

Cultural Perspectives and Sentiment Dynamics: A  
Comparative Study of Climate Change Discourse in India  
and USA

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Github Link - <https://github.com/mansion99/COMS-6901-Research-Project>

# *Abstract*

This study presents a comprehensive analysis of sentiments in climate change-related articles from India and the USA between January 2015 and November 2023. Advanced language models, specifically GPT from OpenAI, is used in this research to systematically evaluate sentiment scores in a dataset of articles curated using the NewsAPI.ai with climate change tags. The study reveals distinct trends in sentiment evolution in both countries, with India showcasing a decrease in sentiment towards climate change mitigation in 2018 and 2019, whereas the USA displays a slight increase. A gradual increase in sentiment in India in 2020, reflects its involvement in proactive environmental measures and local conservation efforts. In contrast, the USA displays a significant dip in sentiment, particularly marked in September 2020, primarily due to intensified debates and policy criticisms within the context of climate change. The research highlights the cultural and political nuances influencing media portrayal of climate change in both countries, revealing India's focus on local and national environmental initiatives and the USA's emphasis on political controversies, international climate politics, and the economic implications of environmental policies. This analysis provides insightful perspectives into the media's role in shaping public perception and discourse on climate change in two globally significant nations.

## 1. Background

This research is about the discourse surrounding climate change that is intricately tied to the cultural contexts. Such a discourse does not merely capture environmental concerns but also mirrors the values, priorities, and ideologies prevalent within different societies. Through the temporal and sentiment analysis of climate change narratives from Eastern and Western perspectives, specifically India and the USA, the study endeavors to delineate the cultural evolution that informs public and political dialogues on this pressing global issue. The analysis is designed to reveal how each culture approaches climate change. This pursuit contributes to a deeper understanding of how climate change is both a scientific reality and a cultural construct, reflected through the lens of media discourse in India and the United States.

## 2. Data

### 2.1 Data Exploration

In the data exploration phase, the focus was on acquiring a comprehensive dataset that included articles on climate change from Indian and US sources, to represent Eastern and Western perspectives respectively. The initial strategy considered utilizing source APIs or web scraping techniques to systematically extract articles from the period of 2015 to 2023. However, this approach faced significant challenges. Web scraping of dynamic HTML pages from news outlets is often restricted, thereby limiting the practicality of collecting historical data over an extended period.

Moreover, the exploration revealed that prominent Eastern news sources such as The Straits Times, Channel News Asia, Times of India, and Inshorts, did not offer APIs that provided access to complete text articles for the desired timeframe. In particular, Global Database of Events, Language, and Tone (GDELT) news API limited data availability to a three-month rolling window, which was insufficient for the intended longitudinal analysis. The absence of readily accessible historical news data necessitated reconsideration of the methodological approach to ensure the robustness and comprehensiveness of the dataset for the study.

### 2.2 Data Collection

Data for both eastern and western sources is collected using the NewsAPI.ai platform, a tool renowned for its expansive coverage, aggregating content from over 150,000 news sources worldwide in more than 40 languages. Esteemed organizations like Bloomberg, McKinsey, IBM, and Airbus utilize this tool for its robust analytical capabilities.

NewsAPI.ai was instrumental in querying a diverse array of news articles related to climate change topics, ranging from policy discussions to environmental impacts, for the period from 2015 to 2023. The following tags was used to collect climate change related data:

Input parameters

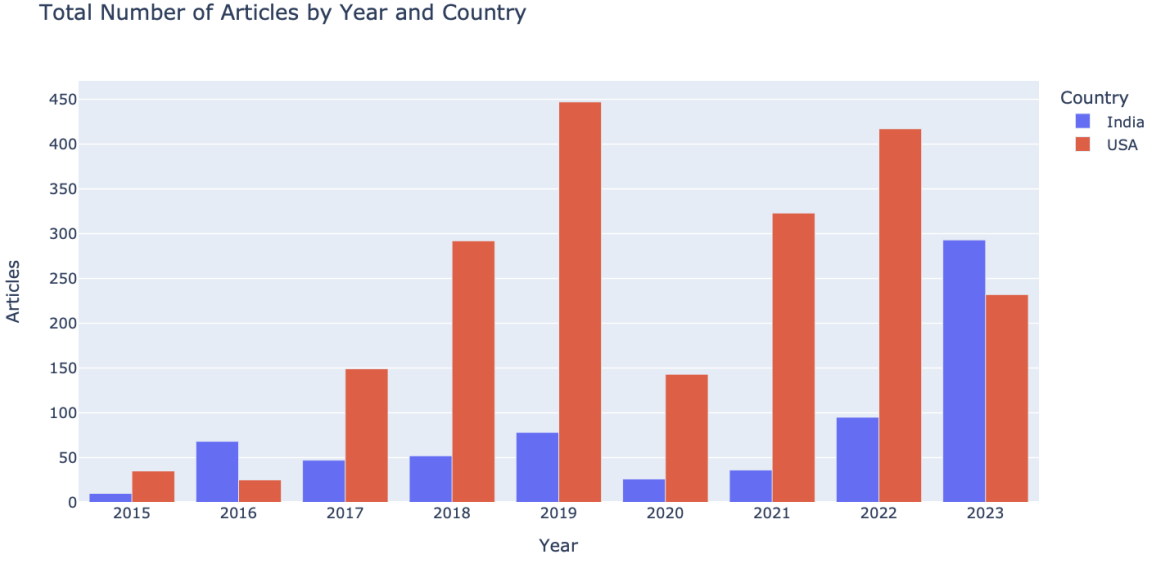
Climate change AND 
  Climate change mitigation AND 
  Climate variability and change AND 
  Paris Agreement (Paris climate accord) AND

Climate change denial AND 
  Climate change adaptation AND 
  Effects of climate change

This strategic query configuration, filtering by language and focusing on the geographic location of India and USA, is designed to yield a comprehensive dataset for the study, ensuring a robust foundation for subsequent analysis.

### 2.3 About the Data

The dataset includes Source, Title, Author, Publication Data and complete text articles. The sources for India are Times of India, Hindustan Times and for the USA it is NY Times, Washington Post, Fox News, CNN. 2768 articles are collected totally for both the countries. The total number of articles collected from Indian Sources(Eastern Sources) is 705 articles and from the Western Sources(USA) is 2063 articles.



## 3. Initial Sentiment Score Calculation

In the initial phase of the study, various methodologies were explored for calculating sentiment scores of each article, particularly RoBERTa and NRC Lexicon. RoBERTa was chosen for its contextual understanding capabilities and NRC Lexicon was selected for its extensive range of emotion categories, offering a more nuanced analysis than the traditional binary classification of sentiments. However, these methods demonstrated limitations in accurately categorizing articles related to climate change. Articles often erroneously received negative sentiment labels when they merely discussed concerns, risks, or challenges associated with climate change, rather than expressing opposition to climate action.

### 3.1.1 Robustly Optimized BERT Pre Training Approach (RoBERTa)

It is pretrained on a larger corpus and with more data, which enhances its language understanding capabilities. It outperforms BERT and other models on several benchmark datasets in high-accuracy sentiment analysis.

#### Working:

- It works on the same principles as BERT, employing a transformer-based architecture with an attention mechanism that understands contextual relations between words (or sub-words) in a text.
- Unlike BERT, which is trained on the final hidden states of the pretraining data, RoBERTa trains on longer sequences and more data, improving its contextual predictions.
- It also removes BERT's next-sentence prediction and trains with dynamic masking, allowing the model to better capture the sentiment nuances in a sentence or paragraph.

Utilized RoBERTa's tokenizer to process the text into tokens that the model understands, dividing the text into manageable chunks if it exceeds the model's maximum sequence length(512). Each chunk is analyzed separately, and the resulting sentiments are aggregated, by a majority vote, to determine the overall sentiment of the article. The sentiment labels are mapped, where LABEL\_0 is 'Negative', LABEL\_1 is 'Neutral', and LABEL\_2 is 'Positive'. Used cardiffnlp/twitter-roberta-base-sentiment model since it was fine-tuned on Twitter data, which

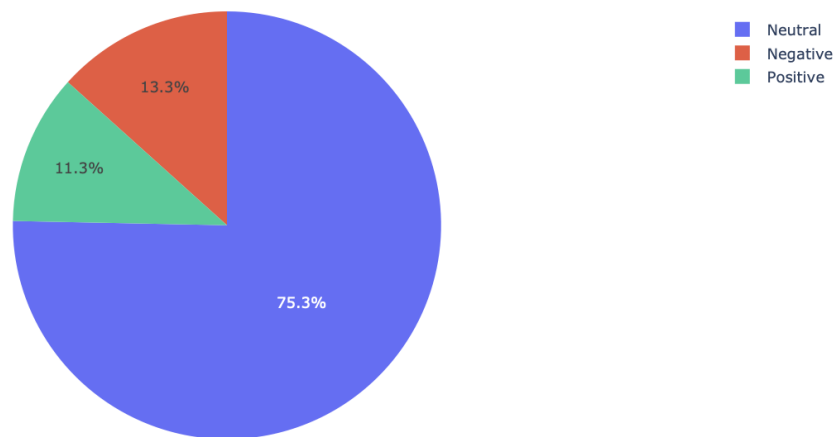
often contains concise expressions of sentiment, making it adept at picking up nuanced emotional cues that might be present in short-form news snippets.

