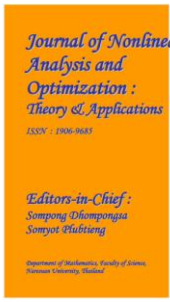
Journal of **N**onlinear **A**nalysis and **O**ptimization
Vol. 15, Issue. 1, No.15 : 2024
ISSN : **1906-9685**



Paper ID: ICRTEM24_128 **ICRTEM-2024 Conference Paper**

STRESS DETECTION IN SOCIAL NETWORKS THROUGH CLASSIFICATION ALGORITHM

[#1]Ms. Tanishqi Baluri, ***UG Student***
[#2]Ms. Lekkala Saranya Reddy, ***UG Student***
[#3]Ms.Kanukunta Sindhu Priya, ***UG Student***
[#4]Ms. Thumula Ramya Sri, ***UG Student***
Department of Information Technology,
CMR COLLEGE OF ENGINEERING &TECHNOLOGY, HYDERABAD.

ABSTRACT: In today's fast-paced and interconnected culture, stress has become a widespread source of concern, affecting people's physical and emotional health. Social interactions are necessary for both alleviating and raising stress. In an effort to shed light on the identification and management of stress in social contexts, this abstract describes a Java-based approach for detecting stress-related social interactions. To evaluate stress during social interactions, we propose using social data analysis and machine learning methodologies. Our system is made up of three key parts: feature extraction, categorization, and data collection. To capture the nuances of social interactions, we collect data from multiple sources, including text, voice, and physiological data. The technique of feature extraction comprises extracting relevant features from these sources, such as voice pitch and text sentiment analysis. We use these attributes as input to our stress categorization model. This technique enables real-time stress monitoring during social interactions by estimating stress levels based on collected parameters. The stress categorization model allows for real-time stress monitoring during social interactions by forecasting stress levels based on retrieved attributes. Because of its portability and robustness, the Java programming language is an excellent choice for developing systems that can be easily integrated into a number of environments.

Keywords: *Stress detection, Sentiment analysis, Machine Learning, Data Mining, Natural language Processing.*

1.INTRODUCTION

Early detection of mental health issues is aided by research on stress and the ability to see signs of depression in social media posts. Social media detection of depression and stress. Problem Synopsis The system looks into the connection between users' social interactions and stress levels on social media platforms in addition to user-posted content, addressing the subject from the angles of:

1. Investigate differences in social interaction content between stressed and non-stressed users.
2. Examine variances in social interaction structure based on structural variety, social impact, and

strong/weak ties.

2.OBJECTIVE

This research attempts to provide a comprehensive overview of the methodologies, strategies, and challenges related with stress detection in social networks via social interactions.We will investigate the complexity of social media data analysis, consent and privacy ethics, and the potential applications of stress detection algorithms. We will also examine the field's future opportunities and restrictions, providing insight into ongoing efforts to improve stress assessment methodologies.

3.EXISTING SYSTEM

The creator of this [1] system offers an automated method that employs data mining techniques to detect mental stress in social media users. To understand the relationships between a user's stress and their activity on social networks, the technique analyzes a variety of characteristics, including textual, visual, and social elements. Using data mining algorithms to extract meaningful and implicit information from social media data allows for the identification of trends and correlations that may indicate stress. The methodology for identifying these links and patterns associated with stress appears to rely significantly on the use of association rules and measures such as Confidence and Support. It's also a good idea to utilize sentiment analysis on social media posts to identify user behaviors related to stress. Sentiment analysis is an important approach for studying stress in social media environments since it can reveal people's emotional states.

The author's proposed structure for this system [2] is fascinating, especially given the vast amount of data available on social networks.It is true that looking at pragmatic aspects and the impact of friends on a user's mental health might provide useful information about depression risks. The inclusion of these aspects has the potential to change diagnostic methods and help clinicians provide more precise assessments. Its credibility is enhanced by evaluating the framework's performance on a large Facebook dataset. Our grasp of social dynamics and user intentions can significantly improve our understanding of mental health issues in online communities.

