A New Approach to Scientific-Research Paper Evaluation

1st Goran Bjelobaba
University of Belgrade, Faculty of organizational sciences
Department for e-business
Belgrade, Serbia
gbjelobaba@gmail.com and ORCID
0000-0003-3684-3248

2nd Hana Stefanovic
Comtrade Information Technology School of Applied Studies
Belgrade, Serbia
hana.stefanovic@its.edu.rs and ORCID
0000-0003-0890-4410

3rd Ana Savic
School of Electrical and Computer Engineering
Academy of Technical and Art Applied Studies
Belgrade, Serbia
ana.savic@viser.edu.rs and ORCID
0000-0002-8099-1136

4th Nedeljko Stefanovic
NOVELIC ltd
Belgrade, Serbia
stenedjo@gmail.com and ORCID
0000-0002-0204-4918

5th Nikola Popovic
Alfa BK University
Faculty of Mathematics and Computer Science
Belgrade, Serbia
nikolap6901@gmail.com and ORCID
0000-0002-5038-0086

***Abstract* — Unreviewed sources such as https://arxiv.org [1] have an advantage over reviewed ones, which reflects in the immediate availability of the former to the reader, whereas in the case of the latter, reviewed sources, it takes six months on average from the submission of a paper to the journal to its publication (in case the paper has been accepted). Reviewed papers, however, have obvious advantages that reviewing brings with itself. In the paper, a solution which should unite into one the good characteristics of both approaches is offered.**

Keywords — review, scientific paper, citation, autocitation, evaluation

I. INTRODUCTION

When speaking about the publication of scientific papers, the situation is as follows:

- A paper can be published immediately and the same may instantaneously be available to the interested readers who can use it for their further research work. In that manner, the advancement of science is not slowed down. The disadvantage of this manner lies in the fact that there is no review process (such as https://arxiv.org) and it does not enable the grading and scoring of those papers, so there is no guarantee of quality for the reason of that fact.
- In reviewed journals, the papers that are ultimately published are usually published six months upon their submission, during which time period the paper is not available to the reader. Once the paper has become available to the reader and after the reader has carried out research studies in which the same would be cited and after they have written a paper, about six additional months should pass for that new paper to be published and for the initial one to be cited. [3] It means that there is a delay of about one year on average, which slows down the development of science. That is a disadvantage of this manner. On the other hand, the advantage reflects in that researchers want the reviewed papers that have been somehow checked. Reviewing also enables the scoring and grading of those papers.

Both approaches have both advantages and disadvantages. The goal is to make a proposal for and create a new, third approach, which would unite into one the good characteristics of both mentioned approaches. The proposal is an electronic source on which it is possible to upload a paper which has not been reviewed yet at the moment of its publication, but which is available to the reader. In that manner, the development of science would not be slowed down. Readers would be enabled to review the paper under their own name if they want to do that. Both the reviewers and the authors would be graded so as to know which reviews one may believe. The proposal for said solution has in some aspects similarities with the mentioned website https://arxiv.org, [1] but it differs from that website in some important elements, which will be mentioned herein. The author can upload his/her paper as soon as he/she has written and checked it, so that the paper may become immediately available to the reader. At that moment, however, the paper is still unreviewed.

A paper might receive an arbitrary number of reviews. Reviews in the form of comments and numerical grades might be written by all those researchers who want to do that, but they would be doing that signing such reviews with their digital certificates. Of course, the issue of reviewer grading and the grading of reviews themselves is immediately raised.

A typical form of abuse reflects in mutual support in the form of mutually giving good grades. Of course, mutual grading does not automatically imply an abuse, so that it cannot be the ground for making complaints, but the phenomenon of circular reviewing (of an arbitrary length)

must somehow be taken into consideration in the calculation.

II. Application Basic Functionalities Overview

The application whose use would enable the uploading and reviewing of a paper, as well as the ranking of reviewers in the described manner, was created.

The application homepage is shown in Figure 1, whereas an Entity-Relationship model (ER model), with the marked primary keys (PKs) and foreign keys (FKs) [2] is shown in Figure 2.

