



Manuscript Matcher: A Content and Bibliometrics-based Scholarly Journal Recommendation System

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and Jon Stroll

Purpose of paper:

- Provide an overview of the recommendation tool, explain its utility
- Share and analyze current user feedback
- Explore ways in which user feedback can be used to make the tool smarter

What is Manuscript Matcher?

System that offers users a set of two recommendations:

- **Potential journals** to publish their manuscript in
- **Similar articles** to their submitted title, abstract and set of citations

Target problems:

- Researchers can face an average wait of **41 days** from the time they submit their manuscript to first decision
- Primary reason for a manuscript's rejection is that it does not meet the “**...quality, relevance, and scientific interest...**” of journal

Target users:

- **Early career researchers** with minimal publishing history
- **Non-native English speakers** who may be publishing in an English language journal for the first time
- **Established researchers** who want to publish outside their core discipline



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While many web-based systems recommend relevant or interesting scientific papers and authors, few tools actually recommend journals as likely outlets for publication for a specific unpublished research manuscript. In this paper we discuss one such system, Manuscript Matcher, a commercial tool

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Title: P-Rank: An Indicator Measuring Prestige in Heterogeneous Scholarly Networks
Author: Erjia Yan
Source: journal of the american society for information science and technology **Published:** 2011

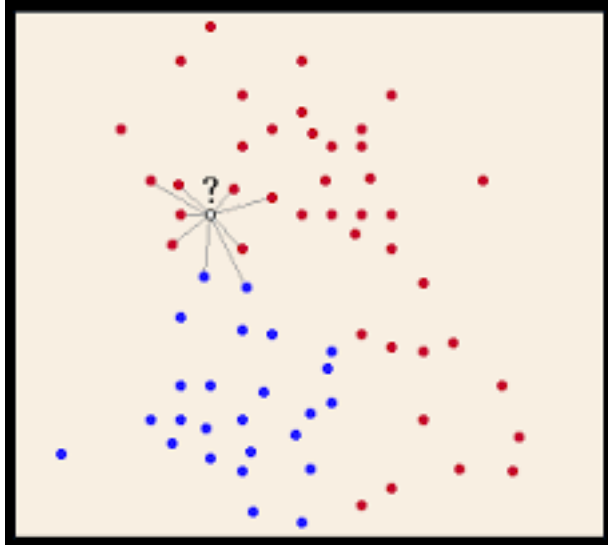
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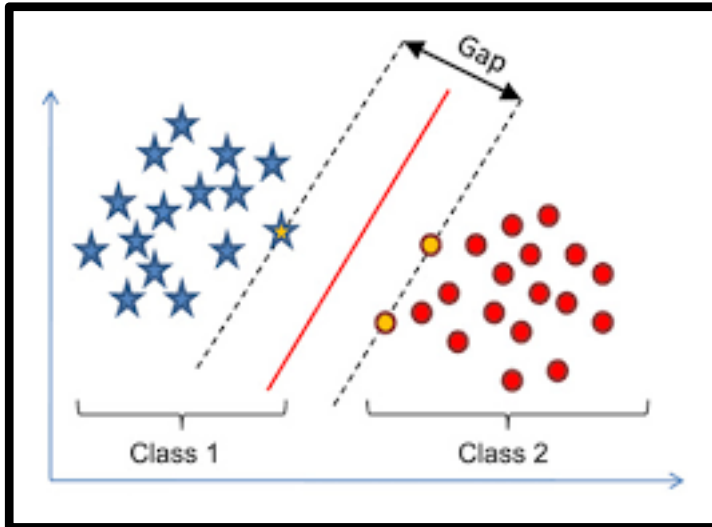
Title: Scholarly Network Similarities: How Bibliographic Coupling Networks, Citation Networks, Cocitation Networks, Topical Networks, Coauthorship Networks, and Coword Networks Relate to Each Other
Author: Erjia Yan
Source: journal of the american society for information science and technology **Published:** 2012

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How does it work?