The author suggests conducting a thorough examination into deep correlation mining in heterogeneous huge data environments [3].To better understand complex data interconnections, employing a Hierarchical Hybrid Network (HHN) architecture to capture multitype interactions between entities and developing metrics to measure internal and external correlations appear realistic. It sounds innovative to incorporate a deep reinforcement learning framework-based intelligent router capable of navigating this network, as well as an improved routing algorithm that considers hierarchical influences across several correlations.

The author appears to have fulfilled the potential of mobile sensing technology to perceive and recognize social situations related with social anxiety [4]. The scientists used wristband sensors to collect data on many aspects of social situations encountered by very socially anxious undergraduate students.To gain a thorough understanding of social anxiety triggers and social behavior patterns, focus on identifying many aspects of social circumstances, such as whether or not people were in a social environment, the size of the social group, the degree of social evaluation, and the situation's phase. This data is handled utilizing a sophisticated multitask machine learning pipeline that allows for the simultaneous analysis of numerous context-related aspects.Future research into the role of personalization in context detection will be valuable.

The author of this method [5] determines each user's stress level by analyzing sentiment and emotion in social media posts. The work employs deep learning models such as BERT for sentiment categorization, as well as machine learning approaches to use large-scale datasets of tweets, to provide a more nuanced understanding of users' emotions.

It was a deliberate decision to adopt Latent Dirichlet Allocation (LDA) as an unsupervised machine learning technique. The use of LDA to recognize word and phrase patterns in documents and classify subjects in textual data may significantly increase our understanding of the emotions represented in social media posts. This study aims to improve mental health and well-being by connecting these emotions to stress or melancholy.

The author developed the Knowledge-aware and Contrastive Network (KC-Net), a complicated mechanism [6], to address inadequacies in current ways to detecting stress and depressed tendencies from social media posts. To explicitly model the speaker's mental state, the proposed model includes mental state knowledge derived from a commonsense knowledge base (COMET) and Gated Recurrent Units (GRU).To focus on relevant knowledge elements, it also includes a knowledge-aware mentalization module based on dot-product attention. Furthermore, a supervised contrastive learning module is employed to efficiently extract class-specific features. The efficacy of this strategy is proved by its performance on a number of stress and depression-related datasets from Reddit as well as SMS-like texts.

The author [7] provides what appears to be a comprehensive method for sentiment analysis using social media data, such as text, emoticons, and emoji. In fact, switching from binary and ternary classification to multi-class classification enhances classification accuracy by allowing for a more comprehensive understanding of sentiment polarity. Machine learning and deep learning algorithms are one approach to sentiment analysis on social media data.It indicates that including it into multi-class classification, particularly when employing deep learning algorithms, results in higher accuracy values and more exact sentiment identification. Sentiment level monitoring with social media data and other AI technologies provides a wealth of information about people's emotions, notably in recognizing depression or worry. It also provides important information about how AI approaches are used to social media sentiment analysis, focusing on how deep learning algorithms and multi-class classification work well together to get higher precision values in sentiment analysis.

This work emphasizes the expanding importance of emotion extraction from text in natural language processing (NLP), as well as its valuable applications in a range of domains such as data mining, recommendation systems, and human-computer interaction. Nonetheless, superfluous data extraction poses a substantial challenge in the emotion extraction process, potentially leading to erroneous emotional prediction. The study proposes a Leaky ReLU activated Deep Neural Network (LRA-DNN) that is divided into four stages: feature extraction, pre-processing, ranking, and classification. To obtain reliable emotion predictions, this approach requires pre-processing the received data for purification, selecting relevant features, ranking these features, and categorizing the data.