### Sentiment Classification Range:

RoBERTa classifies sentiments based on the contextual relationship of words rather than the presence of specific keywords.

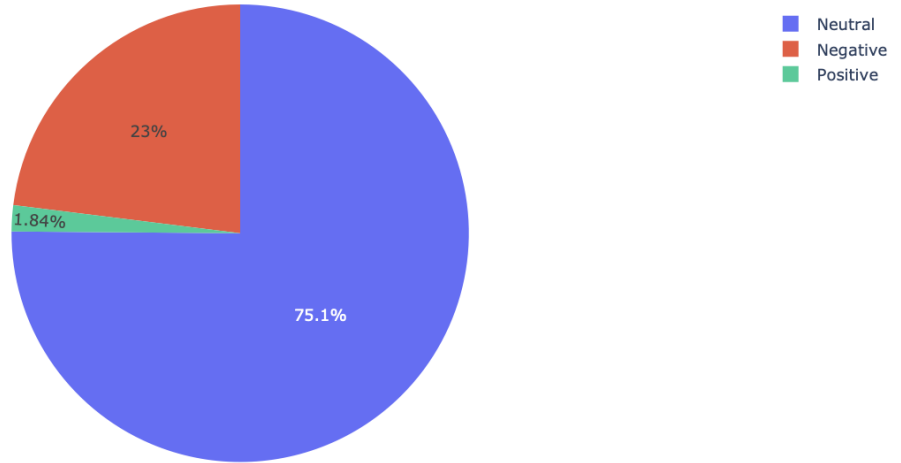
- Negative sentiment - negative aspects or challenges related to climate change, such as the difficulties in combating it, the impact of policy decisions, or challenges faced by specific countries
- Positive sentiment - reflects a positive development or achievement in climate change efforts, like the signing of an agreement or successful initiatives.
- Neutral Sentiments - often comes from factual reporting, absence of emotional language, or balanced discussions without clear positive or negative leanings.

Sentiment Distribution in India



A larger proportion of neutral sentiments is observed in Indian articles. And only 24% of the articles represent positive and negative sentiment.

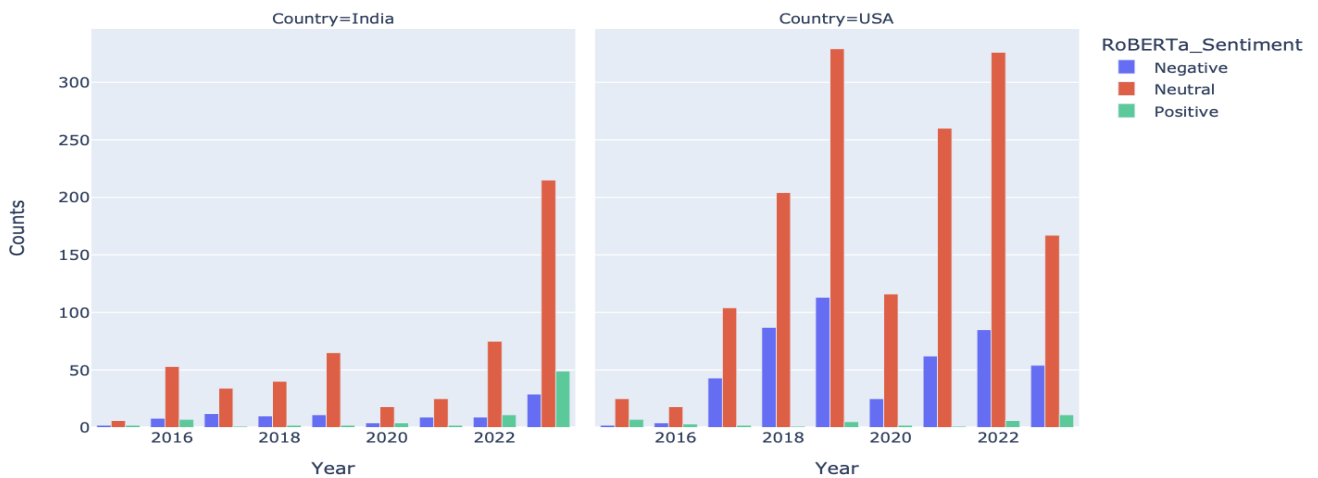
### Sentiment Distribution in USA



The significant presence of negative sentiments in the USA indicate critical perspectives on climate policy effectiveness or concerns about implementation challenges.

Number of Articles present in each year for all the 3 sentiment categories for both India and USA:

### Yearly Sentiment Distribution in India and USA





Media Coverage in India for Climate Change has traditionally been less than in the USA. However, from 2020 to 2023, there has been a gradual increase in climate change reporting in India. This increase may be attributed to India taking a more active role in international climate negotiations, increased impacts of climate change on the Indian subcontinent, and growing public awareness and activism. The sudden peak of positive sentiment in 2023 might be associated with India's evolving climate policies, investment in renewable energy, and its role in international climate forums.

A significant increase in negative sentiment can be observed from 2016 to 2017 and onwards in the USA due its intention to withdraw from the Paris Agreement under the Trump administration, causing media coverage and discourse on climate action. In 2020, the negative sentiment dropped because of the temporary decrease in emissions during COVID19 and has continued being less than 2018 and 2019 because the USA rejoined the Paris Agreement under the Biden administration.

#### Examples to Support the Above Findings:

##### Indian News Articles:

Positive Sentiment shown in the article: India has made strides in tackling climate change

This article speaks about how India has provided “real solutions” for tackling climate change issues, thereby reflecting a positive development or achievement in climate change efforts.

##### USA News Articles

Negative Sentiment shown in the article: Flooding of Coast, Caused by Global Warming, Has Already Begun

This article speaks about how Tidal floods are causing significant damage to the United States' coastline which is caused due to Global warming, indicating the consequences of climate change.

#### Statistical Test to Check if Sentiments are Significantly Different:

The T-statistic is a measure of the difference between the two group's means relative to the variation in their sample data. T-statistic of 10.316978427728202 is relatively high, indicating a

significant difference between the average sentiment scores of climate change-related news articles in India and the USA.

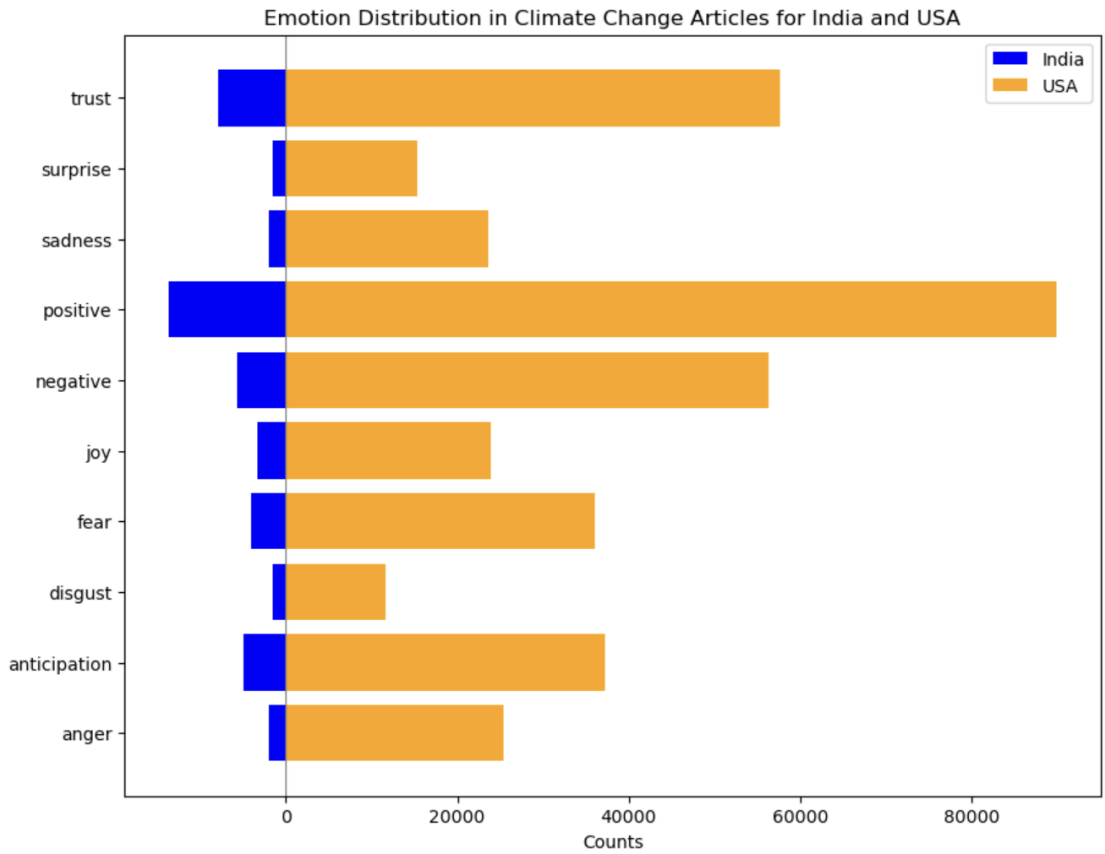
The P-value indicates the probability of observing the data assuming the null hypothesis (no difference between the groups) is true. A P-value of  $1.6331500130072418e-24$  (extremely close to 0) indicates that the probability of observing such a difference by random chance is extremely low. This extremely low P-value strongly suggests that the difference in sentiment scores between Indian and American news articles is statistically significant and not just due to random variation.

