

Unlocking the Power of GWF Research: Introducing an AI-Driven Portal for Enhanced Accessibility and User-Friendly Experience!

Behbooei, M., Kamaloo, E., Persaud, B.D., Eager, S., Goucher, N., Grant, J., Van Cappellen P., Lin, Jimmy

University of Waterloo



Project Objectives

1. Create a user-friendly and accessible public interface for GWF research outputs by utilizing AI and open access resources
2. Utilize NLP (Natural language processing) models to identify the most relevant publications related to a given search query
3. Cluster GWF publications effectively using BERT (Bidirectional Encoder Representations from Transformers) and k-means clustering techniques

2.NLP Based search

- Three different NLP models was used to make embeddings through the Title and Abstract of all the GWF publications (scincl, specter2, and cohere)
- Pyserini was utilized to index and suggest the most relevant publications for the search query
- Below, you can find the first three results for the search query "Climate change adaptation"

The search function would be able to capture various aspects of a query, including the meaning of words, topic relevance, and other elements that may be beyond human comprehension

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1 -----
Title:
AghaKouchak, A., Chiang, F., Huning, L. S., Love, C. A., Mallakpour, I., Mazdiyasn, O., et al. (2020). Climate Extremes and Compound Hazards in a Warming World. Annual Review of Earth and Planetary Sciences, 48(1), 519548. https://doi.org/10.1146/annurev-earth-071719-055228

2 -----
Title:
Spring, A., Nelson, E., Knezevic, I., Ballamingie, P., and Blay-Palmer, A.: Special Issue Levering Sustainable Food Systems to Address Climate Change (Pandemics and Other Shocks and Hazards): Possible Transformations, Sustainability, 13, 8206, https://doi.org/10.3390/su13158206, 2021

3 -----
Title:
Sillmann, J., T.L. Thoranisdottir, N. Schaller, L. Alexander, G.C. Hegerl, S.I. Seneviratne, R. Vautard, X. Zhang, F.W. Zwiers, 2017: Understanding, modeling and predicting weather and climate extremes: Challenges and opportunities. Weather and Climate Extremes, 18, 65-74, doi:10.1016/j.wace.2017.10.003
    
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Figure 2: First three results for the search query "Climate change adaptation"

3.Topic Clustering

- Our approach uses efficient filtering to help users find publications that are relevant to their interests
- Publications encoded to a high dimensional embeddings using BERT based models
- Colour-coded cluster represents publications with similar topics
- The 2D representation of the clusters makes it easy to visualize the relationships between publications

1.GWF Research Publications



The GWF anthology output website (based on the ACL anthology) allows refereed publications to be accessed through key categories.

- Publication year
- Author
- Project Name
- University affiliation
- Article topic



Link to the website

Figure 1: Adapted network for GWF publications with filtering capabilities

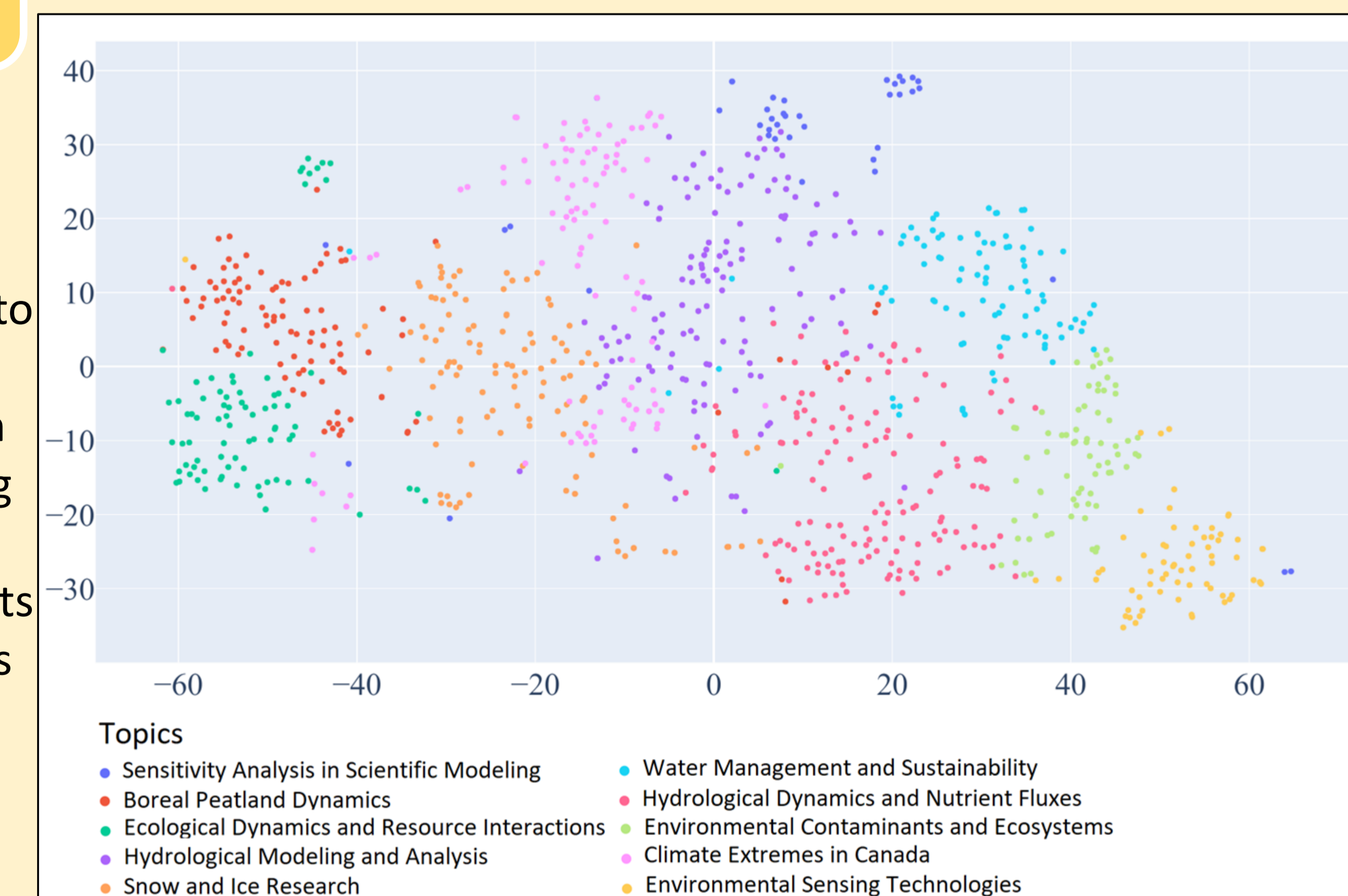


Figure 3: Example of k-means clustering of GWF refereed publications by topic

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Next Steps

- Create a user interface for using the search capability
- Develop an interactive Website to support browsing of publications
- Run this workflow for all the GWF articles and outputs

Future Implications

- Our techniques enable GWF users to access publication content more efficiently and professionally
- The models we use are capable of comprehending and analyzing publication content, resulting in highly accurate suggestions for users
- Our approach improves the user experience by providing relevant and useful information quickly and accurately

