MINI PROJECT REPORT

ON

"Emotion Detection in Text using VADER and TextBlob"

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Introduction:

Emotion detection in a text is a component of "natural language processing" which helps in understanding the human emotions through the texts. This project is done by implementing two sentimental analysis tools VADER(Valence Aware Dictionary and sentiment Reasoner) and TextBlob which helps in detecting the emotions. It involves analysing and classifying the emotional tone behind a series of words, Emotions, such as joy, sadness, anger, surprise, fear, and others. VADER is particularly effective for social media texts, as it is tailored to understand emoticons, slang, and short sentences commonly used in online communication that are associated with positive, negative or neutral emotions. While TextBlob's sentiment analysis is based on a polarity and subjectivity system, it provides a good general-purpose tool for emotion detection in text. This report will discuss the principles behind emotion detection, review the workings of VADER and TextBlob, and evaluate their performance in emotion classification tasks.

Problem statement:

Emotion Detection in Text using VADER and TextBlob

Objectives:

The primary objective of this project is to explore emotion detection in text using two popular NLP tools: VADER and TextBlob. The project aims to implement and evaluate these tools for identifying and classifying emotional tones such as happiness, sadness, anger, and surprise from various types of text, including social media content and informal communication. A key focus is to compare the effectiveness of VADER and TextBlob in emotion detection, analyzing their strengths, weaknesses, and accuracy across different datasets. The project aims to discuss potential real-world applications of emotion detection, such as in customer service, social media monitoring, mental health analysis, and personalized content recommendations.

Python libraries used:

1. TextBlob
2. VADER (Valence Aware Dictionary and sentiment Reasoner)
3. NLTK (Natural Language Toolkit)

Module of the project:

1. The project can be divided into several key modules: The **Preprocessing Module** handles cleaning and preparing the text by removing noise, tokenizing, and normalizing it.
2. The **Emotion Detection with VADER Module** uses VADER to analyze sentiment and classify the text as positive, negative, or neutral based on a compound score.
3. The **Emotion Detection with TextBlob Module** employs TextBlob to analyze sentiment polarity and subjectivity, classifying emotions such as happy, sad, angry, or surprised based on predefined thresholds and keyword matching.
4. The **Emotion Mapping and Classification Module** maps sentiment values or keywords to specific emotional categories.
5. The **Evaluation and Comparison Module** assesses and compares the performance of VADER and TextBlob using accuracy metrics and performance evaluations.
6. The **Visualization Module** generates visual representations like graphs or pie charts to display the emotion detection results.
7. The **Main Execution and Testing Module** runs the overall system, testing various sample texts and displaying results for comparison.
8. The **Integration and User Interface Module** can provide a simple interface for user input and output, allowing interaction with the emotion detection system.

Code:

```
!pip install textblob nltk vaderSentiment

from textblob import TextBlob

from vaderSentiment.vaderSentiment import SentimentIntensityAnalyzer

analyzer = SentimentIntensityAnalyzer()

def detect_emotion_vader(text):

    sentiment = analyzer.polarity_scores(text)

    compound_score = sentiment['compound']

    if compound_score >= 0.05:

        return "Positive"

    elif compound_score <= -0.05:

        return "Negative"

    else:

        return "Neutral"

def detect_emotion_textblob(text):

    surprise_keywords = ["OMG", "surprise", "wow", "amazing",
"unbelievable", "shocked", "incredible", "wow"]

    angry_keywords = ["angry", "furious", "rage", "enraged",
"irritated", "mad", "upset", "fuming"]

    if any(keyword in text.lower() for keyword in
surprise_keywords):

        return "Surprise"

    if any(keyword in text.lower() for keyword in angry_keywords):

        return "Angry"

    blob = TextBlob(text)

    polarity = blob.sentiment.polarity
```

```python
        subjectivity = blob.sentiment.subjectivity
        if polarity > 0.5:
            return "Happy"
        elif polarity < -0.5:
            return "Sad"
        elif subjectivity > 0.5:
            return "Surprise"
        else:
            return "Neutral"
sample_texts = [
    "I am so happy and excited about this event!",
    "I feel terrible, everything is going wrong.",
    "I am so angry about what happened today!",
    "This is the best day ever!",
    "I don't know how to feel, i'm so irritated.",
    "wow I won the game.",
    "I am furious about how they treated me!"
]
for text in sample_texts:
    emotion_vader = detect_emotion_vader(text)
    emotion_blob = detect_emotion_textblob(text)
    print("Text: ", text)
    print("Emotion detected by VADER: ", emotion_vader)
    print("Emotion detected by TextBlob: ", emotion_blob)
    print("-" * 50)
```

Output:

```
Text:  I am so happy and excited about this event!
Emotion detected by VADER:  Positive
Emotion detected by TextBlob:  Happy
---------------------------------------------------
Text:  I feel terrible, everything is going wrong.
Emotion detected by VADER:  Negative
Emotion detected by TextBlob:  Sad
---------------------------------------------------
Text:  I am so angry about what happened today!
Emotion detected by VADER:  Negative
Emotion detected by TextBlob:  Angry
---------------------------------------------------
Text:  This is the best day ever!
Emotion detected by VADER:  Positive
Emotion detected by TextBlob:  Happy
---------------------------------------------------
Text:  I don't know how to feel, i'm so irritated.
Emotion detected by VADER:  Negative
Emotion detected by TextBlob:  Angry
---------------------------------------------------
Text:  wow i won the game
Emotion detected by VADER:  Positive
Emotion detected by TextBlob:  Surprise
---------------------------------------------------
Text:  I am furious about how they treated me!
Emotion detected by VADER:  Negative
Emotion detected by TextBlob:  Angry
---------------------------------------------------
```

Applications of this project:

1. This project can be used in analyzing customer reviews and feedback to detect emotions and sentiments. Businesses can gain insights into customer satisfaction, identify unhappy customers, and improve their products or services based on emotional feedback.

2. Implementing emotion detection in chatbots or virtual assistants enables them to respond more empathetically to users, improving user satisfaction and making the interaction feel more human-like.
3. Emotion detection from text can be useful in analyzing online discussions, forums, or social media posts for signs of emotional distress, depression, or anxiety, providing early warnings and support for mental health professionals.

Limitations of this project:

1. Both VADER and TextBlob may struggle with detecting emotions in complex or ambiguous texts, where sarcasm, irony, or context-heavy sentences could mislead sentiment analysis. They may not fully understand nuanced emotional expressions.
2. In the TextBlob Module, the reliance on predefined keywords (e.g., "angry" or "surprised") may not be comprehensive enough to detect all emotional expressions. Examples:

```
--------------------------------------------------
Text:  i am so anxious today.
Emotion detected by VADER:  Negative
Emotion detected by TextBlob:  Surprise
--------------------------------------------------
```

Bibliography:

1. VADER Sentiment Analysis. (n.d.). Retrieved from https://github.com/cjhutto/vaderSentiment
2. NLTK – Natural Language Toolkit. (n.d.). Retrieved from https://www.nltk.org/
3. TextBlob Documentation. (n.d.). Retrieved from https://textblob.readthedocs.io/en/dev/

Github link:

https://github.com/Karthiga2006-star/Mini-project-2024-/upload/main