

# Author Response Information for Submission 64

## Response Letter(s)

### Response Letter

As we do not have much space, we first answer general questions raised by two or more reviewers and then some specific issues.

1) Problem too narrow and solutions too specific to sport social networks.

Although we focused in one domain, the problem (i.e., ranking of network nodes) and solution (i.e., time decaying edge weights coupled with PageRank) has a fairly broad context. Ranking is a fundamental problem of many networks. Our solution is based on temporal events between nodes that are characterized by some type of advantage of one node over the other. The events can be any type of dispute or conflict of interest between pairs of nodes that, when resolved, gives advantage to one of the nodes. Alternatively, the conflicts could represent win-win situations where both nodes receive (non-equal) benefits. Other examples would be law firms (nodes) and judicial disputes (edges with time-decaying weights) or scientific collaboration between paper co-authors (edges with time-decaying weights). We have included these comments in the conclusions.

2) Comparison with T-Rank

There are significant conceptual differences between our approach and T-Rank and similar methods. They work on the algorithmic level and their solutions are hard-coded. We, otherwise, work on the data engineering level, modifying certain aspects of the data representation. Thus, we are potentially much more flexible and adaptable to different domains and applications, by modifying the parameterization via alpha, or changing the type of decaying function.

#### Response:

We included this argument in the related work and more thorough comparisons with other methods as future work.

3) Issues related to the alpha parameter.

We in fact do not provide an out-of-the-box way to choose the alpha parameter. However, we think that may there not be a single best alpha for all cases, it depends on how much of the past we want to carry to the predictions of the ranks. This depends ultimately in the current rules of the competition. In this sense, this may be thought as a flexibility of the method, since rules may change (in fact, depending on the sport, a lot). Also, we have seen in some cases (e.g., MMA) that the best values of alpha are in a short range, with at most three best possible values to look for.

In any case, we are working on ways to improve this aspect, which we consider an important future work.

Response to reviewer#1's comment regarding problems with the MMA data and gold standard: We do not consider that the MMA data had problems; we only mentioned peculiar aspects of this sport that guided our experiments. Regarding the gold standard, it's an aggregation of 25 rankings with credibility among the participants of the sport, so we think it's trustable.

Response to reviewer#3's regarding the decaying function: We tested with other functions, and none produced better results. The reason is that, in this type of network, recent events are the most important to determine the best athletes in a certain point in time. For other applications this may change.

<b>Time:</b>	Aug 1, 02:11 GMT
<b>Letter:</b>	<p>Dear [*FIRST-NAME*],</p> <p>Thank you for your submission to SBBB 2012. The SBBB 2012 review response period will be between today and July 29th.</p> <p>During this time, you will have access to the current state of your reviews and have the opportunity to submit a response of up to 500 words AND the revised version of your paper. Please keep in mind the following during this process:</p> <ul style="list-style-type: none"> <li>* The response must focus on any factual errors in the reviews and any questions posed by the reviewers. It must not provide new research results or reformulate the presentation. Try to be as concise and to the point as possible.</li> <li>* The program committee will read your responses carefully and take this information into account during the discussions. On the other hand, the program committee will not directly respond to your responses, either before the program committee meeting or in the final versions of the reviews.</li> <li>* Your response will be seen by all PC members who have access to the discussion of your paper, so please try to be polite and constructive.</li> </ul> <p>The reviews on your paper are attached to this letter. To submit your response you should log on the EasyChair Web site for SBBB 2012 and select your submission on the menu.</p> <p>Best wishes,</p> <p>Marco</p> <p>[*REVIEWS*]</p>
<b>Time:</b>	Jul 16, 16:46 GMT

## Reviews

### Review 1

Overall rating: **-1** (weak reject)

IN THE CASE OF A  
FULL PAPER IT MAY BE  
NOMINATED FOR BEST 1 (No)  
PAPER: from 1

(lowest) to 2 (highest)