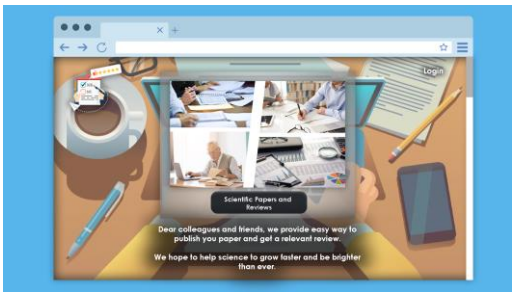

Fig 1. The application homepage

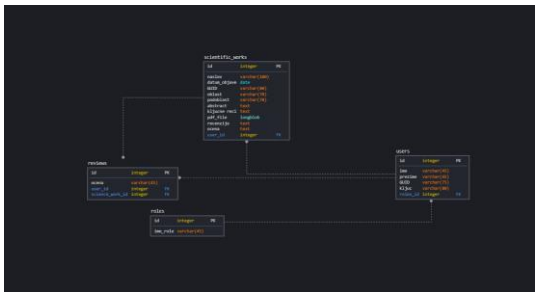

Fig 2. An Entity-Relationship model (ER model)

In the scientific paper database, each scientific paper has the following items defined:

- the name and GUID,
- the author/authors (GUID),
- the scientific area and the subareas,
- the abstract,
- the key words,
- the document in the pdf format,
- the list of the reference reviews, and
- the derived grade based on the reviews.

Each user is enabled to go through the list of the scientific papers classified into areas, select a paper, read it online or download it in the pdf format, all this without logging in.

The user may register as the "Author" or the "Reviewer".

The following items are defined for the "Author"-type user:

- the name and surname, and GUID,
- the list of the scientific papers, and
- the grade derived from the paper reviews that is recalculated with each next review.

The following items are defined for the "Reviewer"-type user:

- the name and surname, and GUID,
- the list of the reviews, and
- the grade.

There is also a possibility of browsing the scientific paper base by:

- the author,
- the scientific area (optional),
- the paper title, and
- the keywords,

with the option of sorting according to the review rating.

There is also a possibility of uploading a review for the scientific paper for which the following items are defined:

- the title of the scientific paper and GUID,
- the author's name (GUID),
- the reviewer's name (GUID),
- the review in the following form: the written form, the grade, I recommend it YES/NO.

There is a possibility of grading the reviewer based on the existing reviews. The reviewer grade is the weight factor of his/her review.

There is a possibility of excluding certain reviews should the Fraud Model be recognizable (e.g. the reviewing cycles).

There is a possibility of showing the list of the authors as per the rank together with the mentioned area in which the paper is published and showing the list of the reviewers as per the rank.

Registered users shall be entitled to the following:

- there is the "Author" role, which has the right to upload a scientific paper and assign it to an appropriate category;
- there is the "Reviewer" role, which has the right to perform the reviewing of scientific papers (anyone may review papers openly);
- there is the "Administrator" role – the Administrator has a possibility to manipulate users and eliminate problems on the application, and
- there is the "Content Administrator" role, which has the right to manage, add and delete the areas and the subareas.

III. Conclusion

The following problems are present in the extant scientific-research paper grading system:

- to publish a paper from its submission to a journal if accepted takes a lot of time,
- the scientific-research paper grading objective methods provide very imprecise results due to divers kinds of fraud in the form of adapting to the grading system (mutual citations and so on),
- the work done by reviewers is not valued and the reviewers are not ranked, so there is no sufficient motivation for reviewing,
- there are a large number of mistakes in published papers in spite of the fact that the same have been reviewed, and
- there is a possibility of power and influence abuse.

Overcoming these problems would enable a completely new scientific-research paper evaluation system.

Information technologies enable decentralization, data changing prevention, digital signing, a public and independent check, and transparency/privacy control, by which different kinds of abuse are prevented, and the quick availability of content, cooperation and measuring the influence are enabled. [5]

The application of the blockchain technology to data decentralization and unchangeability, the application of cryptographic solutions aimed at defining and limiting data access control, i.e. data transparency and privacy, digital signing and digital certificates aiming to exclusively create accounts under the real identity and undeniability with the purpose of gaining an insight into the reputation of a participant in this system are possible. [4]

REFERENCES

[1] https://arxiv.org

[2] J. D. Ullman, “Principles of Database and Knowledge-Base Systems”, Computer Science Press; 1993

[3] Z. V. Popovic, “Kako napisati i objaviti naucno delo”, Akademska misao i Institut za Fiziku, 2004

[4] S. Pratima, J. Rajni, B. Malaya Dutta, R.Blockchain technology for cloud storage: a systematic literature review, ACM Computing Surveys. 2020, Vol. 53 Issue 4, pp. 89-32.

[5] Q. Amer, K. Faten F., Blockchain Technology, Business Data Analytics, and Artificial Intelligence: Use in the Accounting Profession and Ideas for Inclusion into the Accounting Curriculum, Journal of Emerging Technologies in Accounting. 2020, Vol. 17 Issue 1, pp. 107-117