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The Impact of Different Dispositions and Gender on Depression, Anxiety, and Stress - DASS

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Abstract*— This aims to understand how different personalities affect Depression, Stress and Anxiety. The three unfavourable feelings that are most frequently linked to psychopathological effects are stress, anxiety, and depression. Depression, Anxiety, and Stress Scale (DASS-42) state that Depression is characterised by profound discontent, abnormal life evaluation, self-deprecation, hopelessness, loss of interest, and disinterest. Anxiety is also associated with hyperventilation, shivering and nausea. The inability to relax, agitation, and impatience are all symptoms of stress. Newer studies support this link between personality and mental health more strongly. Particularly, major depression, generalised anxiety disorder, and other disorders are linked to a personality trait known as neuroticism. Regularly feeling fearful, depressed, guilty, angry, or envious is a sign of neuroticism. To a certain extent, personalities may change, and many people employ coping mechanisms to lessen the negative effects of negativity on their everyday lives and long-term mental health. The DASS, a set of 3 self-report measures, is employed to rate the unfavourable emotional states of stress, anxiety, and depression. The DASS was developed as more than just another set of scales to assess emotional states as they are typically understood. but to further the process of characterising, comprehending, and quantifying the common and clinically relevant states of emotion that are typically referred to as stress, anxiety, and depression. The World Health Organization (WHO) claims that men and women experience mental illness in various ways. This article clarifies the psychological traits that affect DAS according to gender. Machine learning models will discover the most accurate characteristics that influence mental disease.

Keywords— : Depression, Stress, Anxiety, DASS , Personality, Machine Learning.

I. INTRODUCTION

In today's world, depression is a very real and frequent condition. More and more people are finding it difficult to handle the increased pressure in their life as our society has grown more competitive, demanding, and busy. The WHO reports that depression is the most predominant mental illness, distressing more than 300 million people worldwide. Numerous health experts have decided to focus their studies on this topic due to the severity of the issue. Since it is challenging for computers to tell the difference between stress, depression, and anxiety, a good learning algorithm is required for an accurate diagnosis. According to WHO, a healthy individual not only has a healthy body but also a healthy mind. Depression differs from typical bouts of depression and momentary emotional responses to day-to-day issues. If distress is recurring and varies from moderate to severe, it can become a chance of becoming a serious medical condition. Affected individuals' whitethorn suffer critically and perform off-colour at work, in university, and the home. When depression is at its worst, suicide might ensue. Nearly 700,000 people commit suicide annually. The fourth most frequent reason of death for persons amongst the ages of 15 and 29 is suicide.

Who is susceptible to getting a mental illness?

Numerous individual, family, societal, and structural factors might interact to either promote or risk psychological health at any single time. While most people are resilient, those most individuals are resilient, those who are exposed to risky situations including deficiency, ferocity, debility, and inequality are more at jeopardy. Personal biological and mental traits, such as a person's innate emotional intelligence and hereditary makeup, can be risky or protective. Numerous risk and protective factors are affected by brain anatomy and/or function alterations in brain anatomy and/or function.

Depression: When you're depressed, it has an influence on almost every characteristic of your lifetime, including your thoughts, feelings, actions, and functioning. One or more of these signs or symptoms may be present in you.

- Discouragement
- Low-level energy
- Sadness
- Anger

- Hopelessness
- Lack of motivation or interest in life in general

Thoughts of suicide or death. Depression might increase a person's thoughts about passing away and dying. They could also consider killing themselves and ways to do so. This is known as suicidal thoughts. dependable source A person could occasionally discuss their views with others. It is crucial to seek help straight away if someone mentions death or suicide since this might be a method for them to beg for it. Depression is a common yet dangerous illness that poses a threat to life. Not everyone who considers suicide does it. However, it's crucial to either call a doctor or assist the person in getting emergency medical attention if they suggest suicide.

