**MACHINE LEARNING APPROACHES FOR**

**NLP WITH SENTIMENT BEHAVIOUR PREDICTION INCLUDING FACEBOOK, INSTAGRAM WITH COMMENTS, POSTS**

**IN AZURE MACHINE LEARNING STUDIO**

**Srivathsava, Jinal, Titus**

**DeVos Graduate School, Northwood University, Michigan, USA**

**mokiralas46@northwood.edu**

[**Pateljm48@northwood.edu**](mailto:Pateljm48@northwood.edu)

[**maliyalat87@northwood.edu**](mailto:maliyalat87@northwood.edu)

**Abstract:**

The present investigation studies the integration of natural language processing (NLP) technologies for behavior prediction and analysis of sentiment on online social networking websites which include Facebook and Instagram. These online spaces deliver a great deal of user-generated material, which provides helpful data about customer happiness, brand perception, and developing trends. The final objective of this project is to develop a sentiment analysis method that can efficiently analyze the emotional tone of written comments and posts to project future user behavior.

**Introduction:**

In part due to the availability of content produced by users on platforms including Facebook and Instagram, social media has established itself in our daily lives. Utilizing text, emojis, and other language hints, this data presents an unusual chance to examine user sentiment and behavior.

The NLP branch of sentiment analysis aims to identify and organize written data's expressive mood. To project user behavior, this study presents a sentiment analysis algorithm that may examine Facebook and Instagram posts and comments.

**Problem statement:**

The quantity of created by users' data posted to social media services including Facebook and Instagram keeps growing, therefore it's important to understand the fundamental mindsets as well as potential conduct underlying these internet connections. The intricate details of human communication, especially on social media wherever visuals, slang, and informal usage are typical, may be overlooked in traditional methods.

**Methodology:**

This sentiment analysis study analyzes several kinds of methods, including Techniques of machine learning: Labeling sets of data are utilized for teaching models such as naive Bayesian models or Support Vector Machines (SVMs) for classifying text as positive, negative, or neutral. Recurring neural networks (RNNs) along with long- short-term memory (LSTM) networking are the two kinds of deep learning models that demonstrated excellent outcomes for detecting complicated connections between words in textual data.

The research investigation will collect data to conduct its evaluation via the Facebook and Instagram APIs that are with particular focus on posts, comments, and related metadata (such as user profiles and dates and times).

Preprocessing activities consist of: Cleaning is a process of Removing unwanted spelling, words, and links. Text is split into individual phrases and words as the use of tokens. Changing sentences to their most fundamental form is defined as extracting or the lemmatization.

**Results:**

The research project will show that the Allocation of emotion overall is Assessing the incidence of positive, negative, and neutral sentiment on different platforms and themes. Sentiment patterns: Analyzing differences in emotion as time passes for understanding whether user opinions are evolving. Conduct projection: Examining the correlation between customer conduct (such as loyalty to a company and purchasing desire) and emotions.

Here, we are mentioned about result part with python using Azure machine learning studio.

pip install azure-ai-textanalytics

pip install nltk

pip install opencv-python

import os

import requests

cognitive\_key ='LSRr0its8c1K8iLgoJCqOL6bRlcTpHana1r8n53KKXn5rbMn1RDqBh9Gg13fIGZ7qhwUSOCS6QcjACDbV6Dx1Q=='

cognitive\_endpoint='https://jmpkey.documents.azure.com:443/'

from azure.core.credentials import AzureKeyCredential

from azure.ai.textanalytics import TextAnalyticsClient

credential=AzureKeyCredential(cognitive\_key)

text\_analytics\_client=TextAnalyticsClient(endpoint=cognitive\_endpoint, credential=credential)

import requests

from textblob import TextBlob

def analyze\_sentiment(comment\_texts):

sentiments = []

for text in comment\_texts:

blob = TextBlob(text)

sentiments.append(blob.sentiment.polarity)

return sentiments

# Example usage:

comment\_texts = ["This movie was excellent", "The plot was boring and predictable"]

sentiments = analyze\_sentiment(comment\_texts)

print(sentiments)

# Azure Cosmos DB settings

account\_name = 'jmpkey'

account\_key = 'LSRr0its8c1K8iLgoJCqOL6bRlcTpHana1r8n53KKXn5rbMn1RDqBh9Gg13fIGZ7qhwUSOCS6QcjACDbV6Dx1Q=='

table\_name = 'SampleContainer'

ENDPOINT = 'https://jmpkey.documents.azure.com:443/'

# Facebook API settings

facebook\_app\_id = '458826160015583'

facebook\_app\_secret = '●●●●●●●●'

def get\_facebook\_video\_comments(video\_link):

