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A Review on Depression and Stress monitoring System via Social Media Data using Deep learning

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Abstract: ***Stress and Depression is nowadays one of the most broadly perceived and increasing mental issue that completely influences our society. An automatic health monitoring systems can be pivotal and very critical to improve the sadness and stress recognition framework using social networking site. Sentiment Analysis implies to the utilization of natural language processing as well as content mining approaches planning to recognize the feeling or opinion. Full of feeling Computing is a way of the examination and advancement of the frameworks and gadgets that can perceive, decipher, process, and mimic the human effects. Sentiment Analysis and deep learning techniques could provide us powerful algorithms and frameworks for a target appraisal and observing of mental issues that are, specifically of depression and stress. The application of sentiment analysis with use of deep learning methodologies for the depression and stress detection and monitoring are discussed. In addition, a fundamental plan for incorporating a framework for stress and depression checking is studied. In particular, the paper traces the basic issues and moves comparative with the structure of such a framework.***
Keywords: Deep learning, Ehealth, stress and depression, sentiment analysis, social media.

I. INTRODUCTION

Social media is surely the richest source of human generated text inputs. Views, feedbacks and critiques which are provided by the social media users will reflect attitudes, thoughts and sentiments towards various topics. We also have a knowledge-based system, that will include an emotional health monitoring system which is used to detect users with a possible psychological disorder specially like depression and stress [1][4]. Symptoms of all of these mental illness are usually observed in users. In this situation, author argues that online social behaviour extraction offers an great opportunity to actively identify mental illness at a very early stage [5].

Depression and stress are one of the most common and most disabling mental disorders, which also has a relevant impact on our society [5]. Currently, various methods for depression and stress detection are present and also diagnosis rely on self-reporting coupled with a health care practitioners informed assessment. The provision of an effective health monitoring system and also diagnostic aids could be very crucial and important in order to improve health professional's work and also lower the healthcare costs. Sentiment and deep learning technologies could help to tackle these objectives by providing effective tools and systems for objective assessment. Such tools and systems do not aim to replace the psychologist or psychiatrist but they can support their decisions and aid the same.

Here the approach is new and innovative for the practice of mental problem detection, there are machine learning techniques that is detection of mental problem in social networks which also exploit the features that are extracted from social network data in order to identify with precision possible cases of mental illness detection [5] [8].

The organization of the paper is as follows section II gives the related work and limitations and last section concludes the paper with future work followed by references.

II. RELATED WORK

Online Social Sites (OSNs) give important data on different users feeling about various topics. Along these lines, applications, such as, checking and suggestion frameworks (RS) can gather and dissect this information [1]. Here there is exhibited a Knowledge-Based Recommendation System (KBRS), that can incorporate well being observing framework in order to distinguish clients who have potential mental unsettling influences, specifically, depression and stress using CNN, BLSTM-RNN algorithms and the eSM2 opinion metric [1] Estimation investigation on microblog posts has been examined inside and out, the sentiment analysis of posts is as yet testing a result of the restricted logical data that they primarily contain in them [2]. In microblog situations, various emojis are many of the time utilized and they also have clear passionate implications. They are significant enthusiastic signs for the microblog nostalgic analysis. They address this issue by developing space as a component portrayal framework and identifying emojis and words into the passionate space dependent on the semantic composition using enhanced convolutional neural network algorithm [2].

There is also a coordinated web-based social networking content investigation stage that uses three level of features, i.e., user produced content like their posts, social graph associations, and user profile information, in order to dissect and identify the typical behaviours that go missing altogether from the standard in huge scale social networking sites [3]. Here a few sorts of investigations have been directed for much superior comprehension of the distinctive user practices in the process of discovery of exceptionally versatile indications of the users. This system used PCA algorithm for feature extraction and Profile-Based Collection Technique, Time-Based and Gradual Enhancement Technique for real time data collection [3].

