Comment on "ranking cricket teams"

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A R T I C L E   I N F O

A B S T R A C T

The paper by Daud, Muhammad, Dawood and Dawood (2015), presented four techniques for cricket team ranking i.e., Team-index(t-index), TeamRank(TR), Weighted Team-Rank(WTR) and Unified weighted TeamRank (UWTR). While analyzing t-index and WTR, some inconsistencies are observed. In this paper, we have revisited t-index and WTR and presented the corrections for observed inconsistencies.

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1. Introduction

Daud, Muhammad, Dawood, and Dawood (2015), presented four methodologies for team ranking termed as Team-index(t-index), TeamRank(TR), Weighted TeamRank(WTR) and Unified weighted TeamRank (UWTR). During the study and analysis of presented techniques we have identified issues in two of them i.e., t-index and WTR. The identified errors are categorized as calculation, factual, nomenclature and conceptual errors. The identified errors are not only corrected but suggested improvements are presented as well.

2. Analysis of t-index proposed by Daud et al. (2015)

In order to rank cricket teams, Daud et al. (2015) proposed t-index by adopting h-index (Hirsch, 2005) i.e., $\sqrt{\frac{N_c T}{a}}$. To achieve their goal, they used sum of match winning margins, runs and wickets, for representing $N_c T$ and was defined as:

$$N_c T = T1 + T2 \tag{1}$$

where T1 and T2 were aggregations of winning margins in terms of wickets and runs respectively. They presented an example whose data was shown in Table 1(Team A) and (Team B) (Daud et al., 2015) and t-index score was calculated using:

$$\text{t-index} = \frac{\sqrt{T1 + T2}}{2} \tag{2}$$

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2.1. Calculation error and suggestions for correction

Daud et al. (2015) solved their example using (2) and it's parameters were:

$$T1 = \frac{\sqrt{\text{Total Number of wickets}}}{2} \tag{3}$$

$$T2 = \frac{\sqrt{\text{Total Number of runs}}}{2} \tag{4}$$

Table 1(Team A) (Daud et al., 2015) showed total number of wickets were 48 while Table 1(Team B) (Daud et al., 2015) resulted total number of runs as 470. The values of T1 and T2 were calculated as:

$$T1 = \frac{\sqrt{48}}{2} = \frac{6.928}{2} = 3.46$$

$$T1 = \frac{\sqrt{470}}{2} = \frac{21.68}{2} = 10.83$$

The calculated value of t-index was:

$$\text{t-index} = \frac{\sqrt{T1 + T2}}{2} = \frac{\sqrt{3.46 + 10.83}}{2} = 7.14 \tag{5}$$

The calculated value of t-index by Daud et al. (2015) is wrong and it's correct value is:

$$\text{t-index} = \frac{\sqrt{T1 + T2}}{2} = \frac{\sqrt{3.46 + 10.83}}{2} = 1.89$$

The t-index score calculated by Daud et al. (2015) as shown in (5) are actually the outcome of following statements:

$$\text{t-index} = \frac{T1 + T2}{2} \tag{6}$$

$$T1 = \frac{\sqrt{\text{Number of Wickets}}}{2} = \frac{\sqrt{48}}{2} = \frac{6.928}{2} = 3.46 \tag{7}$$

$$T2 = \frac{\sqrt{\text{Number of Runs}}}{2} = \frac{\sqrt{470}}{2} = \frac{21.68}{2} = 10.83 \tag{8}$$

Subtituting the values of T1 and T2 from (7) and (8) in (6) the t-index score is,

$$\text{t-index} = \frac{3.46 + 10.83}{2} = 7.14$$

3. Analysis of Weighted TeamRank (WTR) by Daud et al. (2015)

Weighted TeamRank(WTR) was proposed by Daud et al. (2015) as an extension of their technique TR which was an adoption of page rank algorithm (Page, Brin, Motwani, & Winograd, 1999). The WTR score of a team "A" was calculated using the following expression:

$$WTR(A) = \frac{1-d}{N} + d \left[\frac{WTR(T_i)}{WC(T_i)} + \ldots + \frac{WTR(T_n)}{WC(T_n)} \right] \tag{9}$$

Where $T_i, T_{i+1}, \ldots, T_n$ represented the teams which played and lost at least one match against "A". Authors defined $WTR(T_i)$, Weighted TR, as the number of matches won by "A" against team T_i. While $WC(T_i)$ was defined as number of matches lost by team T_i against all the teams. While calculating $WC(T_i)$, different weights were assigned to features used in it i.e.,

$$WC(T_i) = \frac{60(matches) + 20(runs) + 20(wickets)}{matches + runs + wickets} \tag{10}$$

Where "matches" represent number of matches lost by T_i from all teams, "runs" was the sum of losing margin of team T_i when it batted second and lost those matches, "wickets" represented an aggregate of losing margin for team T_i in terms of wickets when team T_i batted first and lost the matches. Authors mentioned that they have used 60% weight for "matches" and 20% each for "runs" and "wickets". They presented an example using values of $WC(T_i)$ i.e., "A and B are two teams and both of the teams have lost 10 matches each. Team A lost its matches with the sum of runs as 200 and wickets 30. The aggregate losing margin of team B in terms of runs is 100 and for wickets it is 15". The contribution made by team A and B in calculating rank of a team, if both the teams lost against T was calculated by Daud et al. (2015) and showed it in Table 2(Team B) (Daud et al., 2015) i.e.,