A Lucene based inverted index is used as the basis for a **k-Nearest Neighbours (kNN)** local clustering algorithm. kNN looks for similar papers and counts the number of similar papers published in each journal to assign one confidence score per journal.



A Support Vector Machine (SVM) classifier is implemented with LibLinear, and used as a global classification algorithm.

It also assigns a confidence score.

Both models are used concurrently and the average of their confidence score is used to calculate how well the recommended journals match the users input.

Minimum threshold:

The tool is smart enough to not give a recommendation if the input data does not meet the minimum confidence score requirement.

Training data:

Metadata records from the Web of Science

Testing data:

Full text papers from various open-access repositories

Taxonomy:

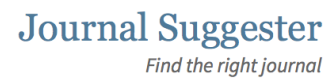
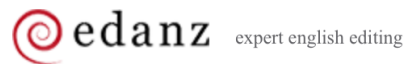
The system architecture comprises both journal classifiers and a recommendation aggregator journal taxonomy, which has three levels and is based on an agglomerative clustering of the domain journals

Source and scope of journal recommendations

- Recommended journals are sourced from the **Web of Science Core Collection (WoS)**; over **10 million** WoS records are consulted with each user submission
- Records are derived from articles published in the **last five years**
- Journals come from a broad and selective range of publishers whose coverage contains hundreds of subject areas within the sciences, medicine, and humanities
- Exclusions:
 - Journals that publish infrequently
 - Review journals and proceedings journals
 - Books and conferences
 - Very general journals, not focusing on any particular subject
 - Journals with a very small Impact Factor (less than 1.0)


What distinguishes Manuscript Matcher?

- Leverages Web of Science citation network of 10 million records
- Pulls recommendations from selective journals across varied publishers and academic domains
- Uses bibliometric-enhanced filtering
- Presents multiple bibliometric data points in the user interface to aid the user's decision making process
- Will not make a recommendation if the submission has not reached the minimum confidence score



User feedback

- Feedback analyzed in paper was gathered from **February 20, 2015** to **September 26, 2016**
- Of the 49,439 EndNote online users who used the tool during this time, 1,957 users (3.95%) provided 2,782 unique feedbacks
- This feedback was in response to 1,800 unique recommended journals

Match Score↓	JCR Impact Factor Current Year 5 Year	Journal	Similar Articles	
▶ 	5.784 2015 5.934 5 Year	CURRENT OPINION IN GENETICS & DEVELOPMENT	0	Was this helpful? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO Submit >> Journal Information >>

Your feedback will be used to help us improve our journal matching capabilities.

