A Comparison of Automated Journal Recommender Systems

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Abstract. Choosing the right journal for an article can be a challenge. Automated manuscript matching can help authors with the decision by recommending suitable journals based on user-defined criteria. Several approaches for efficient matching have been proposed in the research literature. However, only a few actual recommender systems are available for end users. In this paper, we present an overview of available services and compare their key characteristics such as input values, functionalities, and privacy. We conduct a quantitative analysis of their recommendation results: (a) examining the overlap in the results and pointing out the similarities among them; (b) evaluating their quality with a comparison of their accuracy. Due to the providers' lack of transparency about the used technologies, the results cannot be easily interpreted. This highlights the need for openness about the used algorithms and data sets.

Keywords: Scientific publishing · Recommender systems.

1 Introduction

The ever-growing number of journals and requirements by funding agencies make it increasingly difficult for researchers to find journals for their manuscripts. Apart from several publication guides [2,26,3,31], the automated recommendation of journals is an active field of study [32,39,41,23]. An overview is provided in [1]. While recommendation approaches based on e.g. co-author networks [23] exist, the majority relies on semantic similarity of the user input to already published scientific articles. Most of the proposed systems do not run in a production mode available to end users.

Two prior articles compare available journal recommendation services: In [13], seven services are compared for features, and illustrative query results are presented. The analysis includes the services provided by Clarivate, Cofactor (since archived [8]), Edanz, Elsevier, IEEE, JANE, JournalGuide, and Springer. In [22] the seven recommendation services by Edanz, Elsevier, Enago, IEEE, JANE, JournalGuide, and Springer are compared. The usefulness of these services is analysed in comparison to the publication habits of 15 interviewed researchers. None of the above-mentioned research provides a quantitative comparison of

Table 1: List of recommender systems, used abbreviation, the provider, and the scope which describes the subgroup of journals suggested.

Recommender Name	**Abbreviation**	**Provider**	**Scope**
Bibliometric and Semantic Open Access Recommender Network [4]	B!SON	TIB and SLUB	Open Access
Charlesworth Author Services Journal Finder [6]	Charlesworth ASJF	Charlesworth Author Services	All
eContent Pro Journal Finder [9]	eContent Pro JF	eContent Pro	All
Edanz Journal Selector [10]	Edanz JS	Edanz (M3)	All
Elsevier Journal Finder [11]	Elsevier JF	Elsevier	Publisher
Food Science and Technology Abstracts Journal Finder [14]	FSTA JF	FSTA/IFIS	Food / Health
Institute of Electrical and Electronics Engineers Publication Recommender[17]	IEEE PR	IEEE	Publisher
Journal / Author Name Estimator [36]	JANE	The Biosemantics Group	Medicine
Jot [37]	Jot	Townsend Lab	Medicine
Journal Guide [18]	Journal Guide	Research Square	All
MDPI Journal Finder [21]	MDPI JF	MDPI	Publisher
Researcher Journal Finder [24]	Researcher JF	Researcher App	All
Researcher.Life Journal Finder [25]	Researcher.Life JF	Researcher.Life	All
Sage Journal Recommender [28]	Sage JR	Sage Publishing	Publisher
ScienceGate Journal Finder [30]	ScienceGate JF	ScienceGate	Publisher
Springer Journal Suggester [34]	Springer JS	Springer Nature	Publisher
Taylor & Francis Journal Suggester [35]	T&F JS	Taylor & Francis	All
Trinka Journal Finder [38]	Trinka JF	Trinka AI	All
Wiley Journal Finder [40]	Wiley JF	Wiley	Publisher
Web of Science / EndNote Manuscript Matcher [7]	WoS MM	Clarivate	All

journal recommender systems; both only include a subset of the available services and compare them using examples or expert evaluations.

In this paper, we analyse the 20 currently available journal recommender systems (as of June 6, 2023). We provide an overview of input options, as well as filter and search features. In contrast to previous work, we perform a quantitative evaluation by measuring the accuracy and the number of overlapping results. As a result, we draw conclusions about how well the services perform and complement each other. The paper is organised as follows: Section 2 describes the services selected for the comparison in this paper. A feature comparison with a description of the scope, input, and filters of the services follows. The quantitative analysis of overlapping results and accuracy is presented in Section 3. Section 4 summarises our findings and derives implications for users.

2 Selection and Qualitative Comparison

The recommender services in this study were found using "journal recommender", "manuscript matcher" and "journal finder" as a query for Google and Bing, and evaluating the results on the first three pages. This comparison only considers journal recommendation services that offer a form of automatic manuscript matching. It excludes services that only offer to filter journals. We only consider services that are currently online and that work with automated (not expert) recommendations. The search resulted in 20 recommender systems presented in Table 1. In the following, we will abbreviate their names as indicated.