### Challenges:

- Sentiment analysis tools like RoBERTa assess language, not the intrinsic stance on climate change, which can lead to misinterpretations.
- A negative sentiment score in articles often captures the expression of concerns, risks, or challenges associated with climate change rather than opposition to climate action.
- It's crucial to contextualize sentiment scores, especially for issues like climate change, where sentiments could reflect the complex interplay between policy effectiveness, environmental impact, economic consequences, and societal response.

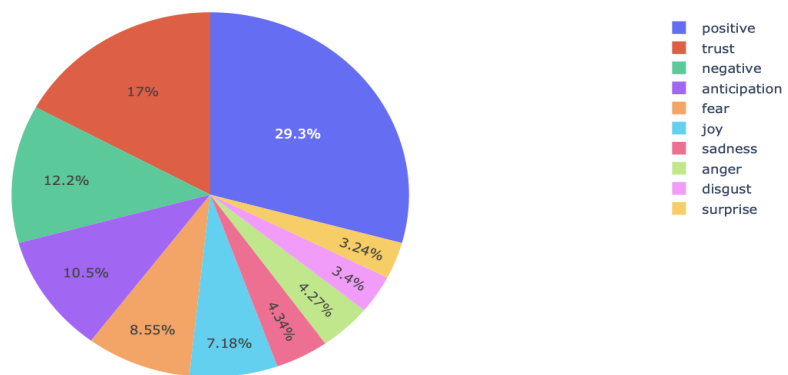
### 3.1.2 NRC Lexicon

The NRC Emotion Lexicon is a list of 14,000 English words and associations with eight basic emotions (anger, fear, anticipation, trust, surprise, sadness, joy, and disgust) and two sentiments (negative and positive). It is developed using Amazon Mechanical Turk to crowdsource human annotations. While RoBERTa gives an overall sentiment score, the NRC Lexicon complements this by breaking down the emotional composition, offering a multidimensional view of sentiment.

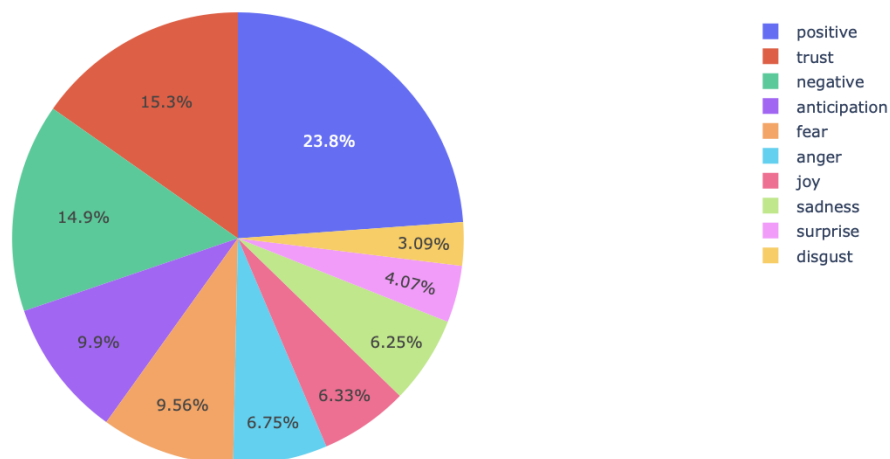


It can be seen above how the 8 emotions vary for both the countries. Positive sentiment has the highest number of counts for both the countries, followed by trust, negative sentiment and anticipation.

Emotion Distribution in India



### Emotion Distribution in the USA



The above pie charts depicts the percentage for each emotion for both the countries. The top 4 emotions for both India and USA are the same. Whereas, the emotions such as fear, joy, anger, sadness, surprise and disgust marginally vary for both the countries.

#### Limitation:

It is a word-level analysis that may not fully capture the sentiment context, especially in a nuanced topic like climate change.

## 4. Generative Pre-Trained Transformers (GPT)

To address the above limitations, GPT mode is used. A transformer-based language model with 175 billion parameters, trained on a diverse dataset encompassing a wide spectrum of the internet's text and recognized for its superior capability in understanding contextual subtleties. The OpenAI API was employed to create a specific sentiment score scale and the model was tasked with reading each article. Based on this scale, GPT assigned sentiment scores, thereby enabling a more contextually accurate assessment of sentiments within the climate change discourse. This approach proved more efficacious in capturing the nuanced sentiment expressions inherent in the complex topic of climate change.

### Working:

- Generation of Context-Aware Embeddings - each word is converted into a vector that captures not just the word's meaning but its context within the sentence.
- Layered Processing in Transformer Architecture - multiple transformer layers process text data in a hierarchical manner. Each layer extracts different levels of linguistic information, from basic syntax to complex semantic relationships.
- Dynamic Adjustment of Neural Network Weights - during its pre-training, it has learned to dynamically adjust the weights in its neural network, based on the input text. This training enables the model to adapt its response strategy depending on the text it analyzes.
- Large-Scale Training for Diverse Textual Understanding - trained on an extensive dataset, GPT can understand a wide range of writing styles and topics. This training is critical for its ability to handle diverse articles on climate change articles, each with its unique style and content.

Sentiment score for each article is calculated using OpenAI's API and gpt-3.5-turbo-1106 model. A prompt is given to read and understand climate change articles and to be able to analyze the context of the articles, whether its sentiments are for or against climate change mitigation as well as checking if the opinions expressed in the articles are based on factual(evidence based) or non-factual information.

Prompt Structure:

Classify the following news article related to climate change:

{article}

Provide the sentiment score on a scale of 0 to 7, where:

0 represents extreme negativity towards climate change mitigation,

3 is a balance,

7 represents extreme positivity.

Provide the factual basis score on a scale of 1 to 5, where:

1 represents opinions based on non-factual information,

5 represents opinions based on factual, evidence-based information.

And a brief analysis

Examples of Responses returned from the GPT Model:

Country	Source	Title	Year	Sentiment Score	Fact Score	GPT Analysis
India	The Times of India	India expresses concerns over the draft of Paris agreement	2015	5	4	The news article discusses the delivery of a draft climate agreement by a team of diplomats to the world's governments. The language used does not exhibit extreme negativity or extreme positivity toward climate change mitigation. The article seems to be based on factual, evidence-based information as it reports on a specific event related to climate change diplomacy
USA	The New York Times	To Tackle Climate Change, a New U.N. Climate Report Says Put a High Price on Carbon	2018	6	5	The article discusses the importance of carbon pricing as a central tool for controlling global warming. It presents various viewpoints and evidence-based information from experts and policymakers, making it a factually based article. The sentiment is positive, highlighting the potential benefits of implementing carbon pricing initiatives for climate change mitigation.

### Sentiment Scale:

The scale ranges from 0 to 7 following the 7 point Likert scale. This scale is chosen and used because it is helpful in gathering data on subjective opinions and preferences which can be seen in news articles. Each score in this range indicates:

- 0 - Represents strong negativity/strongly disagreement towards climate change mitigation
- 1, 2 - Represents somewhat disagreement towards climate change mitigation
- 3 - Represents neutrality/either agreement or disagreement(balance) towards climate change mitigation
- 4 - Represents partial agreement towards climate change mitigation
- 5, 6 - Represents agreement towards climate change mitigation
- 7 - Indicates high positivity and proactive engagement in climate change mitigation

### Example Headlines for each Sentiment Score Category:

For Sentiment Score 1:

Difficult for India to mitigate climate changes without support - Times of India  
Trump's reasons for leaving the Paris climate agreement just don't add up  
Alaska officials outraged after feds cancel Trump-era ANWR oil leases  
Expressing climate distress through art exhibitions | Chennai News - Times of India  
Trump's half-baked claims on climate

For Sentiment Score 2:

Paris pact not enough to save the world  
Many Europeans would be scared if Trump were elected president, survey suggests - Times of India  
Diplomats Confront New Threat to Paris Climate Pact: Donald Trump  
Trump's victory creates uncertainty for wind and solar power

For Sentiment Score 3:

In Paris, Negotiators Trim a Draft Climate Agreement, Climate Scientists Press for Nuclear Energy, Activists Prepare for Failure  
Obama and President Xi of China Vow to Sign Paris Climate Accord Promptly  
Iceland reaffirms support for India's permanent UNSC seat - Times of India  
New Orleans' New Flood Maps: An Outline for Disaster  
IGIA achieves carbon neutral status, first in Asia-Pacific region - Times of India

For Sentiment Score 4:

Putin: Climate agreement must be legally binding  
Over 130 countries likely to sign Paris pact on climate change - Times of India  
Paris Climate Accord Is a Big, Big Deal  
Paris Agreement on climate change to be signed today in New York - Times of India  
A Sequel to the Paris Climate Accord Takes Shape in Vienna

For Sentiment Score 5:

Paris Climate Deal Passes Milestone as 20 More Nations Sign  
France welcomes India's decision to ratify Paris Climate pact - Times of India  
A New Draft Agreement for Paris Climate Negotiators  
Flooding of Coast, Caused by Global Warming, Has Already Begun  
Govt surrendered to US on Climate pact: CPI(M) - Times of India

