Utilizing Natural Language Processing Techniques to Analyze Expert Feedback on IPBES's Regional Assessments: A Case Study on the Asia Pacific Region

Danmeng CAI
Master's Program in Informatics, Graduate School of Comprehensive Human Sciences,
University of Tsukuba
s202226089@s.tsukuba.ac.jp

Son Hai VU
Master's Program in Faculty of Printing and Media,
Stuttgart Media University
sv058@hdm-stuttgart.de

Summary

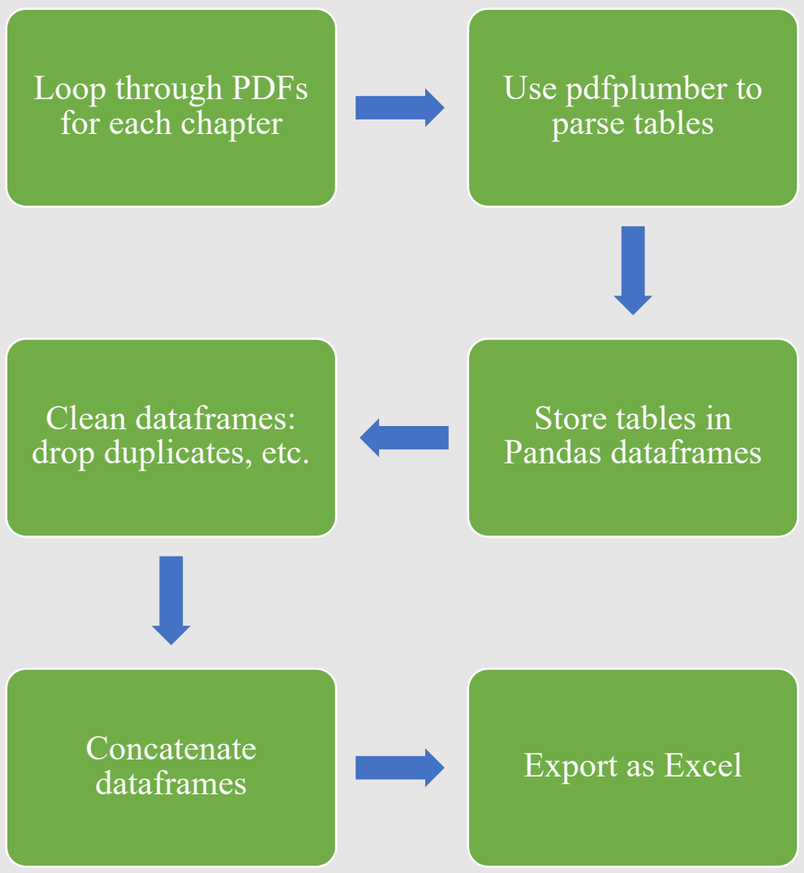
- We propose to use Natural Language Processing (NLP) techniques to enhance understanding of the experts feedback on the assessment of Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Service (IPBES).
- Key phrases that can positvely or negatively affect experts' sentiments are shown in **Fig.1.** and **Fig.2.** .
- **Fig.3.** shows a network to demonstrate what are the semantically important key phrases and how semantically close they are related to each other.