Comments

*User provides free text feedback like...**

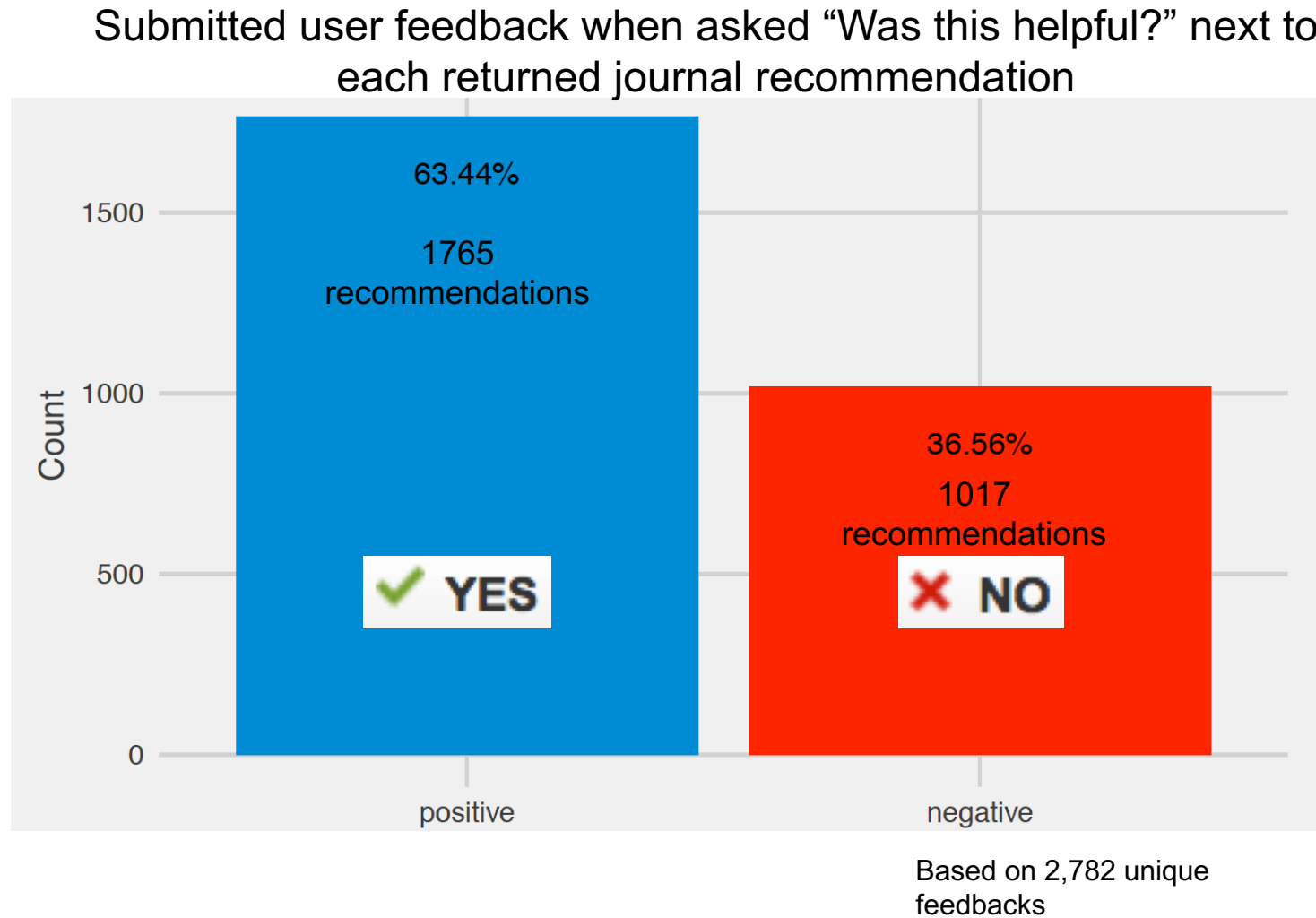
"This was so helpful"

"Not sure how a journal on treating mental illness is related to support for breastfeeding mothers. The matching algorithm must be off on this one."