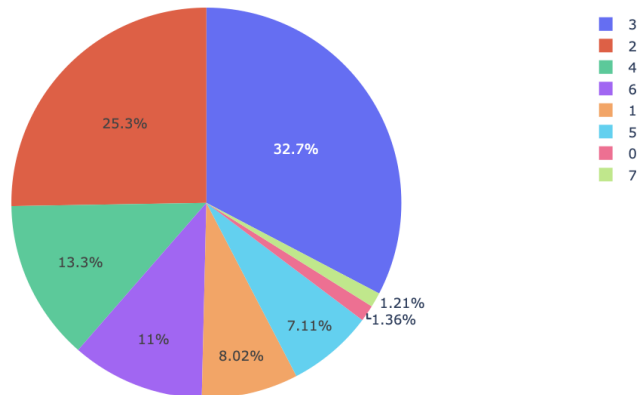
For Sentiment Score 6:

Leaders Move to Convert Paris Climate Pledges Into Action  
India has made strides in tackling climate change: TERI chief - Times of India  
Obama Discusses Climate Pact With Modi  
The Paris Climate Pact Will Need Strong Follow-Up  
Javadekar gets a promotion for cutting green tape - Times of India

For Sentiment Score 7:

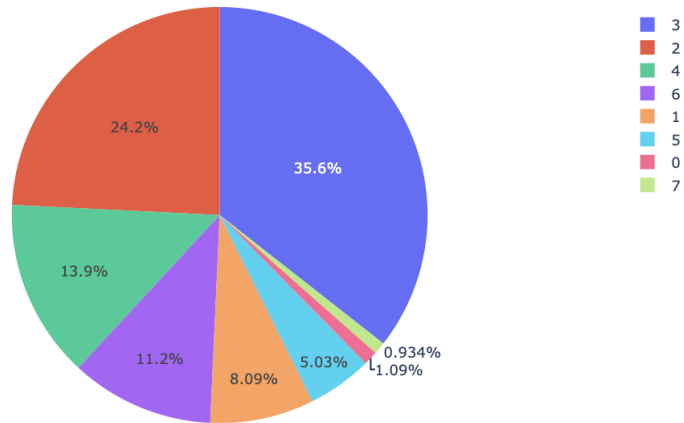
Meet the Teenagers Leading a Climate Change Movement  
Surprise Deal Would Be Most Ambitious Climate Action Undertaken by U.S.  
SMC to install weather systems in all zones of city - Times of India  
For Biden's economic team, an early focus on climate  
Global Biofuels Alliance may be a key G20 takeaway under India's presidency - Times of India

Sentiment Scores for India





Sentiment Scores for USA



The pie charts above for India and USA show similar distribution of sentiment scores with negligible variations in percentages for each category.

### Factual Information Scale:

It ranges from 1 to 5:

- 1 - Opinions with minimal factual information.
- 5 - Highly fact-based, evidence-driven content.

### Example Headlines for each Fact Score Category:

For Factual Score 1:

Climate crazies want to use schools to brainwash your kids with this radical agenda  
At 'America First Energy Conference', solar power is dumb, climate  
Russia-Ukraine crisis: Biden's twin failures on energy and foreign policy gave Putin tools to invade

For Factual Score 2:

ADB to fund millions of LED lights, pumps across India - Times of India  
Trump distances himself from far right, continues to attack the media  
Trump says East could use some 'global warming' this weekend

For Factual Score 3:

The Destination in Paris Climate Talks Was a Journey That Begins Now

India key to success of Paris climate deal: EU official - Times of India  
 EESL to set up model units for energy efficiency in Surat's textile cluster - Times of India

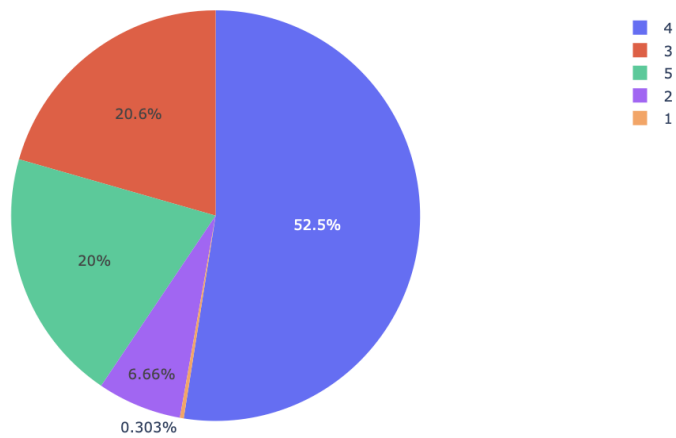
For Factual Score 4:

The Paris Climate Pact Will Need Strong Follow-Up  
 Paris Climate Accord Is a Big, Big Deal  
 IMD to launch maiden city-wise heat forecast - Times of India

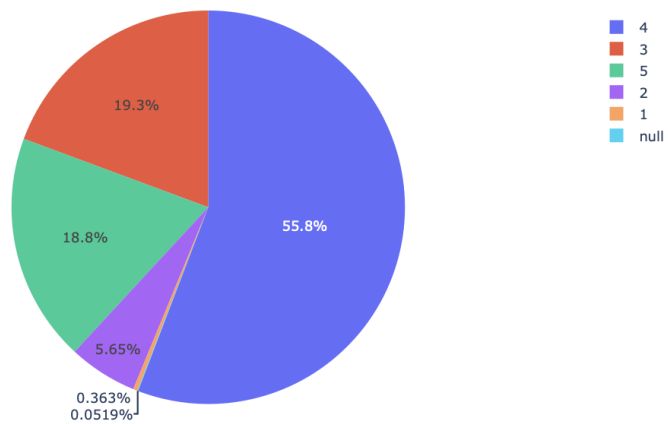
For Factual Score 5:

New rules to ensure disposal of hazardous waste in environmentally sound manner: Javadekar - Times of India  
 A Path for Climate Change, Beyond Paris  
 Inside the Paris Climate Deal

Fact Scores for India



Fact Scores for USA



The pie charts above for India and USA show similar distribution of factual scores with negligible variations in percentages for each category.

### *Correlation between Sentiment Score and Fact Score:*

To understand the correlation between these two scales, the Pearson correlation function is used. The correlation coefficient of approximately 0.383 between the sentiment scores and fact scores suggests a modest positive correlation. This indicates that to a certain degree, articles with higher sentiment scores tend to have higher fact scores as well, and vice versa. However, the correlation is not strong, hence it's not definitive.

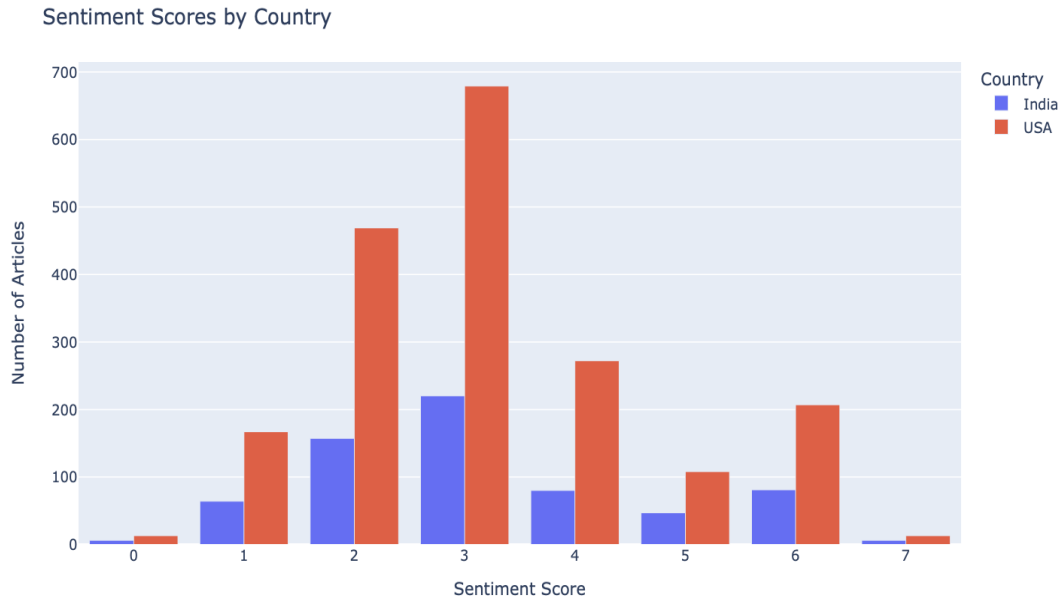
### *Advantages for Sentiment Score Calculation using GPT:*

- Contextual Understanding through Self-Attention - uses a mechanism called 'self-attention' in each transformer layer. This mechanism allows the model to evaluate and assign different levels of importance to each word in a sentence, based on its context. It enables the model to understand the relevance and influence of specific words or phrases on the overall sentiment of a text.
- Semantic and Tonal Interpretation - The model processes linguistic features such as word choice, syntax, and semantics to infer tone and underlying sentiments. It can interpret subtle expressions of approval or disapproval, which is crucial for climate change articles.
- Handling Long-Range Dependencies in words - it can understand how words or phrases far apart in a sentence can influence each other's meaning. Which is helpful in understanding complex sentence structures found in nuanced opinion climate change articles
- Advanced understanding of context, subtext, and linguistic nuances and capable of processing complex sentence structures and idiomatic expressions, critical for accurate sentiment interpretation especially in the context of climate change articles.
- Its performance in natural language understanding surpasses most other models.