You could have an anxiety disorder, a depressive condition, or both if you frequently feel worried or depressed for no obvious cause. It's fairly uncommon for someone to have both illnesses simultaneously. Almost half of those who are given a diagnosis of depression also receive one for an anxiety condition. Both depression and anxiety are severe yet curable conditions. The symptoms of each ailment may be treated with the same drugs. Both conditions have distinct origins, yet they also have comparable symptoms including anxiety, irritability, sleeplessness, and difficulty focusing. Anxiety: Symptoms of an anxiety disorder include: Persistent, nagging worry or anxiety in circumstances when most individuals would not feel fear, panic, or threatened. Panic or anxiety episodes occur suddenly and without a known cause. These disorders can make it difficult for you to maintain relationships, work, or even leave the house if left untreated. Despite their apparent similarities, stress and anxiety are not the same. The distinction? Anxiety is a response to anxiety, which is a response to daily stressors or dangerous scenarios. Unknown causes of anxiety can continue longer and are more challenging to cure. Many individuals are impacted by stress, and it may have an impact on their health. Included among the symptoms are: Headaches and High Blood Pressure, Chest discomfort, heart palpitations, rashes on the skin, and lack of sleep are all symptoms of stress, which usually go away as the stressors do. It's crucial to take action to lessen or completely remove stress whenever feasible since persistent stress can worsen anxiety or depression.

The relationship between personality and mental disease has now been brought to a whole new level. Researchers under the direction of Chi-Hua Chen, a professor at the University of California-San Diego's department of radiology, discovered a link between genetic variants that affect personality and the likelihood of acquiring the mental illness. The "Big Five" categories frequently employed to evaluate personality traits were the subject of the study. In a nutshell, researchers discovered the following for each component by identifying specific changes in genes and chromosomes.

- Emotional stability: Anxiety and depressive disorders were genetically associated with neuroticism.
- Attention deficit disorder hyperactivity syndrome, or ADHD, has indeed been linked genetically to extroverted traits including being highly talkative and energetic.
- Openness to new experiences: This quality comprises virtues like inventiveness and intellectual curiosity. But a connection between schizophrenia and bipolar illness was discovered.
- In contrast to antagonistic personalities, agreeable personalities had a lower risk of having a related psychiatric disorder.
- Consciousness versus irresponsibility. These characteristics were also associated with a decreased incidence of mental illness.

Mental Illness and Personality

Will you eventually become clinically depressed if you're negative now? While other personality features seem to safeguard against mental illness, some seem to make them more likely to develop in the future. Newer studies support this link between personality and mental health more strongly. Particularly, major depression, generalised anxiety disorder, and other disorders are linked to a personality trait known as neuroticism. Regularly feeling fearful, depressed, guilty, angry, or envious is a sign of neuroticism. Don't give up if you notice these characteristics in yourself. To a convinced degree, personalities may change, and most people employ managing mechanisms to lessen the negative effects of unconstructiveness on their everyday lives and longstanding psychological health. Psychological qualities are a matter of degree, claims Dr. Roman Kotov, an associate professor in the division of neurology at Stony Brook School of Medicine in New York. They are categorised along a continuum, like intelligence. To examine the association between personality qualities and hopelessness, anxiety, and substance use disorders, Kotov and colleagues reviewed 175 articles in 2010. Major depressive and anxiety disorders have been linked to social phobia and low levels of extraversion, or introversion. Disagreeableness and disinhibition, which include impulsivity and a disregard for social norms, have been linked to the emergence of substance use disorders. The analysis, published in the journal Psychological Bulletin, found that neuroticism was the personality trait most frequently linked to mental health conditions across the board.

The relationship between personality and mental disease has now been brought to a whole new level. Researchers under the direction of Chi-Hua Chen, an affiliate professor at the University of California-San Diego's physician's office, discovered a link between genetic variants that affect personality and the likelihood of acquiring the mental illness. Data from 23andMe, a personal genetics

company, as well as information Using data from the European Genetics of Psychology Project and other organizations that examine the connections here between genetic code and character, were used in the ground-breaking study, which was published last December in Nature Genetics. According to Chen, the 23andMe contribution includes DNA sequencing of genetic data gleaned from consumer testing and coupled with personality scores gathered from responses to online surveys.