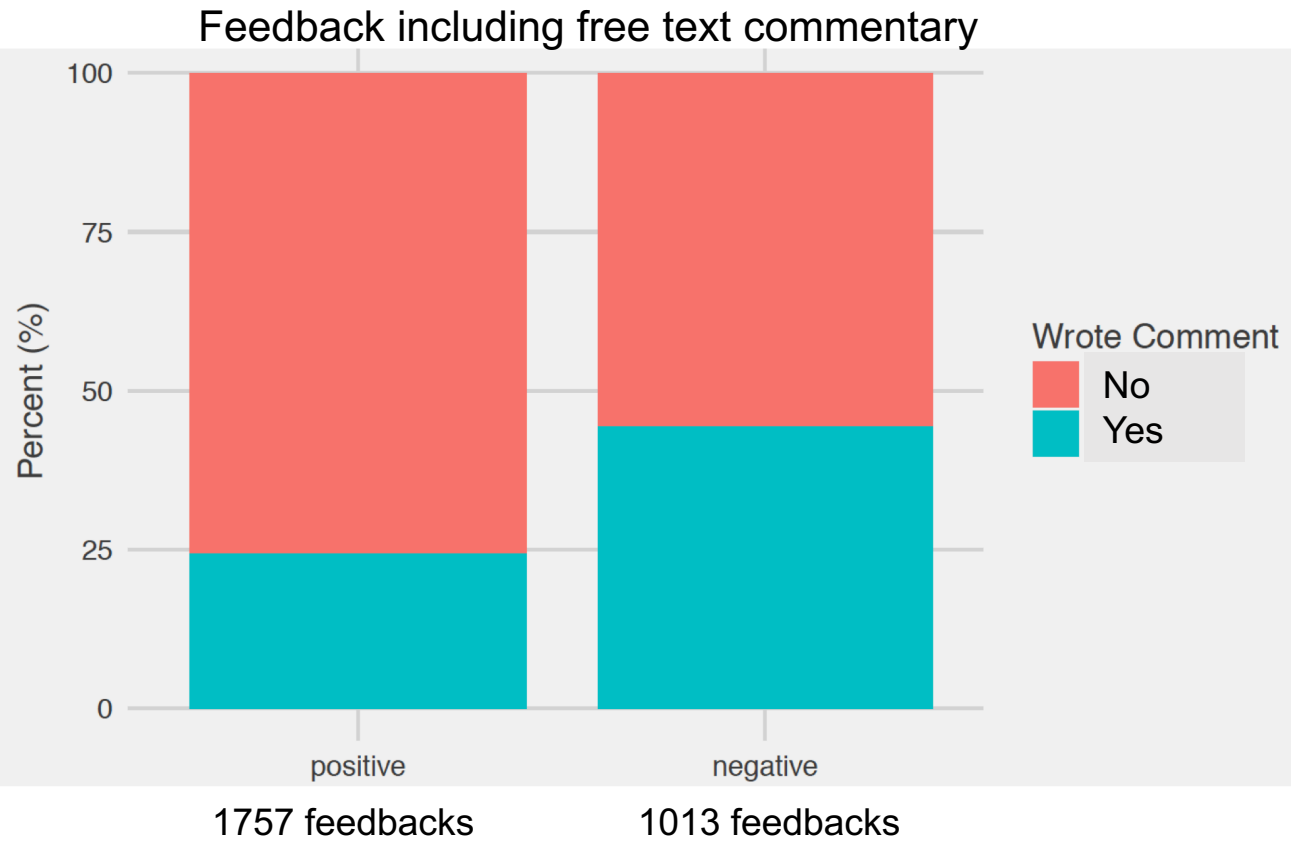
The scope of this journal has been changed. They are more "biofuel". Also, as an international journal, they are not open to composting under the cold climatic conditions of Canada (this is not international).

"Wasn't aware of this journal and looking at articles it could be of use."