Introduction

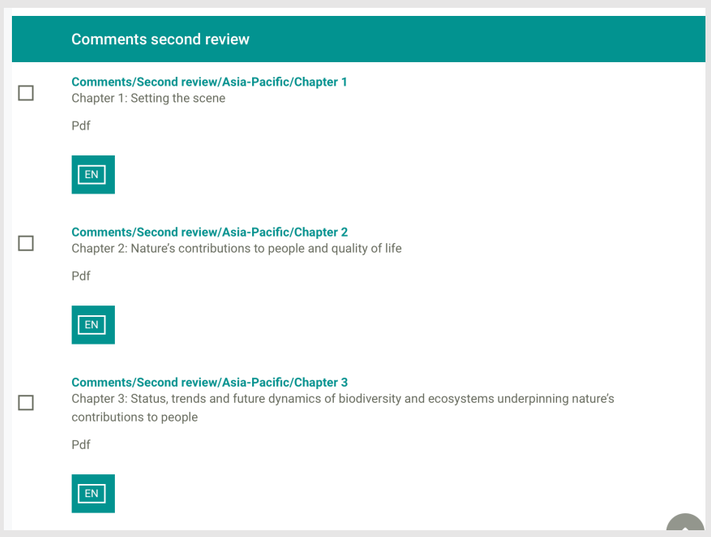
- **IPBES**, an intergovernmental body founded in 2012, **has taken significant role in examining biodiversity trends and nature's contributions at regional and global scales**.
- Notably, in 2015, IPBES initiated four regional assessments including Africa, the Americas, Asia Pacific, and Europe and Central Asia. **A cornerstone of these assessments' credibility lies in the peer review overseen by the Multidisciplinary Expert Panel (MEP) of IPBES**. Expert commentary offers insights into regional concerns and potential areas for practical action.
- **However, a gap exists: these expert comments have not been systematically studied, either qualitatively or quantitatively.**
- We propose to leverage NLP techniques to undertake **sentiment analysis** and **contextual semantic network examination** of the expert comments, focusing on the Asia Pacific region.

Method

- The expert review comments analyzed in this study were collected from the official IPBES website. [1]
- We parse the PDF data through the following pipeline:



(A Pipeline for Parsing PDFs)



(Input of the Pipeline)

	Reviewer Name	Chapter	From Page	From Line	To Page	To Line	Comment	Response
0	Binaya Raj\nShivakoti	General	0	0	0	0	APR includes a lot of general statements, defi...	Thank you. We have hopefully\nimproved this in...
1	Government\nof Japan	General	0	0	0	0	Data gaps exist througout the draft assessment...	Thank you. We have aimed to make this\nmore ex...
2	IPBES\nKnowledge\nand Data Task\nForce (KD TF)...	General	0	0	0	0	This review provides feedback from the IPBES K...	Thank you. We have incorporated the\nuseful ma...
3	IPBES NFP -\nAustralia	General	0	0	0	0	In addition to our specific comments on the SP...	Thank you for this important feedback.\nWe hav...
4	IPBES NFP -\nAustralia	General	0	0	0	0	2. The case studies in the report are not deta...	We have aimed to improve on the case\nstudies ...
...	...	...	...	...	...	...	...	...
1787	Elise Belle	Ch.6	78	3320	78	3320	"prominently supported is"	The conclusion was revised and the sentence wa...
1788	Elise Belle	Ch.6	78	3323	78	3324	"challenges to the private sector for investin...	The conclusion was revised and the sentence wa...
1789	Elise Belle	Ch.6	78	3330	78	3331	"Some traditional management practices are sti...	The conclusion was revised and the sentence wa...
1790	Elise Belle	Ch.6	78	3339	78	3339	"in the form of MEAs"	The conclusion was revised and the sentence wa...
1791	Elise Belle	Ch.6	78	3340	78	3340	"of BES, however, mainstreaming BES"	The conclusion was revised and the sentence wa...

1792 rows × 8 columns

(Output of the Pipeline)

- We employ a pretrained model "nlptown/bert-base-multilingual-uncased-sentiment " for sentiment analysis and visualize the findings using word clouds.[2]
- We use KeyBERT for key phrases exgtraction. To understand the semantic relationships between these key phrases, we use BERT embeddings. Gephi is used for visualizations.[3]