Also users stress state is firmly identified with that of his friends in web-based social networking, Here a huge scale dataset from certifiable social stages were used in order to efficiently think about the connection of user's pressure states and their social associations [4]. Author here initially characterizes a lot of stress related text, visual, and social traits from different perspectives, and afterwards proposed a novel half breed model - a factor diagram model joined with Convolution Neural Network to use tweet substance and social collaboration data for stress discovery [4]. Psychological instability has a very deep affect on people, families, and by expansion, in entire society all in all. Informal communities enable people who have mental issues to speak with others sufferers by means of online networks, giving us a precious asset to think about on textual indications of mental medical issues [5]. They crawled a large body posts made by users in online communities. Features were extracted for input to the model. Using a machine learning technique, they formulated a joint modelling to determine the mental health co-occurring in online communities from these features [5]. A target building prescient model that influence language and standards of conduct, these also are utilized especially in online life, in order to decide if a user is experiencing the instances of mental issue. These prescient models are made conceivable by utilizing a novel information assortment process, authored as Subconscious Crowdsourcing, which gathers a quicker and progressively solid dataset of patients.

The tests recommend that extricating explicit language examples and social connection highlights from solid patient datasets can enormously add to advance examination and identification of mental issue. This paper used Linguistic Inquiry and Word Count (LIWC) and Latent Dirichlet Allocation (LDA) algorithms [6].

As an alternative approach one can provide with evidence that daily stress can be correctly identified based on behavioural metrics, derived from a user's activity on his mobile phone and also from few additional indicators, such as the given weather. The given statistical model, which is not dependent of a particular person, obtained a good accuracy score of for a stress recognition problem of daily nature [7]. Also, they identified as well as narrowed down the indicators which have strong predictive power. This the focus may be on using of TFIDF and LIWC algorithms for feature Extraction and Random forest for classification [7]. The study of the action's developments in between users in the Facebook social network in order to catch the idea of mental health awareness can be done. It is observed for example, they found that only less than half percentage of Facebook user pairs interact consistently from one month to the next. Interestingly, it was also identified that even though the existing links between the considered activity network undergo a rapid change with time, many of the properties of the activity network will remain unchanged with time [8].

Social media tools devices are wide spread in web correspondence and are picking up prominence in the correspondence procedure between open organizations and residents.

This investigation directs an examination on how online networking is utilized by Official Statistical Institutes to cooperate with residents and scatter data. A straight relapse method is performed to inspect which web based life stages (Twitter or Facebook) is a progressively viable apparatus in the correspondence procedure in the official insights territory. This examination proposes that Twitter is a more amazing asset than Facebook in upgrading the connection between legitimate insights and residents, conforming to a few different investigations.

Next, played out an investigation on Twitter organize qualities talking about "authentic measurements" utilizing NodeXL that uncovered the unexploited capability of this system by legitimate factual offices [9].

There is research on the neural engineering which will then focus on the classification of various stress such as emotional stress, physical stress, mental stress and no stress with the use of Electroencephalography (EEG) signal analysis. Stress as we know is one of the leading causes for several health-related problems and diseases [10]. Hence, it becomes necessary for the people in order to monitor their stress. The human body will take and also responds to stress in different ways which are resulting to two classifications of stress namely as, mental and emotional stress. Traditional methods in classifying stress such as through questionnaires and self-assessment tests are said to be subjective since they rely on personal judgment. So here first the features are extracted, these features are then used as inputs to classify stress using Artificial Neural Network (ANN) and validated using K-fold Cross Validation Method. Lastly, the results from the software assisted method is compared to the results of the traditional method [10].