This method [9] addresses the important challenge of identifying stress from textual data by recognizing the significant impact that stress has on both individuals and wider societal systems. Although previous studies on mood, emotion, and mental disorder detection in text have focused on specific datasets, there is a need for a stress detection technique that is consistently effective across a variety of textual datasets.The proposed method intends to increase stress classification accuracy by combining distributional representations with lexicon-based features, which is a new approach. The study presents a comprehensive framework for text stress detection that incorporates emotive, syntactic, social, and topic-related factors in order to conveniently organize these data.In order to fully utilize distributional representation, the study also evaluates three distinct word embedding methodologies. To accomplish this, three machine learning models are thoroughly tested on three publically available English datasets.

4.PROPOSED SYSTEM

Goals of the proposed model To identify stress via social media, complete the following objectives:

1. It takes as input a list of users and their social interactions.
2. Using interaction patterns and text content, machine learning models trained on labelled stress data can forecast stress levels.
3. The observed stress patterns can then be used to tailor reports, notify users, or take other relevant actions.

ConceptsusedforProposedModel Sentiment Analysis (NLP):

Sentiment analysis algorithms can detect stress-related information by examining the emotional tone of text data.Common ways include the following: Lexicon-based methods: Text sentiment scores are computed using sentiment lexicons, which are lists of words that have been assigned sentiment ratings.Methods using machine learning: Supervised machine learning models (such as Naive Bayes, Support Vector Machines, and deep learning models) are trained on labelled sentiment datasets.

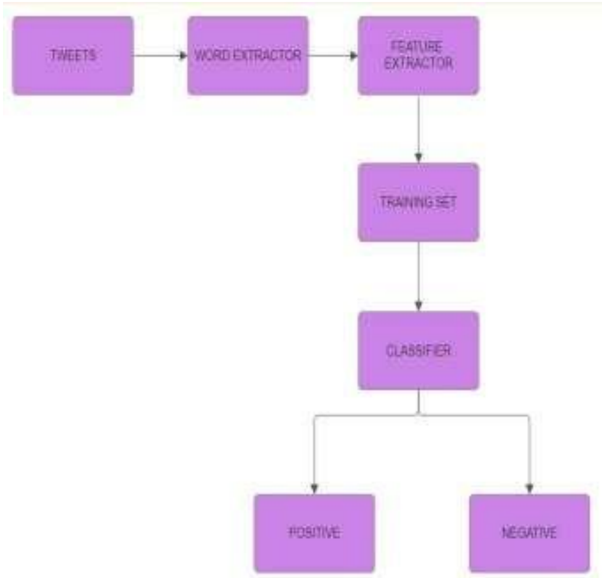


Fig2:Proposedsystem(Blockdiagram)

Natural Language Processing (NLP) Techniques:

Tokenization is the process of breaking down text into words or tokens that can be analyzed.
Terminate Word Removal: Eliminating commonly used terms (e.g., "the," "and") that may not have much meaning. Lemmatization and stemming involve reducing words to their most basic or root form in order to reduce dimensionality.Topic modeling is a technique for identifying patterns in text data related to stress.

Time-SeriesAnalysis:

When physiological data, such as skin conductance or heart rate, is employed in stress detection, time-series analysis approaches likeTo extract relevant patterns, employ autoregressive models or Fourier analysis.

Fig3:TimeSeriesAnalysis

Clustering Algorithms:

Similar social interactions can be clustered together using clustering approaches such as k-means or hierarchical clustering, which may aid in the detection of stress-related patterns.

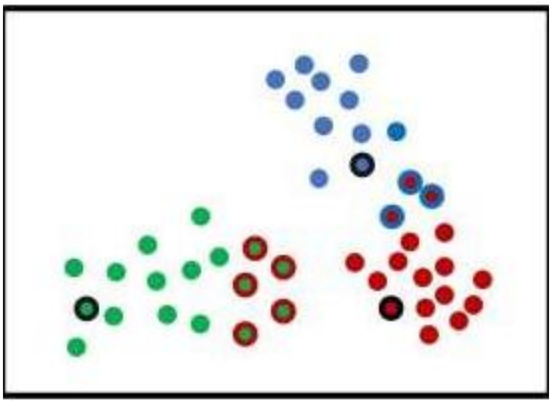


Fig4: ClusteringAlgorithm

Implementation:

