WEATHER HUB

USING MACHINE LEARNING TO PREDICT AN INDIVIDUAL'S BELIEF IN CLIMATE CHANGE BASED ON THEIR TWEETS!

2023

PREPARED BY
ANDISIWE JAFTA

ABSTRACT

We are at the highest point we've been since 2002. Congratulations to everyone!

In an era where environmental consciousness is on the rise, companies seek to align their products and services with the values of their consumers. This white paper introduces Weather Hub, an innovative app designed to predict an individual's belief in climate change based on their Twitter activity. The app employs a machine learning model that classifies sentiments into four distinct categories: belief, no belief, neutral, and news facts.

This groundbreaking solution enhances market research efforts, providing companies with real-time insights into consumer sentiment, thereby informing strategic marketing decisions for a sustainable future.

WEATHER HUB

UNLOCKING FUTURE SUCCESS THROUGH CLIMATE INTELLIGENCE

INTRODUCTION

Weather Hub, the app that grants you the power to predict climate change sentiment with a few clicks!

AAs environmental awareness becomes integral to consumer choices, companies are eager to gauge public sentiment on climate change. Weather Hub addresses this need by leveraging machine learning to classify Twitter sentiments, allowing businesses to adapt their strategies to align with consumer beliefs.

OBJECTIVE

The primary goal of Weather Hub is to accurately predict an individual's belief in climate change through the analysis of Twitter data. By classifying sentiments into belief, no belief, neutral, and news facts categories, the app provides companies with a comprehensive understanding of public opinions.

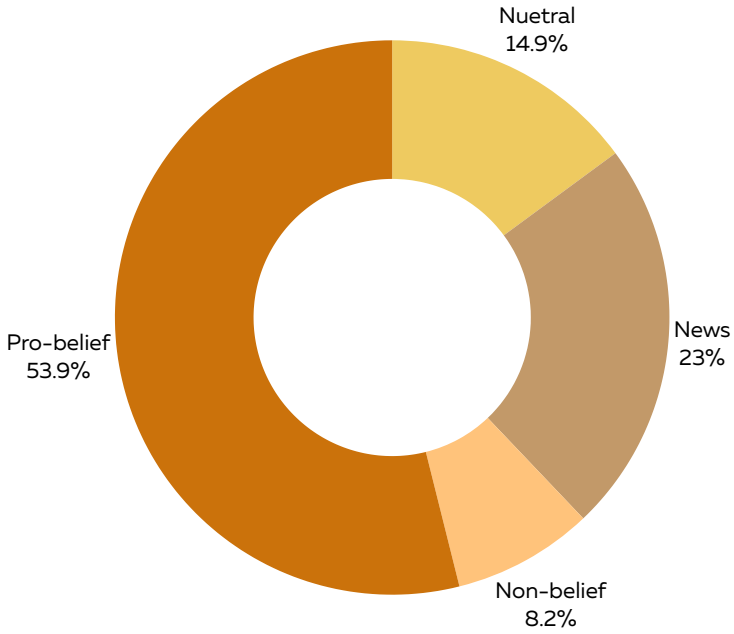
EVALUATION METRIC

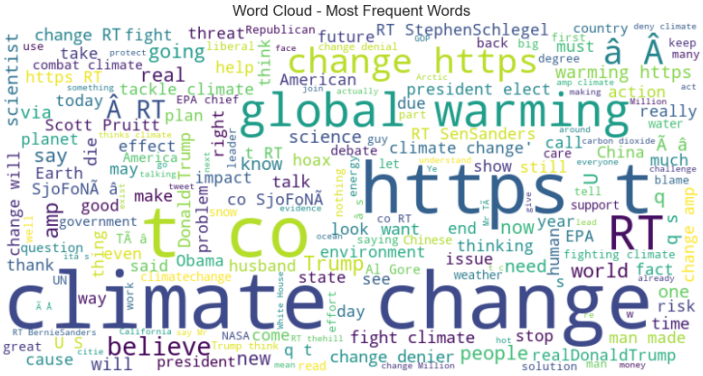
The performance of the machine learning model is assessed using the Mean F1-Score, a metric that balances precision and recall. This ensures a robust solution, favoring models that simultaneously maximize both precision and recall.

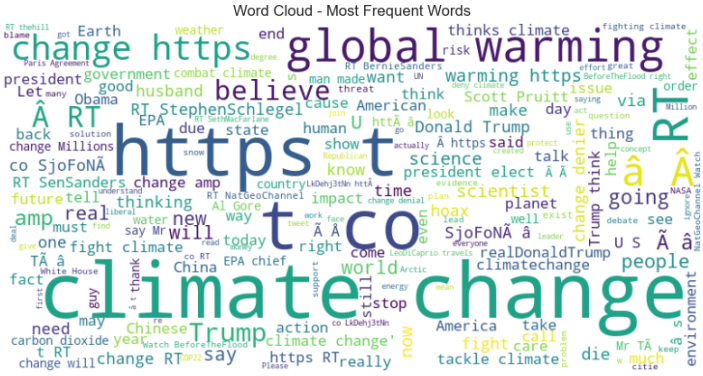
Model	F1 Score	Precision	Recall
Logistic Regression	**0.72**	0.70	0.70
Support Vector Machine	0.56	0.27	0.29
K-Nearest Neighbours	0.55	0.37	0.55

DATASET INSIGHTS

Analysis of word frequencies reveals significant bi-grams such as ['climate' 'change'], ['global' 'warming'], and ['believe' 'climate']. Additionally, identification of potential encoding issues like ['â' 'Â'] guides preprocessing steps. Hashtags and mentions, while not directly influencing classification, provide insights into sentiment, opinions, and engagement levels surrounding climate change discussions.







TEXT CLEANING

To enhance model performance, text cleaning operations are performed. This includes converting text to lowercase, removing unnecessary characters, symbols, URLs, mentions, and stopwords. Punctuation removal further ensures that the text data is cleaned and ready for analysis.

MODEL SELECTION AND EVALUATION

Weather Hub employs various classification models, including Logistic Regression, Decision Tree, Random Forest, Support Vector Machine, Naive Bayes, and K-Nearest Neighbours. Feature scaling is applied to sensitive models to ensure consistent performance across varying feature scales. Model evaluation is conducted using classification reports, focusing on precision, recall, and F1 score.

WEATHER HUB APP FEATURES

- Real-time insights into customer sentiments on climate change.
- Tailored marketing strategies based on sentiment analysis.
- Risk and opportunity assessment for proactive decision-making.
- Categorization of tweets into belief, no belief, neutral, and news facts.
- Identification of key keywords for targeted advertising and collaboration opportunities.

CONCLUSION

Weather Hub empowers companies to stay ahead in the dynamic landscape of consumer sentiments. By accurately predicting climate change sentiment on Twitter, businesses can customize strategies, engage with their audience effectively, and contribute to a sustainable future.

FUTURE DEVELOPMENTS

Continuous refinement of the machine learning model based on user feedback and evolving social media trends. Expansion of Weather Hub features to encompass additional social media platforms for a comprehensive sentiment analysis.

REFERENCES

"Twitter Sentiment Classification: Predicting Climate Change Belief." Unpublished white paper.

Kaggle: Machine Learning and Data Science Community." Retrieved from https://www.kaggle.com/competitions/edsa-sentiment-classification