2.1 Description of Services

As shown in Table 1, seven out of 20 services only deliver results that are part of the publisher providing the tool. Of the rest, one is focused on open access and two on medicine. The Charlesworth ASJF, JANE, Jot, Researcher JF, and Trinka.AI JF include pre-print servers in their results.

Only B!SON and Jot are open-source. B!SON, the Elsevier JF, JANE, Jot, and the WoS MM have been described in research papers. The B!SON recommender uses Elasticsearch, a neural network, and bibliographic coupling to recommend journals [12,5]. The Charlesworth Journal Finder claims that its search is powered by Researcher JF. The results, however, are different. The Elsevier JF uses BM 25 to find one million similar articles and averages the scores for each journal [19]. JANE uses Lucene's MoreLikeThis algorithm to find the 50 most similar articles to the user input [29], sums the scores per journal and normalises them. Jot is based on JANE and adds counting of the journal appearances in a user-provided list of references [15]. The WoS MM averages the results of a Support Vector Machine and a Lucene k-Nearest-Neighbors search [27].

2.2 Search Input

While attributes such as full text [16] or authors [20] have been used in research to suggest journals, most services use title and abstract. Keywords and subject are also used by a few services. B!SON works with references by parsing for DOIs in the text the user enters (copied from the PDF or a structured format like bibtex); Jot expects a bibliography file in the RIS format. The Charlesworth ASJF, Edanz JS, IEEE PR, JANE, and Researcher JF use a single input field for several attributes at once. The ScienceGate JF first suggests several, editable keywords based on the title and abstract which are then used for the recommendations.

2.3 Filtering, Sorting and Other Features

Most services offer filter and sorting options for the score, title, publisher, publication time, open access or journal impact factor. The Charlesworth ASJF, eContentPro JF, Researcher JF, T&F JS, and Wiley JF have few to no filter, or sorting options.

In the following, we will list noteworthy features of the systems: B!SON facilitates the search with an already published article by fetching the inputs via e.g. Crossref. Elsevier JF offers to enter the author's organisation to get personalised publishing options based on existing agreements. It also detects if the input data belong to an article already published by Elsevier. The IEEE PR can filter venues to publish before a specified date and also searches for conferences (not considered in this paper). JANE allows searching for similar articles and authors who published similar work. Jot provides a two-dimensional visualisation with the "prospect" (estimated chance of acceptance) on the X-axis and an impact metric (e.g. CiteScore) on the Y-axis. Journal Guide has a comparison function to create an overview of selected journals from the result list.

2.4 Transparency and Privacy

Only B!SON and Jot are open source, but several recommender systems show which similar articles led to the recommendation of a journal: B!SON, Edanz JS, JANE, Jot, Journal Guide, Researcher.Life JF, Sage JR, and Trinka.AI JF. Most services do not publicise which journals are in their data set and if it is up-to-date. The websites often, at least, indicate the number of journals included.

Both the Journal Guide and JANE have the option to scramble the entered abstract on the client side for privacy. All systems offer an encrypted TLS connection; Jot, however, features an expired certificate at the time of writing.

The majority of recommender systems are free and can be used anonymously. However, the WoS MM and the Trinka.Ai JF only work with an account. Researcher.Life JF requires an account for advanced features such as viewing similar articles. Similarly, the eContent Pro JF requires the name and e-mail address for a mandatory sign-up to their e-mail communications. The T&F JS explicitly states that they store the submitted abstracts and which results the user clicks on. The Trinka.AI JF also stores the input along with the generated results so the user can review them later. There is no option to delete searches. Only B!SON and the Edanz JS promise to not store the user inputs.

3 Quantitative Evaluation

In the following, we perform a quantitative comparison of the accuracy and the overlap of the results. We used smaller article test sets to avoid getting blocked.

3.1 Comparison of Independent Recommender Systems

We test the publisher-independent recommender systems with 50 articles from the only journal we found in all recommenders: "New Biotechnologies" (ISSN 1876-4347). Similarly to research on web search engine results [33], we present the average overlap of the top 15 results based on the ISSNs in Table 2.

Table 2: Comparing the average overlap of results for the publisher-independent recommenders systems