Gender and Mental Health

We are aware that results in terms of mental health seem to vary depending on a person's gender. How gender affects our social experiences is one of the causes. For instance, Men are less likely than women to be diagnosed with depression. Women encounter specific gender-based stressors in addition to societal factors that may make them more likely to seek therapy and receive a diagnosis (more on this in the section on addressing mental health). Women are under more time pressure than males since they spend nearly twice as much time on childcare, undertake two more hours of housework every day, and make up the majority of caregivers (which includes not only children but also elderly or disabled family members). The likelihood of mental health issues rises with early sexism of girls and women. The likelihood of difficulties with mental health rises with early sexism of girls and women. Girls and women are also constantly at risk of violence; in the US, one in four women will experience physical abuse from an intimate partner, and one in every six women has experienced attempted or actual rape at some point in her life. All of this wears on us Obviously, further identity-related problems exacerbate this. Women who identify as members of a racial, ethnic, gender identity, or religious minority face increased risks and pressure in daily life. However, according to specialists, qualities like conscientiousness offer protection from these conditions. Being reliable and self-disciplined makes you less likely to struggle with mental health issues. Another quality with lesser risk is agreeableness.

II. Literature Survey

For gathering and then classifying data from blog postings, several researchers have concentrated on using machine learning techniques like the Cnn Model, the Svm, and the Randomised Forest Tree to predict depression and anxiety symptoms. The text has been encrypted using a variety of techniques. Bag-of-Words, Maximum - likelihood Temporary Files, and Topic Modelling have all been used. Additionally, Python programming has been employed for demonstrating trials, with the CNN classifier producing the most successful outcomes of all classifiers [2] with recall and accuracy ratings of 0.72 and 78%, respectively. For categorization in [7], several machine learning techniques like RFT, SVM, Naive Bayes, Catboost, and Logistic Regression were employed. 470 sailors were questioned for this study, and data on their jobs, sociodemographics, and health were gathered using 16 criteria, such as academic, age, credentials, scheduled income, work position, BMI, length of the facility, family structure, marriage status, and diabetes, ischemic heart disease, or hypertension is present (if any). Additionally, fake academic success indicators and marriage status are included. The scholars discovered that Catboost 82.6% and 84.1% of all the classifiers, offered the highest accuracy and precision values. Sau et al. (2017) physically congregated info on 630 old people, 520 patients from the Medical University and Hospital of Kolkata, West Bengal, who were receiving special treatment. Following the application of various classification techniques Among the two sets of information of 110 and 520 individual citizens, confusion matrix outperformed Bayesian Approach, supply - chain, 3-layer perceptron, Bayesian Network, irregular forest, arbitrary tree, J48, sequential random enhancement, random sub-space, and K star, producing the best estimation accuracy of 91% and 89%, including both. We used the WEKA tool in [1] for feature selection and categorization. Social media is now quickly becoming a healthcare assessment tool for diagnosing various illnesses. Topics and psycholinguistic characteristics that appeared in LiveJournal entries were chosen by Saha et al. [8]. These were subsequently entered into a collaborative exhibiting framework to classify the mental issues present in online groups with a focus on depression. The learning demonstrated that talks in online communities extended beyond depressive symptoms, outperforming the established and MLT and STL baselines. Twitter users' jeopardy factors for depression and PTSD were the subject of the Reece et alstudy .'s [9]. Increases in the likelihood of PTSD were identified using the Hidden Markov Model (HMM). 31.4% and 24% of the whole dataset were found to be afflicted by depression and PTSD, respectively. To estimate the risk of suicide, Braithwaite et al. [10] composed tweets from 135 volunteers hired through Amazon Mechanical Turk (MTurk). It was found that 92% of predictions about suicide rates were accurate. Twitter streaming data was retrieved by Du et al. [11] who then utilised psychological stressors to label messages having been identified as miserable. With a precision of 78%, the CNN outperformed the extra trees (ET), SVM, and other methods in recognising tweets with suicidal intentions. The audial-text method may be employed to simulate depression, in which case the scholar gathers information from people who are experiencing depression. Context-free programming yielded the best auditory (balanced, sequential, and cross) outcomes when the long poor memory neural network algorithm was employed to assess sorrow [12]. Early signs of depression were also foreseen in [13] from social media material. CLEF risk was used to obtain the data. Five different systems were examined, and it was found that combining The best outcomes were achieved through machine learning and information retrieval. Big data is used,Hou et al. were able to estimate.