Sr No	Title	Author	Algorithms	Journal	Description
1	A Knowledge-Based Recommendation System that includes Sentiment Analysis and Deep Learning	Renata L. Rosa, Gisele M. Schwartz, Wilson V. Ruggiero, and Dem´ostenes Z. Rodr´ıguez, Senior Member, IEEE	CNN, BLSTM-RNN algorithms	IEEE 2019	Here a Knowledge-Based Recommendation System (KBRS) was proposed, which is designed for an emotional health monitoring system that is used to detect users that have a potential psychological disturbance, specifically, related to depression and stress.
2	Emotion-Semantic Enhanced Neural Network	Guang Yang, Haibo He, Fellow, IEEE, and Qian Chen	convolutional neural network algorithm	IEEE 2019	The emotional signals issue is addressed by constructing an emotional space as a feature representation matrix and projecting emoticons and words into the emotional space based on the semantic composition.
3	Leveraging analysis of user behavior to identify malicious activities in large-scale social networks	M. Al-Qurishi, M. S. Hossain, M. Alrubaian, S. M. M. Rahman, and A. Alamri	PCA algorithm, Profile-Based Collection Technique, Time-Based and Gradual Enhancement Technique	IEEE 2018	An integrated social media content analysis platform was proposed that uses three levels of features, i.e., social media user-generated content, social graph connections, and user's profile activities, to analyze and detect anomalous behaviors that deviate significantly from the norm in large-scale social networks.
4	Detecting Stress Based on Social Interactions in Social Networks	Huijie Lin, Jia Jia, Jiezhon Qiu, Yongfeng Zhang, Lexing Xie, Jie Tang, Ling Feng, and Tat-Seng Chua	Convolutional Neural Network	IEEE 2017	A novel hybrid model that has a factor graph model that is combined with Convolutional Neural Network in order to leverage tweet content and social interaction information that is used for stress detection
5	A Framework for Classifying Online Mental Health Related Communities with an Interest in Depression	Budhaditya Saha, Thin Nguyen, Dinh Phung, Svetha Venkatesh	LIWC based single and multimodal algorithms	IEEE 2016	A number of significant examples were found where the used features provided a strong indicative power in the prediction of co-occurring communities which are interested in depression
6	Subconscious Crowdsourcing: A Feasible Data Collection Mechanism for Mental Disorder Detection on Social Media	Chun-Hao Chang, Elvis Saravia, Yi-Shin Chen	TF-IDF and LIWC algorithms for feature Extraction and Random forest for classification	2016 IEEE/ACM	Here they proposed predictive models that leverage language and behavioral patterns, used particularly in social media, to determine whether a user is suffering from two cases of mental disorder.
7	RsRS: Ridesharing Recommendation System Based on Social Networks to Improve the User's QoE	I.-R. Glavan, A. Mirica, and B. Firtescu	Linear regression	ACM 2016	This study conducts an analysis on how social media is used by Official Statistical Institutes to interact with citizens and disseminate information. A linear regression technique was used in order to examine which social media platform (Twitter or Facebook) is giving a better tool in the communication process in the official statistics area.
8	Classification of stress into emotional, mental, physical and no stress using electroencephalogram signal analysis	A. E. U. Berbano, H. N. V. Pengson, C. G. V. Razon, K. C. G. Tungcul, and S. V. Prado	Discrete Wavelet Transform (DWT), Artificial Neural Network(ANN)	2016 IEEE (ICSIPA)	Here a further research on neural engineering was done that focuses on the classification of emotional stress, mental stress, physical stress and no stress with the use of Electroencephalography (EEG) signal analysis.
9	Daily Stress Recognition from Mobile Phone Data, Weather Conditions and Individual Traits	Andrey Bogomolov, Bruno Lepri, Michela Ferron, Fabio Pianesi, Alex (Sandy) Pentland	An ensemble of tree classifiers based on a Random Forest algorithm, Support Vector Machines with linear and Gaussian radial basis kernels, and	ACM 2015	Here an alternative approach is used for providing of evidence that daily stress can be accurately identified based on the behavioural metrics, which are derived from the user's mobile phone usage activity and also from additional indicators, such as the weather conditions was proposed
10	On the Evolution of User Interaction in Facebook	Bimal Viswanath Alan Mislove Meeyoung Cha Krishna P. Gummadi	Activity Network	ACM 2009	Here the evolution of activity between users in the Facebook social network was analyzed. It was observed that links in the activity network have tendency to come and go rapidly with time, and the strength of ties exhibits a general decreasing trend of activity as the social network linkages.

III. OPEN ISSUES

A lot of work has been done in this field due to its extensive usage and applications. In the above section, some of the approaches which have been implemented in order to achieve the same purpose have been mentioned. These works are majorly differentiated by the algorithms used for Stress and Depression detection systems.

In the existing works mostly data mining and machine learning algorithms have been used and major work is done on only text data.