Result

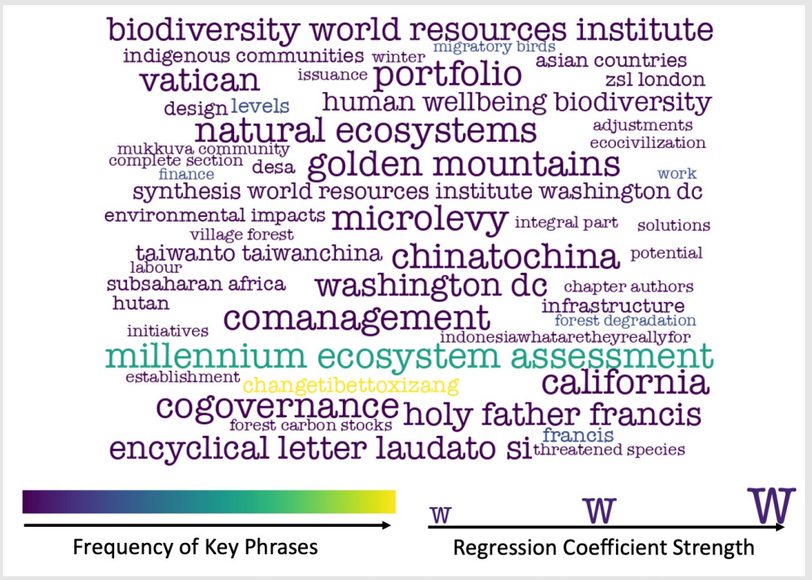


Fig.1. Key Phrases having Positive effects on Sentiments

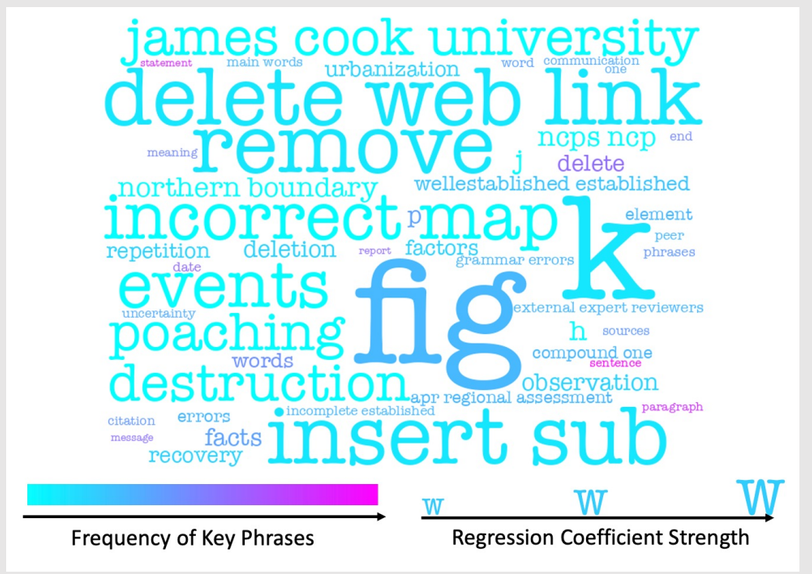


Fig.2. Key Phrases having Positive effects on Sentiments

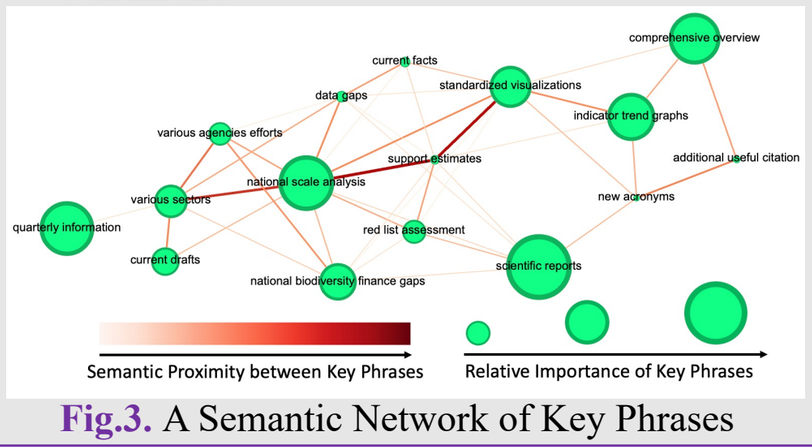


Fig.3. A Semantic Network of Key Phrases

Future Work

- We can try Zero-Shot Classification using Open AI API for sentiment analysis and invite reviewers to verify the accuracy of these classifications.
- We aim to compare the results from Asia Pacific region with those from other regions to distinguish between unique and universal issues.

References

[1]Regional Assessment Report on Biodiversity and Ecosystem Services for Asia and the Pacific, https://www.ipbes.net/assessment-reports/asia-pacific, last accessed 2023/09/21
[2]bert-base-multilingual-uncased-sentiment, https://huggingface.co/nlptown/bert-base-multilingual-uncased-sentiment, last accessed 2023/09/21
[3]KeyBERT, https://github.com/MaartenGr/KeyBERT, last accessed 2023/09/21