2. *Calculation of FORM for Sachin.*

Runs	5 EDMA	11 EDMA	FORM
99			
8			
55			
71			
94			
30			
0			
16			
43			

Runs	5 EDMA	11 EDMA	FORM
79			
47	38.26619	48.54623	78.82423
72	52.33453	47.57898	109.9951
21	51.96442	47.43323	109.5528
4	43.15638	42.09682	102.517
99	48.92318	46.34891	105.5541
29	44.94651	41.06789	109.4444
97	51.44496	48.03338	107.1025
30	52.17704	49.42916	105.5592
10	51.54987	47.42857	108.6895
35	39.58211	46.36686	85.36723
44	42.40861	43.80223	96.81839
32	30.50984	42.27158	72.17578
5	25.07313	36.05251	69.54616
0	22.30368	33.12843	67.3249
2	15.662	31.74215	49.34132
63	20.91192	30.45193	68.67189
117	39.77092	40.12405	99.11991
91	57.01221	41.73566	136.6031
11	57.1149	39.1654	145.83
50	65.30964	42.4216	153.9537
5	52.65139	38.80762	135.6728
6	31.17689	34.81365	89.55365
7	15.37099	31.93684	48.12934
20	17.14602	32.51792	52.72792
61	20.84336	37.962	54.90587
163	54.44075	54.32534	100.2124
46	61.16923	52.79263	115.867
27	63.33551	45.4096	139.4761
138	87.16711	52.43002	166.2542
8	74.63783	50.44111	147.9703
14	45.89107	46.44293	98.81175
4	36.79602	44.67464	82.36443
32	37.48744	46.00249	81.49003
40	20.27598	48.09121	42.16151
175	55.96594	64.10596	87.30223
10	53.42069	58.34264	91.56372
69	65.52628	52.13532	125.685
43	66.56841	51.55819	129.1132
96	77.63823	58.20522	133.3871
8	45.3517	47.02287	96.44605
4	42.63772	45.01967	94.70908
200	72.07371	64.34497	112.0114

** 5 EDMA: Exponentially decaying moving average of 5 matches. 11EDMA: Exponentially decaying moving average of 11 matches.



4. Conclusion

In calculating current batting average not out runs are added in total career runs but innings is not counted. This results in overestimation of average. The new batting average that we have developed solves this problem of overestimation.

When short term EDMA is more than long term EDMA it shows that batsman is scoring well in recent matches compared to long past matches. So when this situation arise, the FORM will be more than 100 and we can say that batsman is in good form and when it is less than 100, we say he is not in good form.

It can also be observed that FORM is cyclic in nature. Using the trend analysis, we can also predict the FORM of the batsman. This will help in estimating the expected total runs of the team.

Similar measure can be obtained for the bowlers.

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