IV. CONCLUSION

In this survey, automatically identifying potential online users with depression and stress is threatening people's health. This analysis demonstrate that deep learning performance is better than other algorithms.CNN, BLSTM-RNN detection accuracy is high compared to other algorithms i.e. ANN, PCA, Sequential minimal optimization (SMO) algorithm and random forest.

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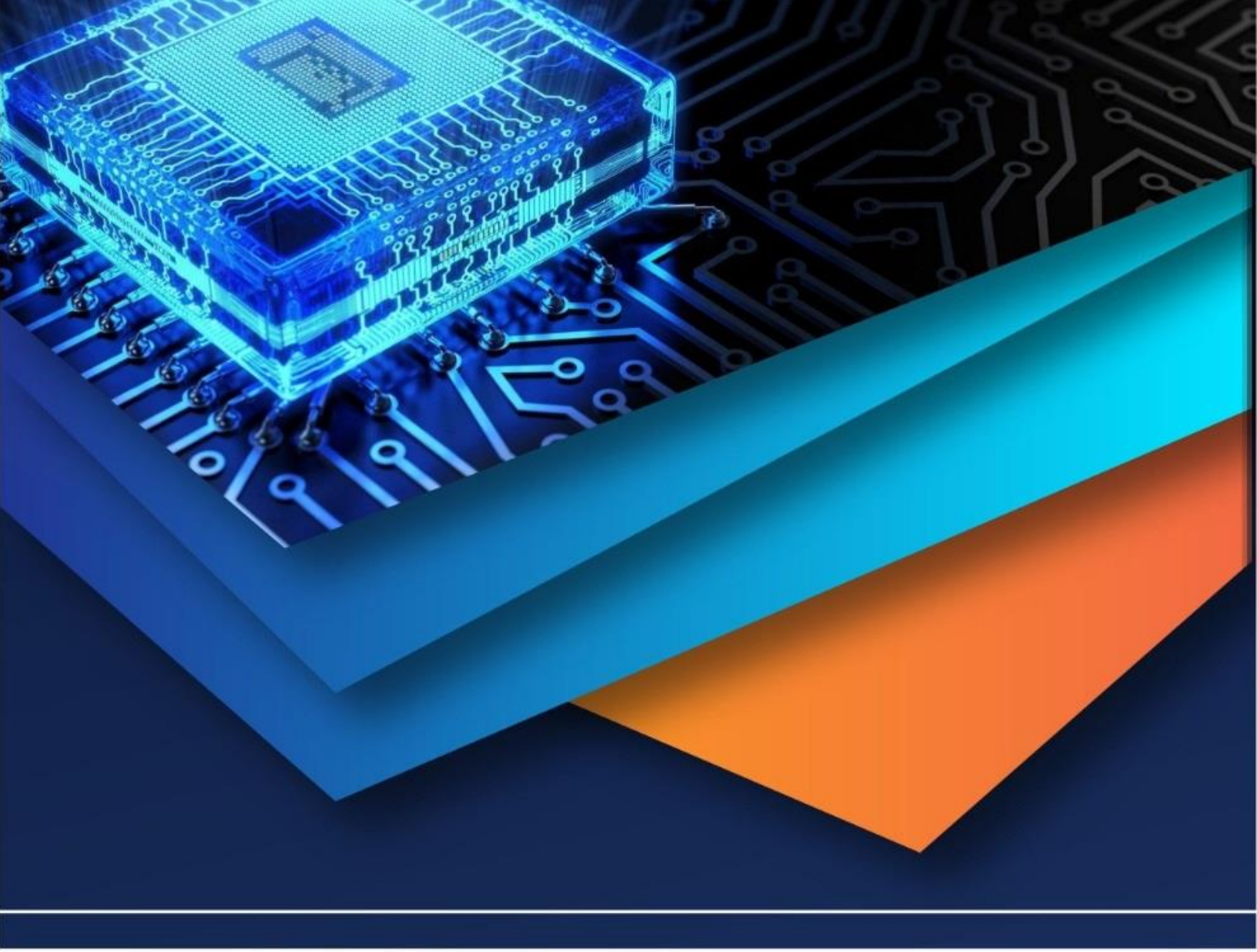

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