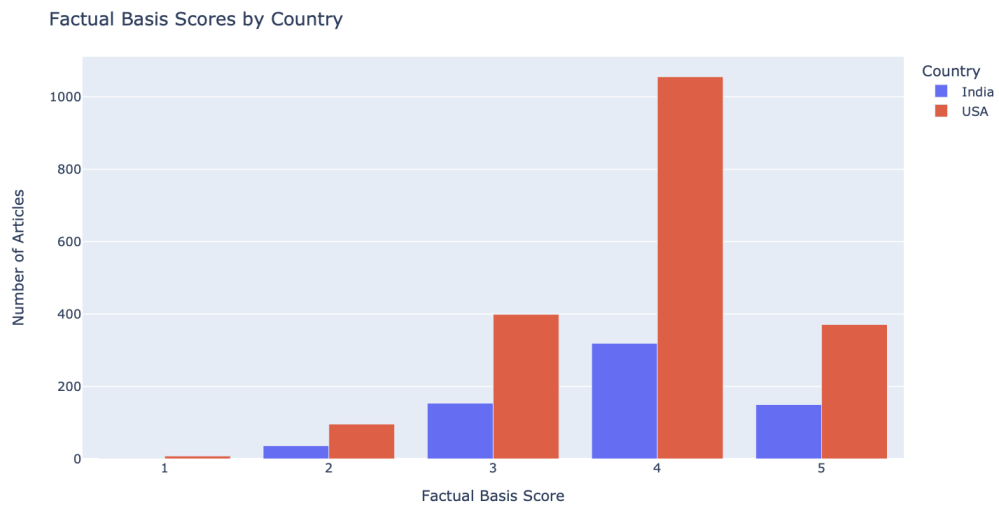
## 4. Findings

### 4.1 Analysis of Cultural Differences

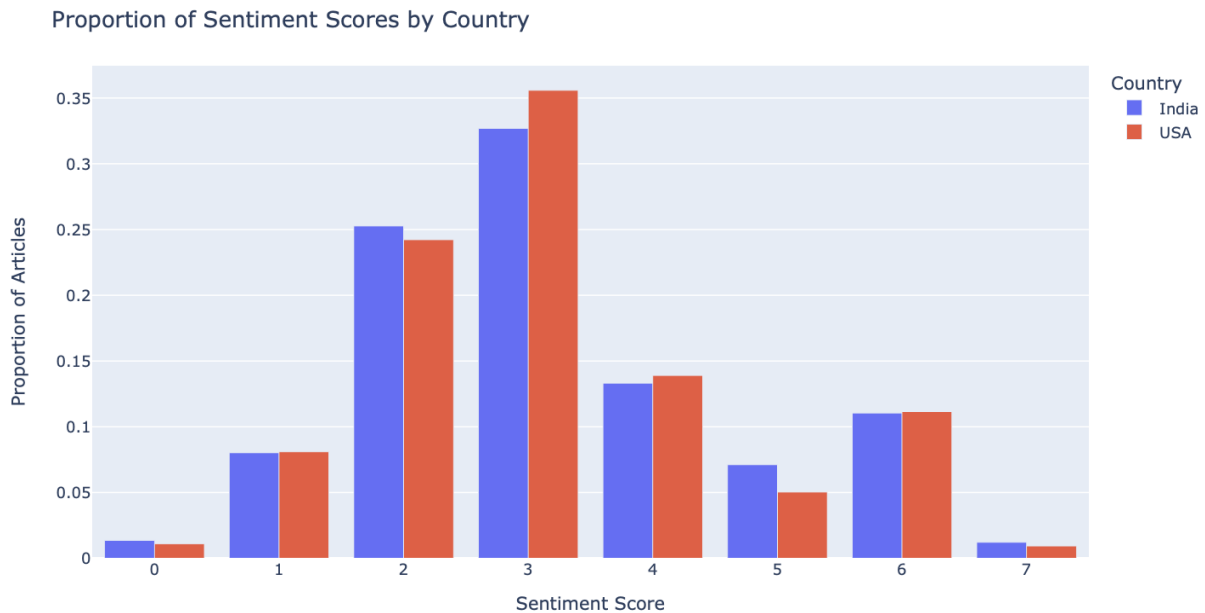
Number of Articles Present in both Countries for each Sentiment Score:



Number of Articles Present in both Countries for each Factual Score:



It is difficult to understand the difference in sentiments between both the countries through the above plots. Since the data collected is imbalanced, the number of articles collected for the USA(Western Media) is 2063 articles, whereas the number of articles for India (Eastern Media) is 705 articles. Hence, the data is normalized by calculating the proportion of articles for each sentiment and factual score within each country. This allows for a fair comparison between the two countries.



From the above plot, it can be seen that 57% of the total number of articles for India have a sentiment score of either 2 or 3, and 59% of the total number of articles for the USA have a sentiment score of 2 or 3 which accounts for the majority of the articles. The distribution of proportions of sentiment scores for both the countries is almost similar. Hence, to better understand the differences between the types of articles that result in similar sentiment scores in India and the USA, clustering algorithm is applied to each sentiment score category for both the countries which could potentially reveal more nuanced differences.

### 4.1.1 K-Means Clustering Algorithm

K-Means is a clustering algorithm known for its simplicity and efficiency in grouping data into distinct clusters. In this analysis, K-Means clustering is used to categorize articles from India and the USA based on their sentiment scores. This facilitates an insightful comparative analysis of the nature and themes of climate change articles in both countries. The articles (text data) is first pre-processed through lowercasing, punctuation and number removal, and stemming, and TF-IDF vectorization is applied. A structured format is achieved suitable for K-Means analysis. The optimal number of clusters is determined using the elbow method, enhancing the precision of the thematic categorization. K-Means assigns each article to a cluster based on the similarity of their TF-IDF vectors. The silhouette score is calculated to understand the distinctiveness and relevance of the clusters formed and the articles present in each cluster is returned. This approach allows for a nuanced understanding of the climate change discourse prevalent in India and the USA, highlighting key differences in sentiment and content.

#### **For Sentiment Score = 1:**

209 articles have a sentiment score equal to 1, out of which India has 53 articles and USA has 156 articles which is 8% of the total number of articles for both the countries.

#### *India:*

Cluster 0 (10 articles) - is focused on environmental regulations and their impact on animal populations and ecosystems. This cluster includes articles about camel populations, grazing land regulations, and environmental laws related to mining and water conservation.

Cluster 1 (34 articles) - is related to environmental policies and international perspectives on climate change, including discussions on water stress, environmental conservation efforts, and international cooperation on climate action.

Cluster 2 (4 articles) - involves local initiatives and actions regarding environmental conservation, such as banning single-use plastics and implementing green practices.

Cluster 3 (5 articles) - is centered around water bodies and the legal actions or governmental efforts to protect and rejuvenate rivers and water systems.

*USA:*

Cluster 0 (26 articles) - is a collection of articles that detail the interplay between environmental policy, regulation, legislative intent, industry influence, and judicial interpretation. These articles offer insight into the challenges of implementing environmental protections within the framework of existing laws, the impact of political and industrial influences, and the broader implications for addressing climate change and environmental degradation. This cluster encapsulates the tension between regulatory efforts and political dynamics in the USA.

Cluster 1 (58 articles) - is about the intersection of politics and climate change, highlighting controversies and debates within the U.S. political landscape, the actions of specific political figures, and the real-world impacts of policy decisions on the environment and society. The cluster reflects the nature of climate policy discussions in the Trump era, as well as the political and legal actions taken by various stakeholders in response to these policies.

Cluster 2 (29 articles) - focuses on Trump's Dismissal of Climate Science, Trump's Reliance on Personal Beliefs Over Established Facts, Trump's Trust in Authoritarian Leaders, articles raise concerns about the implications of Trump's disregard for facts, including the undermining of scientific institutions, the credibility of the presidency, the formulation of policies not rooted in reality, and the potential encouragement of similar behavior by other world leaders.

Cluster 3 (13 articles) - encapsulates a complex debate over climate change policy, the economic costs and benefits of transitioning to clean energy, and the political hurdles that come with implementing such transformative changes in the United States. It also touches on the broader international implications of U.S. energy policy

Cluster 4 (15 articles) - focuses on the tension between the Trump administration's energy policies, which favor increased fossil fuel production and deregulation.

Cluster 5 (9 articles) - focuses on the wildfires in California, particularly the massive fires that struck the town of Paradise and other areas. The cluster includes debates on forest management

practices, political responses, and the impact of climate change on increasing the severity and frequency of such wildfires. The cluster raises concerns about the broader environmental impact of the wildfires, including air quality issues and the long-term effects on California's landscapes. Articles also touch upon the resilience of the affected communities and their efforts to recover from the devastation. Some articles include personal stories from residents who experienced the fires.

Cluster 6 (6 articles) - centers on the politicization of natural disasters like hurricanes, the debate over the role of climate change in exacerbating these events, and the responses from political figures and media to these crises

*Differences in Articles between India and USA with Sentiment Score = 1:*

Clusters in India tend to focus on specific environmental policies and local initiatives. There's a strong emphasis on conservation efforts, including the protection of water bodies and actions against single-use plastics.

The USA clusters highlight the complex interplay between environmental policy, political influence, and legislative challenges. There's a significant emphasis on the political dimension of environmental issues, particularly the controversies and debates related to climate change during the Trump administration.

1. Political Context and Controversies:

India: The political context in India's clusters is more about local and national efforts in environmental conservation and less about political controversies.

USA: Political controversies, particularly related to the Trump administration's stance on climate change, dominate several clusters.