Machine learning, data processing, and data collection are some of the components required to construct a comprehensive stress detection system for social interactions in a social network. This is a concise summary of Java code.Keep in mind that this is simply a basic example; creating a complete system would necessitate more complicated methods, as well as possibly external libraries and APIs.

```java
import java.util.List;
class SocialInteraction {
    String text;
    String sender;
    String receiver;
    public SocialInteraction(String text, String sender, String receiver) {
        this.text = text;
        this.sender = sender;
        this.receiver = receiver;
    }
}
class User {
    String username;
  |   public User(String username) {
        this.username = username;
    }
}

class StressDetectionSystem {
    List<User> users;
    List<SocialInteraction> interactions;

    public StressDetectionSystem(List<User> users, List<SocialInteraction> interactions) {
        this.users = users;
        this.interactions = interactions;
    }

    public void detectStressBasedInteractions() {
            for (SocialInteraction interaction: interactions) {
            String text = interaction.text;
            String sender = interaction.sender;
            String receiver = interaction.receiver;
        }
    }
}
class StressDetectionSystem {
    List<User> users;
    List<SocialInteraction> interactions;

    public StressDetectionSystem(List<User> users, List<SocialInteraction> interactions) {
        this.users = users;
        this.interactions = interactions;
    }

    public void detectStressBasedInteractions() {
            for (SocialInteraction interaction: interactions) {
            String text = interaction.text;
            String sender = interaction.sender;
            String receiver = interaction.receiver;
        }
    }
}
public class Main {
    public static void main(String[] args) {
        User user1 = new User("User1");
        User user2 = new User("User2");
            SocialInteraction interaction1 = new SocialInteraction("I'm feeling really stressed.", "User1", "User2");
        SocialInteraction interaction2 = new SocialInteraction("Don't worry, we'll get through this.", "User2", "User1");

        List<User> users = List.of(user1, user2);
        List<SocialInteraction> interactions = List.of(interaction1, interaction2);

        StressDetectionSystem stressDetectionSystem = new StressDetectionSystem(users, interactions);
        stressDetectionSystem.detectStressBasedInteractions();
    }
}
```

In this condensed example, we create a core framework for managing users, social interactions, and detecting stress. However, for real-world stress detection, more advanced approaches and resources are required, such as machine learning models, sentiment analysis tools, natural language processing (NLP) libraries, and social network data. Much more study and development would be required to produce a complete and accurate system.

5.RESULTS

The Java code outline supplied was a condensed example intended to demonstrate the elements and composition of a social network stress detection system.The output of such a system would be determined by the sophistication and complexity of the algorithms and data processing methods used.

Fig6 stressdetectionusingTwittersocial structure

To evaluate our model, we first test multiple models against the Weibo-Stress dataset.The graph above is built based on tweet level properties. The graph depicts the user's level of stress.The application can calculate the user's stress level based on each tweet or overall stress based on all tweets sent up to the given date.

Fig7 stress detection

The suggested system generates two graphs. It is clear that the user's stress level is usual.The two graphs show that the user is not excessively stressed. In addition, we assess our model using a variety of data sets. Our model's accuracy is 81.43%. The tweets on Twitter are written in different languages than the training dataset, which contributes to the four models' low accuracy. As a result, it may not perform optimally on the Twitter dataset.

6.CONCLUSION

Finally, our proposed approach for identifying stress-related social interactions is a viable strategy for addressing today's society's growing stress problem.In an increasingly interconnected world, we aspire to provide people with the resources they need to live healthier, more balanced lives through the use of machine learning and social data analysis. This project just provides a framework for utilizing Java to build social interaction based on stress detection in social networks. This has the potential to significantly increase real-time monitoring, accuracy, and a variety of other areas. so that the project's functionality can be updated.

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