IN THE CASE OF A  
SHORT PAPER THIS  
SUBMISSION MAY BE  
INVITED TO SEND AN 1 (No)  
EXTENDED VERSION

TO JIDM?: from 1  
(lowest) to 2 (highest)

IF THE PAPER WILL  
NOT BE ACCEPTED IN  
THIS EVALUATION  
PHASE A NEW

REVISED VERSION  
MAY BE CONSIDERED  
IN THE REBUTAL  
PHASE?: from 1  
(lowest) to 2 (highest)

1 (No)

RELEVANCE TO SBBD:  
from 1 (lowest) to 7  
(highest)

2 (Reject)

TECHNICAL QUALITY:  
from 1 (lowest) to 7  
(highest)

3 (Weak Reject)

ORIGINALITY: from 1  
(lowest) to 7 (highest)

3 (Weak Reject)

AUDIENCE APPEAL:  
from 1 (lowest) to 7  
(highest)

2 (Reject)

PRESENTATION: from  
1 (lowest) to 7  
(highest)

6 (Accept)

IMPACT OF THE IDEAS  
AND RESULTS: from 1  
(lowest) to 5 (highest)

2 (Reject)

The paper presents a ranking method that is based on representing competitors as nodes in a network where edges represent winners and losers of direct confronts. The ranking of the nodes comes out of PageRank, except that edge weights are both cumulative, representing victories of competitors in direct matches, and time-decaying, accounting for recency of confronts. The method has one parameter,  $\alpha$ , which controls the speed with which the edge weights decay.

The method per se is a direct application of a known idea (i.e., PageRank), and not unlike previous time-aware PageRank formulations. Similarly, other previous work on ranking sports competitors have been proposed and discussed in the paper. The main difference w.r.t. related work is on the kinds of data used or the way that time is interpreted in the network (e.g., as in T-Rank), and the method for comparing the rankings.

The paper validates the ranking scheme in two ways. On a martial arts dataset (MMA), the validation takes into account the whole history of the sport, and divides competitors by category. On a tennis dataset (ATP), the network of confronts is split temporally. The experimental validation offered in the paper consists of recall and ranking correlation with external sources. For the case of MMA, the ranking is that of a newspaper, whereas for ATP the rankings used are the official ones, computed according to a well understood formula.

Review:

In summary, this paper presents the results of a data analysis exercise to investigate whether the proposed framework of building the network and applying the modified PageRank strategy leads to something that resembles the external rankings. Besides the limited set of potential applications, two problems with the methodology limit the papers' appeal.

First, for the MMA experiment, the paper illustrates problems with the data (e.g., the same fighter may belong to different categories on different organizations), and simplifications needed to deal with these problems. However, the external ranking is rather subjective (one can safely bet that that ranking being from the USA today, N. American competitors would rank more prominently, for instance). With all that, it is hard to assess what is the importance of being able to reproduce that

ranking.

The results presented in the paper paint a rather discouraging picture, in the sense that acceptable can be found in many cases, but there are many exceptions to that rule. Moreover, the best results come with a wide range for the parameter  $\alpha$ . In fact, the main observations/conclusions in the paper are just that the method can work in some cases.

As is, the paper does not make a strong case for why this research is either hard or relevant.

## Review 2

Overall rating: **1 (weak accept)**

IN THE CASE OF A FULL PAPER IT MAY BE NOMINATED FOR BEST PAPER: from 1 (lowest) to 2 (highest) **1 (No)**

IN THE CASE OF A SHORT PAPER THIS SUBMISSION MAY BE INVITED TO SEND AN EXTENDED VERSION TO JIDM?: from 1 (lowest) to 2 (highest) **1 (No)**

IF THE PAPER WILL NOT BE ACCEPTED IN THIS EVALUATION PHASE A NEW REVISED VERSION MAY BE CONSIDERED IN THE REBUTAL PHASE?: from 1 (lowest) to 2 (highest) **2 (Yes)**