2. Local vs. National and International Perspectives:

India: Indian clusters appear more focused on local and national initiatives, such as the rejuvenation of rivers and banning plastics, and include international cooperation on climate action.



USA: The US clusters include both national and international perspectives, with an emphasis on the broader implications of US energy policy, the economic aspects of transitioning to clean energy, and the country's position in global climate politics.

### 3. Type of Environmental Issues:

India: The environmental issues in India's clusters are more centered around conservation, water stress, and local ecological initiatives.

USA: The issues in the US clusters are more diverse, covering wildfires, climate change policy debates, natural disasters like hurricanes, and their politicization.

### 4. Government Response and Public Perception:

India: There's a focus on governmental efforts to protect the environment, reflecting a proactive stance in policy implementation and public support for these measures.

USA: The clusters suggest a more contentious relationship between government actions and public perception, especially in the context of political figures' responses to natural disasters and environmental crises.

### 5. Economic Considerations:

India: Economic considerations are less prominent in the Indian clusters, with a greater focus on environmental protection and conservation efforts.

USA: Economic implications, particularly the costs and benefits of clean energy transitions and the impact of environmental policies on industries, are a significant aspect of the US clusters.

### **For Sentiment Score = 2:**

634 articles have a sentiment score equal to 2, out of which India has 167 articles and USA has 467 articles which is around 24% to 25% of the total number of articles for both the countries.

#### *India:*

Cluster 0 (70 articles) - focuses on environmental management and urban planning issues, particularly waste management challenges and initiatives in Indian cities. The cluster includes articles on how major cities like Mumbai are addressing waste disposal challenges, especially in

the context of frequent fires at dumping grounds. It also includes discussions about air quality in mining areas and the implementation of measures to maintain acceptable air quality indices. There is also some information on the decisions taken by municipal corporations and environmental boards, highlighting collaborative efforts between local bodies and the central government to tackle environmental challenges as well as the role of NGO's.

Cluster 1 (97 articles) - focuses on international environmental policies, climate change discussions, and India's response to global climate challenges. It mainly includes India's reaction to the Paris Agreement, Critiques and Analysis of Climate Policies, and internal strategies and actions to combat climate change, including ratification of international treaties and internal discussions on environmental policies. Reports on visits and collaborations with foreign dignitaries and organizations, focusing on climate change

*USA:*

Cluster 0 (35 articles) - focuses on the destructive wildfires that occurred in Southern California. The cluster includes articles talking about severity and spread of Wildfires, impact on communities, the environmental and health risks, and the broader implications in terms of climate change and future preparedness.

Cluster 1 (432 articles) - Several articles talk about international efforts to tackle climate change, particularly the Paris Agreement; the challenges, expectations, and progress in global climate negotiations and the potential impact of these agreements on mitigating global warming. There's a significant focus on the political responses to climate change issues, including the stances of various countries and political parties.

*Differences in Articles between India and USA with Sentiment Score = 2:*

- India's articles focus on the nation's response to the Paris Agreement, internal strategies for climate action, and collaborations with foreign entities. India's environmental challenges are mainly related to urban planning and management. This reflects the country's rapid urbanization and the environmental pressures that come with it.

- The USA's articles, while also discussing international climate efforts, place a stronger emphasis on political responses and the varying stances of different political groups and leaders. The USA's primary environmental concern, as per the clusters, is related to natural disasters (wildfires), which are directly linked to broader climate change issues. This highlights the immediate and visible impacts of environmental changes on American communities.

### **For Sentiment Score = 3:**

902 articles have a sentiment score equal to 3, out of which India has 216 articles and USA has 686 articles which is around 32% to 35% of the total number of articles for both the countries.

#### *India:*

Cluster 0 (23 articles) - focus on educational initiatives, such as the collaboration between the Goa State Biodiversity Board and the state education board, to involve students in biodiversity and climate change projects. It also includes an article about Goa looking towards the Netherlands for solutions to coastal sand erosion. The articles also discuss the effects of rapid urbanization, such as habitat changes leading to diseases like scrub typhus spreading from rural to urban areas.

Cluster 1 (15 articles) - focuses on the critical aspects of wildlife conservation, especially concerning tigers. It includes the use of technological advancements like drone surveillance in tiger reserves, discussions on national animal status and its implications for conservation, addressing human-wildlife conflicts, particularly with elephants, conducting environmental assessments, celebrating conservation successes, and the role of governmental policies and initiatives in these efforts.

Cluster 2 (42 articles) - revolves around sustainable development, focusing on financial institution's performance in supporting rural infrastructure, urban development strategies for sustainable growth, and infrastructure projects aimed at boosting regional economies while considering environmental impacts.

Cluster 3 (45 articles) - focuses on pollution control, Coverage of government directives and plans to combat environmental issues like deforestation and air pollution. It also includes efforts to involve communities and the public in environmental protection through campaigns and awareness programs; encouraging public participation in environmental conservation and highlighting the role of citizens in combating climate change.

Cluster 4 (48 articles) - It includes local climate change initiatives such as installing household weather meters in Surat for micro-level weather forecasting and pollution monitoring. Discussions on studies and reports highlighting the impacts of climate change in different regions of India, including potential declines in living standards due to changing climatic conditions, effects on agriculture and economic growth. Actions taken by state governments and local administrations, such as Bihar's call for increased green cover and efforts to mitigate the impacts of global climate change. Addressing the challenges posed by climate change, such as erratic rainfall, extreme weather conditions, and rising temperatures.

Cluster 5 (53 articles) - Discussions on power reform initiatives, such as the Uday scheme, and the reluctance of some state governments, like Tamil Nadu, to adopt these reforms. The significance of renewable energy, particularly geothermal energy, and India's cooperation with countries like Iceland in this sector. Coverage of India's diplomatic interactions with other countries, emphasizing support for India's permanent seat in the UN Security Council and collaborative efforts on global challenges like climate change. India's engagement in international platforms such as BRICS, focusing on various global issues including climate change.

*USA:*

Cluster 0 (295 articles) - discusses a range of issues related to climate change and its impacts. It includes challenges and risks associated with hurricane seasons, specifically in New Orleans, and the implications of FEMA's new flood maps. examines the implications of these rising levels for local communities, ecosystems, and policies. The impact of global warming on the airline industry, with a specific focus on how increasing temperatures and heat waves could affect

aircraft takeoff and lead to operational challenges, such as weight restrictions and delayed or canceled flights. An art installation in Philadelphia, designed to provoke discussions about climate change and rising sea levels, which ironically sank due to heavy rains.

Cluster 2 (391 articles) - focuses on the Paris climate talks and the resulting Paris climate agreement. The discussions and articles in this cluster likely cover various aspects of the negotiations, the roles and statements of key figures like John Kerry, and the reactions of different stakeholders, including scientists, activists, and corporations.

*Differences in Articles between India and USA with Sentiment Score = 3:*

- India's clusters show a more localized and diverse approach, addressing specific issues like wildlife conservation, pollution control, urban development, and educational initiatives. In contrast, the USA's clusters are more focused on broader aspects of climate change, such as its impacts on different sectors and international agreements.
- The USA's clusters are more oriented towards international diplomacy and global agreements, such as the Paris climate talks, whereas India's clusters also include international cooperation but with a notable focus on local initiatives and regional impacts

**For Sentiment Score = 4:**

356 articles have a sentiment score equal to 4, out of which India has 88 articles and USA has 268 articles which is 13% of the total number of articles for both the countries.

*India:*

Cluster 0 (5 articles) - includes articles about mining-related and port expansion projects in India. The key aspects include review and assessment by the Expert Appraisal Committee (EAC), Environmental and Coastal Regulation Zone (CRZ) clearances, impact of projects on local habitats and ecology, and socio-economic considerations. Government and Judicial interventions

which includes reconstitution of committees overseeing illegal mining and directions for environmental compliance.

Cluster 1 (4 articles) - deals with proactive measures taken in various regions of India to address plastic waste management, public engagement in sustainability efforts, rejuvenation of polluted water bodies, and the implementation of innovative technologies and collaborative projects for environmental conservation such as EU-India water partnership.

Cluster 2 (10 articles) - the topics covered in this cluster are fire hazards and safety audit, educational and awareness programs, bureaucratic changes and appointments in the Ministry of Environment, Forests and Climate Change. The Tata Institute of Social Sciences (TISS) entering into a strategic alliance with the University of Sydney for research on human security and the impact of human activities on climate and the environment showcases the cross-border collaboration in addressing global environmental issues.

Cluster 3 (7 articles) - focuses on urban environmental challenges faced by major cities in India such as heatwaves and climate change in Delhi, and air pollution in Mumbai. The cluster also talks about pollution control measures at AIIMS, Delhi, public health and disaster management workshop in Dehradun and India's low score on Global Clean Air Scorecard.

Cluster 4 (17 articles) - focuses on conservation activism, wildlife protection, and the conflicts arising between development projects and environmental preservation. It includes arrest of environmental activist Piyush Manush in Tamil Nadu, notification of ecologically sensitive areas in Western Ghats, India-Bangladesh Relations and Environmental Concerns. Opposition to railway line upgrade through Melghat Tiger Reserve and Goregaon-Mulund Link Road through Sanjay Gandhi National Park.

Cluster 5 (5 articles) - discusses the impact of climate change on weather patterns and conservation initiatives. It includes articles about rising night temperatures in Maharashtra, possible renaming of Corbett Tiger Reserve, 'Gift a Tree' Initiative in Delhi, challenges in providing land for plantations, and mega plantation drive in Bhubaneswar.