Overall, users found the suggested journals helpful



Those with negative feedback were more likely to comment

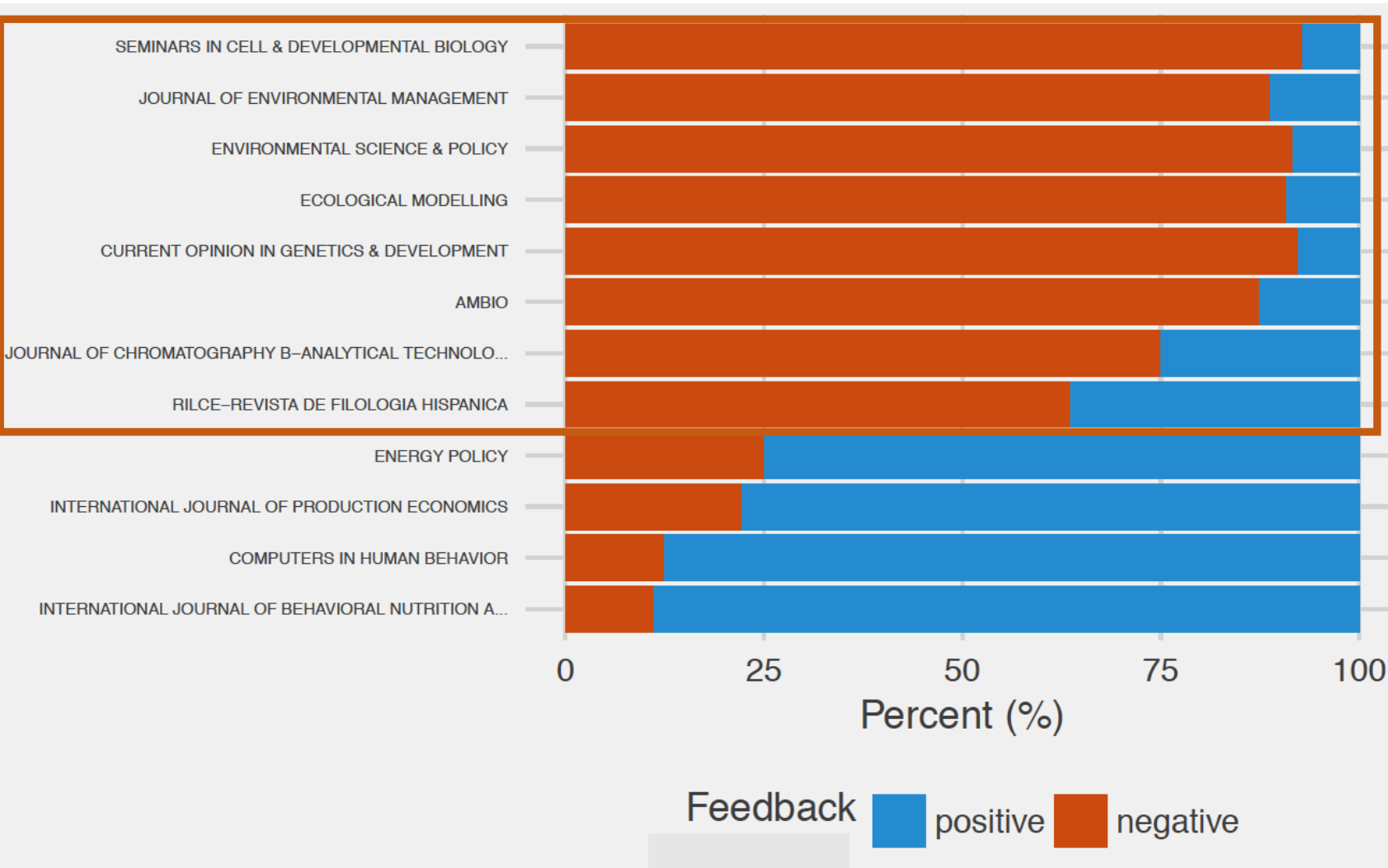


44.54% of users providing **negative feedback** on a journal recommendation wrote a comment, whereas only **24.53%** of users with **positive feedback** did so.

Positive feedback reflects a homogenous sentiment... negative remarks are more varied

Positive Words	N	Negative Words	N
thanks	46	nothing	29
good	33	match	22
helpful	32	study	22
match	23	related	21
great	16	research	15
excellent	13	field	14
one	12	topic	13
will	12	subject	12
relevant	11	title	12
research	11	case	10

