CLIMATE CHANGE MODELING PROJECT REPORT

INTRODUCTION

CLIMATE CHANGE HAS EMERGED AS ONE OF THE MOST CRITICAL GLOBAL CHALLENGES. MONITORING PUBLIC OPINION AND PREDICTING FUTURE TRENDS ARE ESSENTIAL TO ADDRESSING ENVIRONMENTAL ISSUES. THIS PROJECT EXPLORES MULTIPLE ASPECTS OF CLIMATE CHANGE USING MACHINE LEARNING AND NLP TECHNIQUES.

WE HAVE DIVIDED THE PROJECT INTO THREE KEY PARTS:

1. SENTIMENT ANALYSIS: UNDERSTAND PUBLIC SENTIMENT TOWARDS CLIMATE-RELATED TOPICS.

2. TOPIC MODELING: IDENTIFY COMMON THEMES IN CLIMATE DISCUSSIONS.

3. CLIMATE FORECASTING: PREDICT FUTURE TEMPERATURE CHANGES USING HISTORICAL DATA.

DATASET DESCRIPTION

WE USED TWO DATASETS:

1. SOCIAL MEDIA DATASET: CONTAINS PUBLIC POSTS RELATED TO CLIMATE CHANGE WITH THE FOLLOWING FEATURES:

   o DATE: TIMESTAMP OF THE POST

   o PROFILENAME: USER PROFILE IDENTIFIER

   o TEXT: CONTENT OF THE POST

   o LIKESCOUNT: NUMBER OF LIKES RECEIVED

   o COMMENTSCOUNT: NUMBER OF COMMENTS

2. CLIMATE FORECASTING DATASET: HISTORICAL CLIMATE DATA WITH FEATURES SUCH AS:

   o YEAR, MONTH, DAY: DATE OF THE RECORD

   o TEMPERATURE: TEMPERATURE READINGS (TARGET VARIABLE)

SENTIMENT ANALYSIS

WE USED TEXTBLOB, A POPULAR NLP LIBRARY, TO EXTRACT THE SENTIMENT FROM THE TEXT. THE POLARITY SCORE HELPS CLASSIFY EACH POST INTO POSITIVE, NEGATIVE, OR NEUTRAL SENTIMENT.

TOPIC MODELING

WE USED LATENT DIRICHLET ALLOCATION (LDA) TO UNCOVER THE MAIN TOPICS IN THE DATASET. LDA HELPS IDENTIFY PATTERNS BY GROUPING WORDS THAT OFTEN OCCUR TOGETHER.

CLIMATE FORECASTING

WE BUILT A LINEAR REGRESSION MODEL TO PREDICT FUTURE TEMPERATURES BASED ON HISTORICAL DATA.

RESULTS AND INSIGHTS

THE SENTIMENT ANALYSIS REVEALED THAT PUBLIC OPINION TOWARDS CLIMATE TOPICS IS GENERALLY NEUTRAL OR POSITIVE, WITH FEWER NEGATIVE OPINIONS.

TOPIC MODELING IDENTIFIED FIVE MAIN THEMES, INCLUDING CLIMATE ACTION, CARBON EMISSIONS, EXTREME WEATHER EVENTS, POLICY MEASURES, AND SEA LEVEL RISE.

THE CLIMATE FORECASTING MODEL ACHIEVED A MSE OF 81%. INCORPORATING ADDITIONAL FEATURES SUCH AS LAGGED TEMPERATURES MAY IMPROVE THE MODEL'S PERFORMANCE.

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