Cluster 6 (17 articles) - it includes articles about India Meteorological Department(IMD) summer temperature outlook, farmers issues in Assam, fines for non-compliance on river Yamuna revival, construction of waste plant in Basai wetland. The cluster also mentions the tragic death of a UNDP consultant en route to a UN environment assembly. Her role in international environmental cooperation highlights the global nature of environmental challenges and the need for collaborative efforts.

Cluster 7 (23 articles) - It includes articles about earth hour day participation, Paris Climate Agreement signing, India's role in Paris Agreement, TERI's World Sustainable Development Summit, European Perception of US Presidential Candidates. It reflects the international community's expectations from political leaders regarding environmental policy and sustainability.

*USA:*

Cluster 0 (131 articles) - focuses on the Paris climate talks, highlighting the global effort to reach a legally binding agreement to combat climate change. It discusses the inadequacy of emission pledges by countries and the challenges in achieving an ambitious climate change action plan. The details of the negotiations, the diplomatic journey, and the potential impact of the Paris Agreement are explored. Russian President Vladimir Putin's statement on the necessity of a legally binding agreement at the Paris climate conference is highlighted.

Cluster 1 (137 articles) - focuses on various aspects of U.S. politics, including Bernie Sanders' presidential campaign and its aftermath. It emphasizes the continuation of the movement he inspired, particularly in progressive politics and issues like climate change and campaign-finance reform. It also discusses the role and statements of the U.S. Defense Secretary Jim Mattis in contrast to President Trump, especially in regard to American values and interests. The reaction of U.S. cities and states to President Trump's decision to withdraw from the Paris climate accord is mentioned, showcasing dissent against this decision and the proactive role of U.S. governors in various social and environmental issues.

*Differences in Articles between India and USA with Sentiment Score = 4:*

- India's clusters focus more on local environmental challenges, government interventions, and the balance between development and conservation. There is also an emphasis on international research collaborations.
- The USA's clusters highlight the impact of national politics and leadership on global environmental policies, the role of state governments in countering federal actions, and the country's significant influence in international environmental agreements.

**For Sentiment Score = 5:**

144 articles have a sentiment score equal to 5, out of which India has 47 articles and USA has 97 articles which is 5% to 7% of the total number of articles for both the countries.

*India:*

Cluster 0 (4 articles) - includes articles about the implementation of environmental laws, cluster touches on healthcare, with a specific example of a premature baby's survival and growth. This story, while primarily a health issue, indirectly links to broader environmental concerns, as the health of newborns can be impacted by environmental factors. The cluster also discusses the challenges and necessary clearances for infrastructure projects such as construction of elevated corridor along river Yamuna in Delhi.

Cluster 1 (14 articles) - includes articles about climate change impact on agriculture, coral reefs and marine ecology, and groundwater policy and management.

Cluster 2 (6 articles) - includes articles about wetland conservation, biodiversity research, and invasive species management. Discussions around the Western nations approach to climate change and the appeal to keep renewable energy out of the World Trade Organisation (WTO) framework demonstrate India's active engagement in global environmental diplomacy and policy.



Cluster 3 (17 articles) - includes articles about Paris Climate Agreement; negotiations and outcomes. Prime Minister Narendra Modi's tweet about the victory of “climate justice” following the Paris agreement indicates India's stance on global environmental issues and the emphasis on equitable solutions. The release of the Hazardous Waste Rules 2016 in India and discussions on climate change approaches by Western nations highlight the country's efforts to manage environmental challenges through legislation and international diplomacy.

Cluster 4 (6 articles) - covers a range of issues involving environmental regulation, conflict between industrial development and ecological preservation, coastal zone management, and the efforts to balance economic growth with environmental sustainability in India

*USA:*

Cluster 0 (6 articles) - it mainly includes articles about the Paris Agreement; Resources and guides for those interested in following the negotiations. The impact of external events, like the November 13 terror attacks in Paris, on the climate conference and related environmental art events. Updates on the evolving versions of the international agreement as negotiators worked through complex issues. Highlights and summaries of the final draft text of the climate agreement submitted to delegates.

Cluster 1 (12 articles) - focuses on practical and immediate challenges of managing and responding to devastating wildfires in California, highlighting a real-world consequence of climate change.

Cluster 2 (79 articles) - articles detailing how rising sea levels and increased flooding are affecting coastal communities in the United States. This includes the challenges faced by cities like Norfolk, Va., and the measures being taken to mitigate the impact of climate change-induced flooding. Coverage of initiatives like the Polynesian voyaging canoe Hokulea's global journey, which aimed to spread awareness about environmental issues and traditional navigation methods. The voyage highlights the cultural significance of traditional knowledge in understanding and addressing environmental challenges. It also includes political responses to climate change such

as Miami Beach's plan to combat flooding, consequences of global warming, and stories of local leaders and communities taking initiative to address climate change challenges.

*Differences in Articles between India and USA with Sentiment Score = 5:*

India's clusters show a blend of regulatory focus, agricultural and marine concerns, international diplomacy, and balancing development with ecological preservation. In contrast, the USA's clusters are more centered on responding to immediate climate impacts like wildfires, addressing specific vulnerabilities like coastal flooding, and emphasizing local and cultural initiatives in the face of federal-level political challenge

**For Sentiment Score = 6:**

288 articles have a sentiment score equal to 6, out of which India has 73 articles and USA has 215 articles which is 11% of the total number of articles for both the countries.

*India:*

Cluster 0 (17 articles) - Discussions about the Indian government's efforts in environmental protection, such as green clearances for coal washeries. Events like the World Culture Festival on the Yamuna floodplains, which raised concerns about environmental damage and conservation.

Cluster 1 (39 articles) - India's challenges with the WTO regarding solar panel production and trade disputes with the US. The dynamics of international cooperation and conflict in the context of climate change and renewable energy. The role of NGOs like Greenpeace in advocating for climate action and the ratification of international agreements.

Cluster 2 (7 articles) - includes articles about the National Green Tribunal's involvement in the conservation of Najafgarh wetlands in Gurgaon, highlighting legal and environmental activism. Supreme Court rulings to protect forested areas in the Aravallis, underscoring the legal framework's role in environmental conservation. The dilemma of local farmers in Haryana regarding land flooding and potential government interventions.

Cluster 3 (6 articles) - includes articles about Earth's temperature rising by one degree Celsius since the 20th century. Increasing unpredictability of monsoons in India, with fluctuations in rainfall patterns causing issues like droughts and floods. Specific impact on mountain regions like the Hindu Kush Himalayas, which are warming faster than the global average. Studies by institutions like IIT Madras and IIT Bombay on changing rainfall patterns. Climate and water atlas warnings about temperature and precipitation changes in the Hindu Kush Himalayas. Findings on how climate change is disrupting traditional weather patterns and causing extreme weather events.

Cluster 4 (4 articles) - Changes in the management effectiveness evaluation of tiger reserves, including Valmiki Tiger Reserve. The increase in tiger populations in specific reserves, reflecting successful conservation efforts. Adjustments in visitor fees and policies in tiger reserves like Dudhwa, aimed at increasing tourism and awareness. Talks and presentations by experts in fields related to environment and wildlife, aiming to educate and inspire action among young people.

*USA:*

Cluster 0 (88 articles) - includes articles about studies conducted by students and scientists on the melting of permafrost, and its effects on Arctic ecosystems. Observations on the impact of climate change in the Arctic region, including rising temperatures and the melting of ice sheets. Involvement of students in hands-on environmental research projects, like the Park School students studying changes in the Arctic landscape. The importance of such expeditions in educating the younger generation about environmental issues and research methodologies.

Cluster 1 (41 articles) - deals more with the global perspective and international cooperation in climate change efforts.

Cluster 2 (86 articles) - delves into specific national and regional policies, showcasing how different areas are implementing strategies to combat climate change.

*Differences in Articles between India and USA with Sentiment Score = 6:*

- India's clusters tend to emphasize legal activism, regional environmental challenges, and international trade disputes related to environmental policies. In contrast, the USA's clusters are more focused on the scientific study of climate change impacts, particularly in the Arctic, and state-level policy initiatives.
- India's clusters reflect its emerging economy status with a focus on balancing environmental protection with economic development and international trade (as seen in solar panel production disputes), whereas the USA's clusters reflect its role as a developed nation with established environmental policies and a focus on leading global climate change initiatives.

**For Sentiment Score = 7:**

26 articles have a sentiment score equal to 7, out of which India has 8 articles and USA has 18 articles which is 1% of the total number of articles for both the countries.

*India:*

Cluster 0 (2 articles) - discusses initiatives and policies related to biofuels and the risks associated with glacial lake outbursts. It highlights India's involvement in the Global Biofuels Alliance, emphasizing the country's role in promoting low-carbon energy pathways. It also covers the threats posed by Glacial Lake Outburst Floods (GLOFs) in the Himalayan region, underlining the risks to populations living in vulnerable areas

Cluster 1 (3 articles) - It includes debates around environmental clearances for a golf course project in Goa, the controversy and alternatives to the Silverline high-speed rail project in Kerala, and the approval of a seawater desalination plant in Mumbai. This cluster reflects the complexities of balancing environmental conservation with development projects in India.

Cluster 2 (3 articles) - addresses air quality monitoring and pollution concerns in urban India. It discusses initiatives like the installation of automatic weather systems in Surat for air quality monitoring and the efforts to combat air pollution in Mumbai.