depression is determined by a person's reading preferences. To create a volume classifier, the characteristics of Chinese text were recovered, and nave Bayes was determined to be the best suitable classification after using five [14]. Using supervised machine learning classifiers, post-traumatic stress disorder has been identified in [15]. Their study's focus is on former UK military personnel who are militants, and its characteristics include alcohol abuse, gender, and level of deployment. Numerous administered machine learning classifiers accomplished sufficient understanding as a result, although the findings were not particularly susceptible to incorrectly negative diagnosis. By analysing the patient's facial expressions and using cross-validation, anxiety and mood disorders were identified in [16] with more accurate findings that are supported by several statistical tests. In [20], imbalance classification was used, while [21] presented ensemble machine learning techniques. Dissimilar machine learning procedures have been used by different researchers to predict psychological disorders, and it has been discovered that the performance of each algorithm varies contingent on the situation; no one process has been identified as being the most appropriate in every situation. As a result, in the current study, every machine learning algorithm remained used to recognise the signs of SAD are psychological illnesses that have serious negative consequences on mental stability, disrupt a person's regular daily activities, and in extreme cases, deteriorate into trauma. cases. The human body releases a variety of hormones when SAD and as a result, nonverbal body language changes. These psychological diseases can be generally categorised as SAD according to the many stages of their research. Anxiety is the disorder's initial, transient stage. This may happen as a result of minor problems with regular activities [25]. The second stage of mental illness is stress, during which psychological instability is tempered by the ongoing effects of anxiety [16]. The third and greatest severe phase of a psychiatric condition that can have a long-term negative impact on a person's physical and mental health is depression [17]. An individual's degree of discomfort is a direct outcome of their stress levels, and this discomfort manifests as anxiety or depressive episodes. Stress is a group of behaviours or occurrences that might make someone feel stressed. Exercises, more labour, overburden duties, exaggerated respiration, insufficient sleep, questionnaires, etc. may overburden of duties, exaggerated respiration, insufficient sleep, questionnaires, etc. may all cause stress. According to research [18], stress may have both good and harmful effects depending on the circumstance research [18], depending on circumstances, stress may have both good and harmful effects. Recognizing stress and examining its different manifestations to accurately diagnose an individual is difficult to process. Computer vision [19] methods appear to be useless for the diagnosis and treatment of stress; nevertheless, SAD recognition may be effectively managed by computerised computer systems. vision strategies.

To get encoded temporal information, the RNN is utilised. Zhou et al. used a neural network to learn depression relation-rich properties from facial expressions using a visual dataset. To investigate pixel fluctuation and link it to shifting expressions, the process picks out important areas of a picture and plots them as a histogram. Using surveillance footage of a depressed person's actions, the video-based dataset [12] may be constructed. without interfering with them, recordedTherefore, to differentiate, the severity degree must be examined. between anxiety, sadness, and stress. There are several methods to link these characteristics to stress, sadness, and anxiety. The psychiatric clinic approach [14] might be useful to categorise such characteristics in which a specialist has to ask the patient and assess the degree of his or her problem. A different strategy would involve using computer vision methods to collect data from individuals, such as ECG, EEG, blood pressure, etc., and apply it to ML strategies for the categorization of SAD.

III. Data and Methodology

A collection of distinct self-report measures called the Depression, Anxiety and Stress Scale - 42 Items (DASS-42) was created to aid in the definition, comprehension, and measurement of the common and clinically relevant emotional states of depression, anxiety, and stress. Anyone may participate in the poll, and the opportunity to receive tailored findings encouraged individuals to do so. They also had the option to complete a brief research survey after the test. This data set was compiled from respondents who indicated their willingness to participate in the study by checking the box next to the statement, "Have you supplied correct answers and may they be used for research? and then ". The 42 questions are graded on a 4-point scale, with 0 ("Did not apply to") to 3 ("Did not apply to Applied to me at all") to 3 ("Applied to me a lot, or almost always"). ratings of depression, the scores for the relevant items are added to determine the levels of stress and anxiety:

