Chapter 15
Natural Language Processing (NLP) for Policy Recommendations in Carbon Management

Vertika Agarwal
https://orcid.org/0000-0003-1160-0610
SRM Institute of Science and Technology, India

Shalini Verma
SRM Institute of Science and Technology, India

Ankur Bist
https://orcid.org/0000-0001-8679-2624
Graphic Era Hill University, India

Untung Rahardja
https://orcid.org/0000-0002-2166-2412
University of Raharja, Indonesia

Pawan Kumar Goel
https://orcid.org/0000-0003-3601-102X
Raj Kumar Goel Institute of Technology, Ghaziabad, India

ABSTRACT

Carbon management has become an integral aspect of sustainable policy management to streamline with the accelerating challenges of climate. This chapter examines the exploration of NLP (Natural Language Processing) with policy recommendation frameworks in carbon management. NLP can automatically review and summa-

DOI: 10.4018/979-8-3373-2091-5.ch015

rize hundreds of research papers on topics like carbon capture, renewable energy technologies, and emission reduction strategies. This allows policymakers to access up-to-date scientific findings without manual reading of every paper. Techniques such as topic modeling can uncover emerging themes in carbon management research, guiding investment and regulatory priorities. Monitoring social media, news articles, and public forums using NLP can provide real-time feedback on public opinion regarding proposed carbon policies. This helps policymakers understand community support or concerns.

1. INTRODUCTION

Natural Language Processing (NLP) has emerged as a powerful tool for analyzing and interpreting large volumes of unstructured textual data. In the context of carbon management and climate policy, NLP plays a crucial role in extracting meaningful insights from policy documents, research papers, government reports, and public communications. As the urgency to address climate change intensifies, effective policy recommendations are essential for guiding governments, industries, and stakeholders toward sustainable practices and reduced carbon emissions.

Carbon management involves strategies to monitor, control, and reduce carbon emissions, which are critical for mitigating global warming and achieving international climate targets such as those outlined in the Paris Agreement. However, the complexity and volume of policy-related data present significant challenges for policymakers. Traditional methods of policy analysis rely on manual efforts, which are time-consuming and prone to inconsistencies. NLP offers a scalable and automated approach to analyze policy texts, identify trends, and recommend actionable strategies(Tie et al,2022)

NLP techniques such as text classification, sentiment analysis, topic modeling, and entity recognition enable the extraction of key information from climate policies and related literature. By applying machine learning models to analyze this data, NLP can identify gaps, inconsistencies, and areas of improvement in existing policies. Furthermore, NLP-based models can predict the potential outcomes of proposed policies and suggest optimal strategies for reducing carbon emissions(Putri et al,2025).

In recent years, advancements in deep learning and transformer-based models (e.g., BERT, GPT) have enhanced the ability of NLP systems to understand complex policy language and generate meaningful recommendations. These models allow for more nuanced analysis of climate policy frameworks, stakeholder positions, and global trends. By integrating NLP with data from environmental monitoring systems and economic models, policymakers can develop more informed and adaptive carbon management strategies.