


Chapter 20

Sentiment Analysis and Text Mining in Environmental Sustainability and Climate Change

Adline Freeda


 <https://orcid.org/0009-0002-3335-0907>

KCG College of Technology, India

A. Anju


KCG College of Technology, India

Krithikaa Venket

 <https://orcid.org/0009-0003-8445-4332>

KCG College of Technology, India

Kanthavel Dhaya

 <https://orcid.org/0000-0002-3599-7272>

*PNG University of Technology, Papua
New Guinea*

R. Kanthavel

*PNG University of Technology, Papua
New Guinea*

Frank Vijay

*Dept. of CSE, SRM Eswari Engineering
College, Chennai, India*

ABSTRACT

The necessity for novel methods to track and comprehend public opinion and conversation around climate change and environmental sustainability has been highlighted by the growing urgency of tackling these concerns. With the use of natural language processing (NLP) techniques, text mining and sentiment analysis provide effective methods for gleaning insightful information from large volumes of textual data. Data from social media, news stories, policy documents, and scholarly publications can all be analyzed to gauge public opinion, spot new trends, and gauge

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how well communication tactics are working. The results show important discourse and mood patterns that can guide policy decisions, enhance communication tactics, and encourage more public action and knowledge in the direction of environmental sustainability. The present study showcases the efficaciousness of text mining and sentiment analysis as indispensable instruments in the continuous endeavor to mitigate climate change and foster sustainable methodologies.

1. INTRODUCTION TO TEXT MINING AND SENTIMENT ANALYSIS

Large volumes of textual data are produced every day in the digital age on a variety of platforms, such as social media, news sources, forums, and scholarly publications. Understanding complicated issues like climate change and environmental sustainability is both easier and harder by the abundance of data available (**Garcia, D., & Schweitzer, F. (2021)**). Among the most effective techniques for extracting knowledge from this vast amount of unstructured data are text mining and sentiment analysis.

Text Mining: The practice of gleaning patterns and important information from textual material is called text mining. It includes an assortment of methods intended to transform unstructured text into an analysable organized format (**Ghaffar, K., et al. (2023)**). Feature extraction (such as term frequency or word embeddings), data modelling, and text pre-processing (such tokenization and lemmatization) are some of the steps that commonly make up this process. Text mining is a useful technique for analysing public discourse, spotting trends, and producing useful insights because it allows researchers to find hidden patterns, trends, and linkages within huge text corpora.

Sentiment Analysis: Sentiment analysis is a subset of text mining that focuses on identifying the attitude or emotional tone that is communicated in a text. This method divides text into sentiment categories—positive, negative, and neutral—using machine learning algorithms and natural language processing (NLP) (**Adebayo, O., & Mahmoud, A. (2020)**). A variety of textual data formats, such as news stories, social media posts, and consumer reviews, can be subjected to sentiment analysis. Researchers and organizations can measure public opinion, evaluate emotional reactions to events or policies, and adjust communication methods by assessing feelings (**Sangeetha, S. K. B., et al (2021)**).

Regarding climate change and environmental sustainability, text mining and sentiment analysis provide valuable perspectives into the views and conversations held by many stakeholders. Using these methods on various data sources allows researchers to:

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