USA:

Cluster 0 (3 articles) - focuses on the aftermath and response to devastating wildfires and tornadoes in the United States. It includes details of the disasters, rescue and recovery efforts, government and community response, personal stories and future precautions and warnings.

Cluster 1 (5 articles) - It includes articles about Maryland Clean Energy Jobs Act, which aims to increase renewable energy production, and Colorado's comprehensive environmental and energy bills. The push towards renewable energy sources like solar, wind, and geothermal power. There are references to solar power developments in South Carolina and the growth of the renewable energy sector in general. Exploration of the economic benefits and challenges of transitioning to a greener economy, including job creation in the clean energy sector and the financial costs associated with climate change mitigation. Coverage of the Biden administration's focus on electric vehicles (EVs) and clean energy as part of its economic and environmental strategy. This includes tax incentives for EV buyers and support for the EV industry.

Cluster 2 (8 articles) - emphasizes the increasing severity of climate change impacts, the urgent need for global action, and the challenges of adapting to and mitigating these change

Cluster 4 (2 articles) - emphasizes the active role of young people in the climate change movement and the tangible impacts of climate change on local communities, particularly in terms of how they adapt to and deal with the aftermath of extreme weather events.

*Differences in Articles between India and USA with Sentiment Score = 7:*

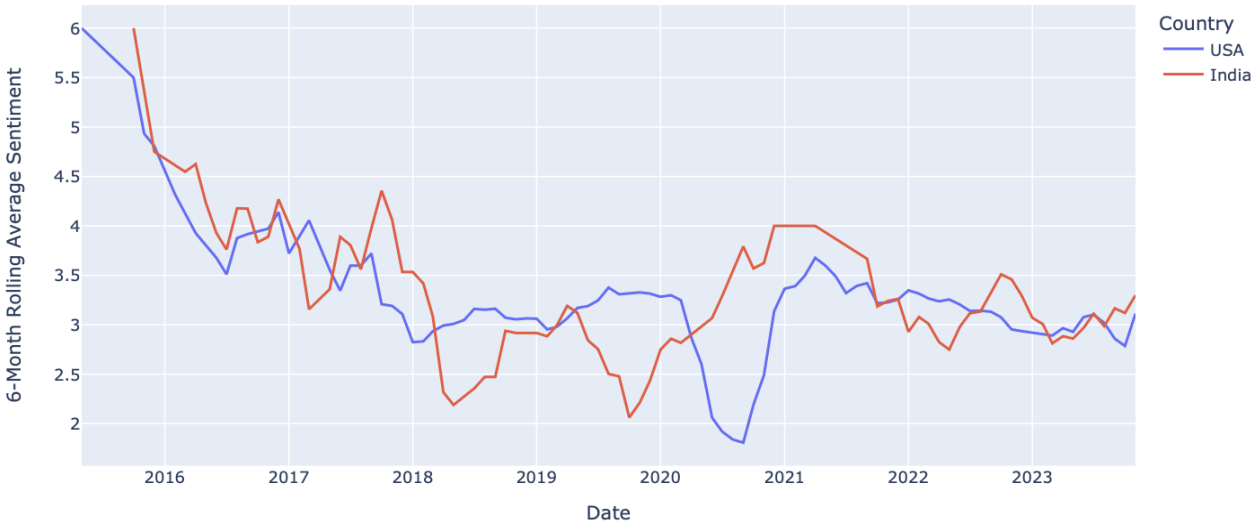
- India's articles tend to focus more on policy and infrastructure challenges, highlighting conflicts between development and environmental conservation, and addressing specific regional issues like GLOFs and urban pollution.
- USA's articles are more centered on reactive measures to natural disasters, legislative actions for renewable energy, and the role of community and youth activism in addressing climate change.

Overall, both India and the USA are actively engaged in climate change mitigation, but their media narratives reveal distinct approaches shaped by their respective cultural, economic, and political landscapes. India's narrative leans more towards a holistic, community-oriented approach, whereas the USA's narrative is more fragmented, reflecting the country's diverse and often conflicting viewpoints on environmental policy. India's climate change narrative is more consistently neutral and centered on proactive local and national efforts, whereas the USA's narrative exhibits a broader spectrum of sentiments and includes both national and international perspectives, heavily influenced by political dynamics, the immediacy of climate change impacts and the country's position in global climate politics.

## 4.2 Trend Analysis

Trends analysis offers a longitudinal perspective on the evolving discourse within India and the USA. Analysis of sentiment scores over an extended period gives insights into how public perception and media portrayal of climate change have shifted in response to global events, policy changes, and cultural influences. This methodical approach not only contextualizes the narrative around environmental issues but also delineates the cultural variances between the two nations as they navigate the complexities of climate change communication.

Weighted Average Sentiment over Time (6-Month Rolling Average)



The graph above shows the weighted average sentiment over time for India and the USA, using a 6-month rolling average to smooth out the data. It does not indicate absolute sentiment but rather a relative measure weighted by the volume of articles from each country. The X-axis represents year, specifically the dates when the articles were published. The Y-axis shows the 6-month rolling average of the weighted sentiment scores. This provides a smoothed view of sentiment trajectory, reducing the noise of monthly fluctuations and making it easier to spot overall trends.

The normalization is based on the weighted average calculated for each article for both the countries, where weights are assigned inversely proportional to the number of articles from each country. This method ensures that each country's sentiment score is represented fairly, regardless of the number of articles, and reduces the impact of the imbalanced dataset. The normalization over a 6-month window averages out the sentiment values and adjusts for any uneven distribution of articles over time, giving a clearer view of sentiment trends without overemphasizing short-term spikes or dips. This approach allows for a more robust analysis of sentiment trends across different timescales.

Both India and the USA show fluctuations in sentiment over time. There isn't a consistent upward or downward trend for either country, suggesting that sentiment about climate change in news coverage has varied but not consistently increased or decreased over the long term. It can be observed from the graph that the sentiment scores of the two countries converge, which may indicate similar reactions to global climate events or news. At other times, the sentiments diverge, which suggests different national responses to climate change or different reporting styles.

*Similar Trends:* Both countries appear to have experienced a decline in sentiment from 2016 to the beginning of 2017 as well as beginning 2023.

*Different Trends:*

- In the time frame of Jan 2018 to May 2018, the sentiment in India continues to decline from 3.5 to 2.1, whereas in the USA, it starts to plateau or slightly increase to 3.1. The difference is marginal.

Example:

India:

Title - Gram sabha definition in draft CAF rules could deprive some forest dwellers of consultation:  
MoTA - Times of India

This article discusses the concerns raised by India's Ministry of Tribal Affairs (MoTA) regarding the draft rules for the implementation of the Compensatory Afforestation Fund (CAF) Act, which were notified by the Union Environment Ministry

USA

Title - Hogan adds Maryland to U.S. Climate Alliance after long delay

This article talks about Maryland Governor Larry Hogan's decision to support the Paris climate accord by joining the U.S. Climate Alliance. Despite Maryland's existing Greenhouse Gas Reduction Act, which sets more ambitious goals than the Paris agreement, Hogan had previously hesitated to join the alliance but now emphasizes Maryland's proactive measures to reduce carbon emissions.

- A slight divergence is noted in mid 2019, where the sentiments in the USA remains constant and has slight increase, whereas India's sentiment appears to decline from 3.1 to 2
- In 2020, India's sentiment seems to increase whereas in the USA there is a significant dip in September 2020.

Examples Titles:

India:

CSE honors 172 schools with Climate Change Awards for 2019 under Green Schools Programme - Times of India

Statue of Unity set to go plastic-free | Surat News - Times of India

Panel discussion on 'Women in Climate Action' held | Kolkata News - Times of India

This home-schooled teen has been selected for Fellowship for Climate Action

IIT Guwahati introduces the first-of-its-kind course on UN-Sustainable Development Goals 2030 - Times of India

USA:

As Trump Again Rejects Science, Biden Calls Him a 'Climate Arsonist'



Climate Voters Still Want More From Biden

New Data Show an 'Extraordinary' Rise in U.S. Coastal Flooding

A War Against Climate Science, Waged by Washington's Rank and File

Progressives Doubted Joe Biden on Climate Change. Can He Win Them Over?

The articles during the 2020 period in India focused more on local and educational initiatives taken towards climate change mitigation. Whereas in the USA, the articles expressed skepticism towards the political leaders ability to handle climate change crises, thus there was a dip in sentiment score for the USA during this period.

## Conclusion

The study's application of advanced sentiment analysis tools, specifically utilizing GPT models from OpenAI, has provided a deeper understanding of the sentiment and cultural nuances in climate change discourse across India and the USA. The findings underscore the importance of contextual and cultural considerations in environmental reporting and highlight the diverse approaches adopted by each country in addressing global climate challenges. The divergent trends in mid-2018 and 2019, where India's sentiment declined and the USA's remained constant with a slight increase, further underscore the differing environmental narratives in the two countries. In 2020, India saw a rise in positive sentiment in climate change articles, highlighting proactive environmental measures and community engagement. Conversely, the USA experienced a notable dip in sentiment, mainly due to intensified debates and criticisms of climate policies, particularly in September 2020. This contrast between the two countries indicates India's focus on local conservation efforts and the USA's emphasis on political controversies, international climate dynamics, and the economic dimensions of environmental policies, demonstrating their distinct approaches to addressing environmental challenges.