	B!SON	Charlesworth ASJF	eContentPro JF	Edanz JS	FSTA JF	JANE	Jot	Journal Guide	Researcher JF	Researcher.Life JF	ScienceGate JF	Trinka.AI JF	WoS MM
B!SON	15.0	1.5	0.0	1.3	0.5	2.6	2.9	2.0	2.9	2.1	1.9	4.5	2.0
Charlesworth ASJF	1.5	7.0	0.0	1.3	0.6	2.7	3.6	2.8	5.6	1.5	1.7	2.8	2.3
eContentPro JF	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Edanz JF	1.3	1.3	0.0	15.0	0.4	3.6	3.6	1.5	2.7	2.1	2.6	4.2	3.6
FSTA JF	0.5	0.6	0.0	0.4	4.6	0.6	0.6	0.4	0.8	0.6	0.8	0.8	0.6
JANE	2.6	2.7	0.0	3.6	0.6	15.0	8.9	3.3	3.7	2.6	2.3	4.4	3.5
Jot	2.9	3.6	0.0	3.6	0.6	8.9	14.7	4.1	5.0	2.6	2.4	5.1	3.7
Journal Guide	2.0	2.8	0.0	1.5	0.4	3.3	4.1	14.4	3.4	1.8	1.5	2.9	1.9
Researcher JF	2.9	5.6	0.0	2.7	0.8	3.7	5.0	3.4	15.0	2.4	2.9	4.9	4.3
Research.Life JF	2.1	1.5	0.0	2.1	0.6	2.6	2.6	1.8	2.4	14.4	2.4	3.9	2.7
ScienceGate JF	1.9	1.7	0.0	2.6	0.8	2.3	2.4	1.5	2.9	2.4	15.0	4.2	3.5
Trinka.AI JF	4.5	2.8	0.0	4.2	0.8	4.4	5.1	2.9	4.9	3.9	4.2	14.6	4.5
WoS MM	2.0	2.3	0.0	3.6	0.6	3.5	3.7	1.9	4.3	2.7	3.5	4.5	15.0

The Charlesworth ASJF, eContentPro JF, and FSTA JF provide fewer results, the rest of the services usually provide the 15 results that were considered. Some queries did not return any or only few results. The prominent overlap between Charlesworth ASJF and Researcher JF confirms that Charlesworth ASJF's recommendations are based on Researcher JF (see Section 2.1). A similar effect can be observed with JANE and Jot. The eContentPro JF and FSTA JF share the least results with the other systems. At least for FSTA JF, this might be caused by its very specific scope. The other systems usually share two to four results, with Trink.AI JF showing the highest overlaps with other services.

3.2 Accuracy

We further test the accuracy (precision) of the recommender systems. To ensure a fair comparison, we test with articles from journals in their data set (i.e. test the Elsevier JF only with Elsevier articles). Each system is tested on 100 articles, coming from 100 different journals to broaden the scope of testing. Articles from this year are excluded so that we can assume that the article should be in the training set. As most systems do not disclose the included journals, we used test queries to identify a list of journals in their data set. We use the API of the scientific database Dimensions[3] to retrieve the corresponding test articles. We also assume that the correct journal is the one where the article was published.

[3] https://docs.dimensions.ai/dsl/

The systems might take other factors into account apart from the semantic match, e.g. possible impact. Having the test articles potentially in the training set is a limitation. Nevertheless, high accuracy can indicate how much the system relies on finding a similar article.

The results are shown in Table 3. As JANE is checking for similar articles [29], the accuracy is high because it will usually find the article in question in its data set. Journal Guide and Springer JS also yield high accuracy. The reason for eContentPro JF's, FSTA JF's, and ScienceGate JF's low accuracies are unclear.

Table 3: Recommender systems and their accuracy considering the first and the first ten results.

Name	**Acc@1**	**Acc@10**
B!SON	0.20	0.88
Charlesworth ASJF	0.21	0.77
eContentPro JF	0.03	0.16
Edanz JS	0.16	0.54
Elsevier JF	0.35	0.86
FSTA JF	0.07	0.29
IEEE PR	0.26	0.68
JANE	0.83	0.96
Jot	0.19	0.93
Journal Guide	0.38	0.98
MDPI JF	0.48	0.88
Researcher JF	0.07	0.49
Researcher.Life JF	0.15	0.48
Sage JR	0.17	0.69
Springer JS	0.97	0.98
T&F JS	0.48	0.91
Trinka.AI JF	0.07	0.41
ScienceGate JF	0.10	0.35
Wiley JF	0.19	0.59
WoS MM	0.12	0.48

4 Conclusions

In this paper, we systematically compared 20 journal recommendation services. We found that most of them use the title and abstract to find the best-fitting journal. Apart from publisher-specific services, 13 independent services exist. Many try to inform the user how a match was calculated, but few have published their source code, recommendation approach, or data sources.

We tested the accuracy of the services and to what degree they delivered the same results. The accuracy varies widely with the Acc@10 ranging from 16% to 98%. While for most recommender systems two to four results are shared, a higher overlap validates the shared recommendation approach of some services.

We derive the following advice: (a) Users should look beyond the first suggestion. (b) For the medical domain, Jot provides more features than JANE and can be recommended. (c) For open-access publications, B!SON and Journal Guide can be recommended. B!SON is more transparent but both services have a high accuracy and number of sorting and filter options. (d) Otherwise, Journal Guide or publisher-specific services can be used. Background knowledge is still required for the final decision.

Declaration of Competing Interests

The authors were part of the B!SON project.

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