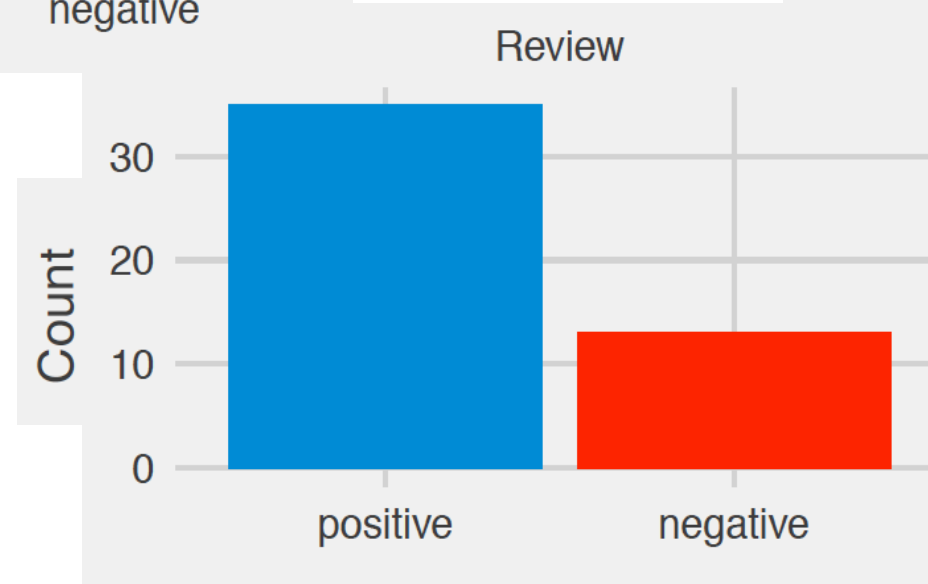
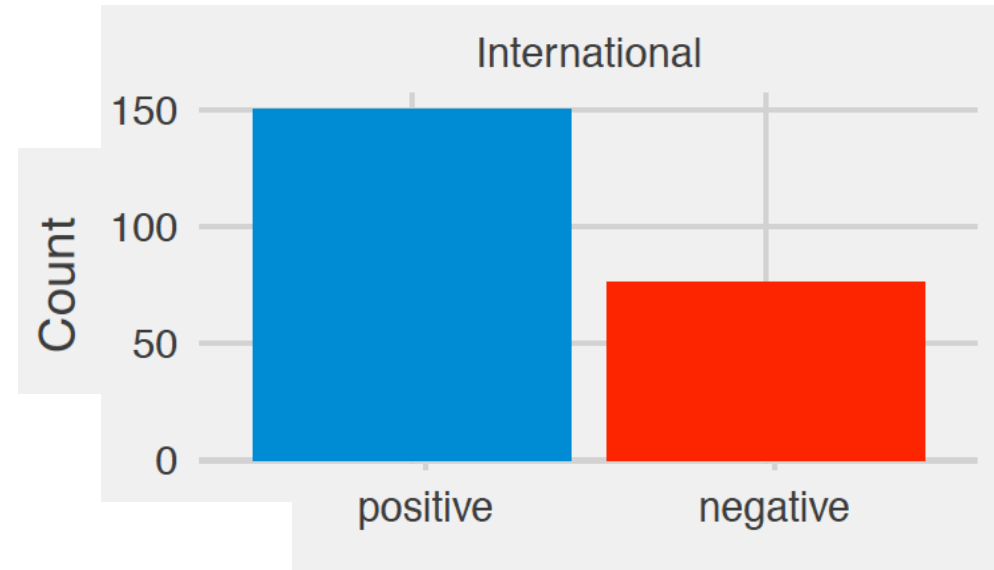
The 12 most commonly recommended journals received mostly negative feedback



Of the 12 most frequently recommended journals, 8 (66.67%) had a majority of negative feedback.

We need to explore why these journals are being recommended more often and why they are generally receiving negative feedback.

Journals with “International”, “Policy” and “Review” in their title received more positive feedback



What motivates users to leave feedback?

Sundaram et al. (1998):

- Word of Mouth (WOM) communication by consumers falls into eight categories, four positive, four negative
- **Altruism** is both a positive and negative motivator to leave feedback
- Other negative feedback motivations include **anxiety reduction**, **vengeance** and **advice seeking**

Talwar et al. (2007):

- The motivation for submitting feedback is not only due to **extreme opinions**, but also to the difference between the ... **prior expectation** of the user and the **actual experience**
- Ratings that confirm the user's prior expectation **will rarely be submitted**

What did users who included citations in their submission think?