RELEVANCE TO SBBD: from 1 (lowest) to 7 (highest) **6 (Accept)**

TECHNICAL QUALITY: from 1 (lowest) to 7 (highest) **5 (Weak Accept)**

ORIGINALITY: from 1 (lowest) to 7 (highest) **5 (Weak Accept)**

AUDIENCE APPEAL: from 1 (lowest) to 7 (highest) **6 (Accept)**

PRESENTATION: from 1 (lowest) to 7 (highest) **6 (Accept)**

IMPACT OF THE IDEAS AND RESULTS: from 1 (lowest) to 5 (highest) **5 (Weak Accept)**

The paper proposes a strategy for ranking in social networks in which the time dimension is taken into consideration. The topic is relevant and the paper is clearly written (although a revision is necessary – see minor comments below).

Why not compare your method to T-Rank? Berberich et al. have shown the importance of time in graph-based ranking. Thus, it seems natural to compare your work against theirs. Also, it is necessary to point out the differences between your approach and T-Rank.

Review:

Is there any method for choosing a good  $\alpha$ ? What guidelines can you offer?

Minor comments:

Figure 1: looser means "not tight" the word you want is "loser"

Section 2: This work focus -> This work focuses  
Section 2 it's produced -> its produced

When listing items, use a comma before "and". For example: "... Australian Open, French Open, Wimbledon, and the US Open."

### Review 3

Overall rating: **1** (weak accept)

IN THE CASE OF A FULL PAPER IT MAY BE NOMINATED FOR BEST PAPER: from 1 (lowest) to 2 (highest) **1** (No)

IN THE CASE OF A SHORT PAPER THIS SUBMISSION MAY BE INVITED TO SEND AN EXTENDED VERSION TO JIDM?: from 1 (lowest) to 2 (highest) **2** (Yes)

IF THE PAPER WILL NOT BE ACCEPTED IN THIS EVALUATION PHASE A NEW REVISED VERSION MAY BE CONSIDERED IN THE REBUTAL PHASE?: from 1 (lowest) to 2 (highest) **2** (Yes)

RELEVANCE TO SBBD: from 1 (lowest) to 7 (highest) **7** (Strong Accept)

TECHNICAL QUALITY: from 1 (lowest) to 7 (highest) **6** (Accept)

ORIGINALITY: from 1 (lowest) to 7 (highest) **4** (Borderline Paper)

AUDIENCE APPEAL: from 1 (lowest) to 7 (highest) **6** (Accept)

PRESENTATION: from 1 (lowest) to 7 (highest) **6** (Accept)

IMPACT OF THE IDEAS AND RESULTS: from 1 (lowest) to 5 (highest) **5** (Weak Accept)

The paper presents a ranking algorithm for social network, for the specific case of sports social networks.

\* Strong points:

An interesting problem, although maybe too specific.

The paper is clear and well written.

Related work is appropriate, although other works could have been mentions (see below).

Experiments were performed on real world data, using a fairly large dataset.

\* Weak points:

There are many Pagerank variations that account for time, besides T-rank. E.g.

- Dalibor Fiala, Time-aware PageRank for bibliographic networks

- Ghosh et al., Time-aware Ranking in Dynamic Citation Networks

Also see: Mobasher et al. Advances in Web Mining and Web Usage Analysis

## Review:

It is not clear what is the conceptual difference between this proposal and those works, including T-rank.

The problem approached is very specific. It would be more interesting if this solution was shown to be applicable to any kind of (dynamic) social network.

The rationale for equation 1 is not clear. Why an exponential decay? Why not any other decay function?

No comparison was performed with other time-based ranking strategies.

\* Conclusion:

This an interesting work, well written and technically sound. Its major flaw is, however, the lack of comparison to other time-base ranking algorithms. Although the experiments validate the approach as effective, they do not show if it is more effective than any of the several other existing proposals.

\* General comments:

I am not sure if the English word "confront" can be used in this context (as a sporting match between participants).

Is there an appropriate method to find the best alpha? Where other decay functions tested?