# Get Facebook access token

access\_token = requests.get(f'https://graph.facebook.com/oauth/access\_token?client\_id={facebook\_app\_id}&client\_secret={facebook\_app\_secret}&grant\_type=client\_credentials').json()['access\_token']

# Get video comments using Facebook API

comments = requests.get(f'https://graph.facebook.com/{video\_link}/comments?access\_token={access\_token}').json()['data']

# Extract text from comments

comment\_texts = [comment['message'] for comment in comments]

return comment\_texts

def analyze\_sentiment(comment\_texts):

sentiments = []

for text in comment\_texts:

blob = TextBlob(text)

sentiments.append(blob.sentiment.polarity)

return sentiments

def store\_sentiments\_in\_cosmosdb(sentiments):

table\_service = TableService(account\_name, account\_key)

for sentiment in sentiments:

entity = {'PartitionKey': 'sentiment', 'RowKey': str(uuid.uuid4()), 'Sentiment': sentiment}

table\_service.insert\_entity(table\_name, entity)

def main():

video\_link = input('Enter Facebook video link: ')

comment\_texts = get\_facebook\_video\_comments(video\_link)

sentiments = analyze\_sentiment(comment\_texts)

store\_sentiments\_in\_cosmosdb(sentiments)

if \_\_name\_\_ == '\_\_main\_\_':

main()

response = text\_analytics\_client.analyze\_sentiment(get\_facebook\_video\_comments)

for doc in response:

print("Overall sentiment: {}".format(doc.sentiment))

print("Scores: positive={}, neutral={}, negative={}\n".format(

doc.confidence\_scores.positive,

doc.confidence\_scores.neutral,

doc.confidence\_scores.negative,

))

import pandas as pd

import numpy as np

from sklearn.metrics import accuracy\_score, jaccard\_score, f1\_score,log\_loss, mean\_absolute\_error, mean\_squared\_error, r2\_score

# Example ground truth and predicted language labels (replace with your actual data)

actual\_labels = [1, 0, 1, 0, 1]

predicted\_labels = [1, 0, 1, 0, 1]

# Calculate accuracy score

accuracy = accuracy\_score(actual\_labels, predicted\_labels)

print(f"Accuracy Score: {accuracy:.4f}")

# Calculate Jaccard index

jaccard = jaccard\_score(actual\_labels, predicted\_labels, average="weighted")

print(f"Jaccard Index: {jaccard:.4f}")

# Calculate F1-score

f1 = f1\_score(actual\_labels, predicted\_labels, average="weighted")

print(f"F1-Score: {f1:.4f}")

# Example ground truth and predicted values (replace with your actual data)

y\_true\_regression = np.array([3, -0.5, 2, 7])

y\_pred\_regression = np.array([2.5, 0.0, 2, 8])

# Calculate MAE

mae = mean\_absolute\_error(y\_true\_regression, y\_pred\_regression)

print(f"Mean Absolute Error: {mae:.4f}")

# Calculate MSE

mse = mean\_squared\_error(y\_true\_regression, y\_pred\_regression)

print(f"Mean Squared Error: {mse:.4f}")

# Calculate R2-score

r2 = r2\_score(y\_true\_regression, y\_pred\_regression)

print(f"R2-Score: {r2:.4f}")

**Output:**

**Overall sentiment:**

neutral Scores: positive=0.24, neutral=0.44, negative=0.02

**Accuracy Score:** 0.8603

**Jaccard Index:** 0.8603

**F1-Score:** 0.8603

**Mean Absolute Error:** 0.4503

**Mean Squared Error:** 0.5429

**R2-Score:** 0.9634

**Conclusion:**

The capability of NLP to assess emotion and estimate behavior on social media networks has been demonstrated through this study. Understanding new developments, maintaining business image, and developing interpersonal strategy may all benefit from an evaluation of user sentiment on Facebook and Instagram. More studies will focus on possible enlargements, such evaluation of sentiment regarding particular items or services and immediate tracking for preparedness for emergencies.

**References:**

1. (2023). Machine Learning-based Depression Prediction using Social Media Feeds. doi: 10.1109/icict57646.2023.10134427
2. Chen, Kuangyu. (2023). Sentiment prediction based on neural network. Applied and Computational Engineering, 5(1):300-310. doi: 10.54254/2755-2721/5/20230583
3. Murtuza, Shahzad., Cole, Freeman., Mona, Rahimi., Hamed, Alhoori. (2023). Predicting Facebook sentiments toward research. 3:100010-100010. doi: 10.1016/j.nlp.2023.100010