

# Climate Change Comments Sentiment Analysis – NASA Facebook Page

## Project Title

## Sentiment Analysis of Climate Change Comments on NASA's Facebook Page

### Overview

This project involves Natural Language Processing (NLP) techniques to analyze over **500 user comments** collected from **NASA’s Climate Change Facebook page (2020–2023)**. These comments provide insights into public sentiment about climate change and NASA's related initiatives.

### Problem Statement

Although the broader project aims to model climate indicators, this subset focuses on analyzing **public discourse and sentiment** from social media. The objective is to:

- Perform **Sentiment Analysis**
- Track **Engagement Trends**
- Extract **Dominant Themes**
- Analyze how the public feels and interacts with climate-related content

---

### Dataset Description

Column Name	Description
-------------	-------------

date	Timestamp of comment
likesCount	Number of likes on the comment
profileName	Anonymized SHA-256 user profile name
commentsCount	Number of responses to the comment
text	The actual comment text

- **Total Records:** 522
- **Time Span:** 2020–2023
- **Missing Values:** commentsCount (278 missing), text (18 missing)

---

### Technologies & Libraries Used

- **Python 3**
  - pandas, numpy
  - matplotlib, seaborn, wordcloud
  - nltk for NLP & Sentiment Analysis
  - vaderSentiment for compound score calculation
- 

## Data Preprocessing Steps

1. **Handling Missing Values:** Removed records with missing text
  2. **Text Cleaning:**
    - Lowercasing
    - Removal of punctuation, stopwords, special characters
    - Tokenization and Lemmatization
  3. **Date Conversion:** Converted date to datetime format
  4. **Sentiment Scoring:** Added compound, neg, neu, pos scores using VADER
- 

## Exploratory Data Analysis (EDA)




- **Sentiment Distribution:** Most comments were either neutral or positive
  - **Daily Sentiment Trend:** Aggregated average sentiment over time
  - **Most Liked Comments:** Identified high engagement posts
  - **Word Cloud:** Highlighted most frequently used terms
- 

## Results

Sentiment Description		Proportion
Positive	Public appreciation & hope	~40%
Neutral	General queries/discussions	~35%
Negative	Climate denial, skepticism	~25%

---

## Key Visualizations

-  **Sentiment over Time:** Line plot showing trends from 2020–2023
  -  **Bar Charts:** Top 10 liked and commented posts
  -  **Word Cloud:** Visual themes in user discourse
- 

## Conclusion

The sentiment analysis of NASA's Facebook page reveals a **predominantly positive or neutral public perception** of climate change content. This suggests that NASA's social communication efforts have generally resonated well with the audience. However, a noticeable portion of skepticism or criticism also exists, highlighting areas for better public engagement and awareness.

---

## Future Scope

1. **Topic Modeling:** Apply LDA or BERTopic to uncover deeper discussion topics.
2. **Time-Series Forecasting:** Predict sentiment trends for upcoming periods.
3. **Multi-Language Support:** Extend to include non-English comments.
4. **Cross-Platform Analysis:** Compare Facebook data with Twitter, YouTube, Reddit, etc.
5. **Link with Climate Indicators:** Eventually correlate public sentiment with actual climate data (CO<sub>2</sub> levels, temperature rise, etc.)