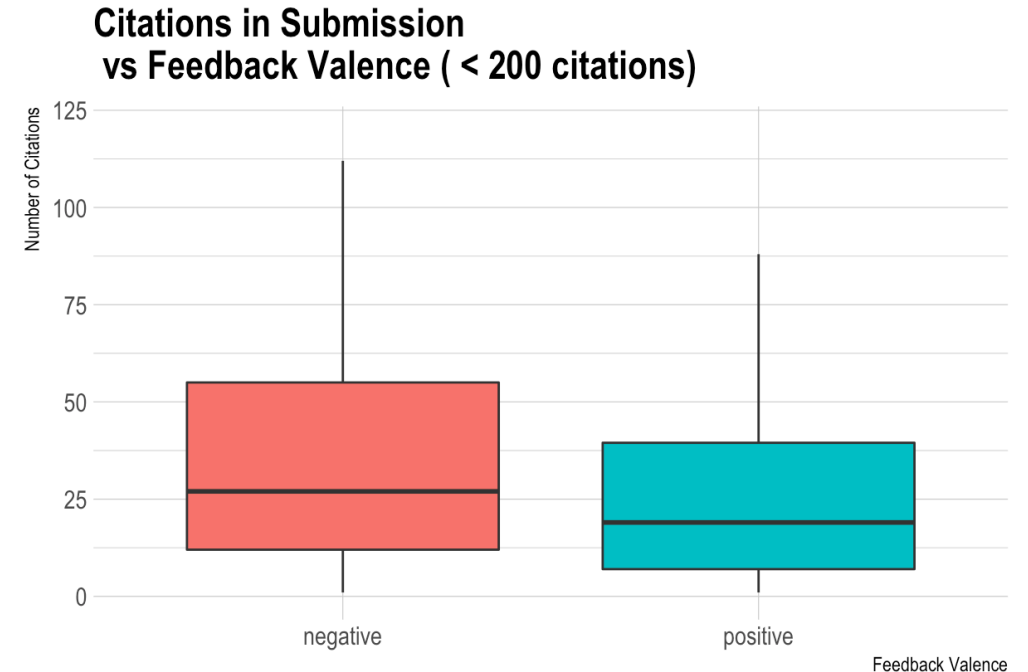
Differently than we thought!

Internal testing indicated that including the citations of a paper in the submission **improved** the quality of recommendations by 30%.

But, user feedback did not confirm this.

Submissions **with** citations received 52.9% positive feedback.

Submissions **without** citations garnered 66.3% positive feedback.



Why did that happen?

Factors to consider

- Feedback is **optional**
- Feedback is **not public**, goes to product and development teams
- Inherent **bias** in post-hoc data analysis

End user motivations

- Positive feedback was rooted in **altruism**, wanting to provide something in return for a rewarding or confirming experience
- Negative feedback rooted in 1) **altruism**, providing feedback in order to help make the tool better and 2) **anxiety reduction**, easing anger and frustration of receiving results the user sees as either substandard or not relevant

How can we improve Manuscript Matcher?

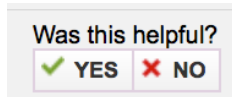
Incorporating user feedback

- A/B testing to test engagement and ratings distribution



It's okay

VS.



- Conduct end user interviews
- Implement a built in feedback loop where user response is immediately used as another piece of training data
- In certain situations, negative feedback could actually be interpreted as validation of the algorithm's accuracy, in the case of users complaining that they had already been published in a recommended journal and are looking for an alternative option

"this paper already exists in Journal of organic chemistry so a poor match!"

How can we improve Manuscript Matcher?

Further development

- Placement of tool in different workflows, outside of EndNote online
- Add more bibliometric data points on the results page to aid user in decision making process
- Revisit social network modeling of citation data [or Deduced Social Networks inferred from user input]
- More sophisticated approaches to natural language understanding:
 - Convolutional neural networks
 - Word embedding models

Questions

- Has anyone tried Manuscript Matcher? If so, what did you think of the results?
- Does anyone have any suggestions for us to consider?
- Has anyone used a recommendation system (not necessarily for journals or papers) that they really like and we might learn from?
- Is anyone interested in helping us test to improve the system?