Depression - 3, 5, 10, 13, 16, 17, 21, 24, 26, 31, 34, 37, 38, 42
Anxiety - 2, 4, 7, 9, 15, 19, 20, 23, 25, 28, 30, 36, 40, 41
Stress - 1, 6, 8, 11, 12, 14, 18, 22, 27, 29, 32, 33, 35, 39

It was administered the Ten Item Personality Inventory (see Gosling, SD, Rentfrow, PJ, & Swann, W. B., Jr. (2003). The Big Five Personality Domains on a Very Brief Scale. 37, 504-528, Journal of Research in Personality)

TIPI1	**Extraverted, Enthusiastic.**
TIPI2	**Critical, Quarrelsome.**
TIPI3	**Dependable, Self-Disciplined.**
TIPI4	**Anxious, Easily Upset.**

TIPI5	**Open to new experiences, Complex.**
TIPI6	**Reserved, Quiet.**
TIPI7	**Sympathetic, Warm**
TIPI8	**Disorganized, Careless.**
TIPI9	**Calm, emotionally stable.**
TIPI10	**Conventional, Uncreative.**

Table 3.1

Personalities have been split into two groups based on 'The Big Five Personality '.

Group 1 - TIPI3, TIPI4, TIPI6, TIPI8, TIPI9. (Traits similar to The Big Five Personality)

Group 2 – TIPI1, TIPI2, TIPI5, TIPI7, TIPI10.

Methodologies

1. Logistic Regression
2. Random Forest Classifiers
3. SVC

Group 1

SVM will be used after trying logistic regression random forest first. In this case, obtaining a specific degree of accuracy is not the objective. It is more important to determine whether personality types can be utilised to foretell the general emotional state shown in Q1-42. Wish to continue using the most basic model.

Logistic Regression	Random Forest	SVM
0.7427093808360867	0.7151989656658526	0.7453670449648039

Table 3.2

Only somewhat, SVC outperforms random forest. The crucial aspect, however, is that we can predict emotional state rather well using just five personality features.

We will determine three scores—S, A, and D—as well as a total score utilising the DASS 42 grading method. Instead of predicting total scores, our objective is to determine if we can more accurately forecast S, A, and D scores. For instance, we would anticipate that TIPI4 and the Anxiety (or A) score would have a strong correlation. Only Logistic Regression will be used since, of the three approaches we investigated, it seemed to perform adequately.

Scores of Stress, Anxiety and Depression.

Stress	Anxiety	Depression
0.5995546616865393	0.8408992960781497	0.7136905617009051

Table 3.3

Based on the aforementioned questions, especially TIPI4, it is evident that anxiety rating is more precisely forecast. Yes, even with TIPI 3, 6, 8, and 9 removed, you may still get a comparable score. Let's investigate it. 0.8212182157735958 is the score. Indeed!!! Inferring that personality types have a significant impact on mental health, we can predict the results of a subset of 42 anxiety-related questions [2, 4, 7, 9, 15, 19, 20, 23, 25, 28, 30, 36, 40, 41] simply only on one attribute TIPI4!.

Group 2

Group consists of 5 traits which are not similar to 'The Big 5 Personalities'. As this study aims to know and understand how personalities affect Stress, Anxiety and Depression group 2 will give a better understanding.

Logistic Regression	Random Forest	SVM
0.6847435713259589	0.6311593161902026	0.6847435713259589

Table 3.4

Considering Group 2 traits and running it over all the questions of the survey gives lesser accuracy when compared to group 1.

Scores of Stress, Anxiety and Depression.

Stress	Anxiety	Depression
0.5452521189484427	0.8362304266628358	0.6805056744720586

Table 3.5

Anxiety top scores the tables with group 2 also. By this, we can conclude that personalities differently affect Anxiety.

Table 3.6

The DASS includes several questions. Gender is one among them. The dataset contains the values Female -2, Male -1, and Other -3.

Does Gender Influence Mental health?

What does it imply when we talk about mental health, and why do we bring up gender in this context? Mental health is the same as physical health in that it relates to how well the mind and body are doing. Although mental disorders still struggle to be regarded as significant medical conditions by the common folk, most of them have personally fallen prey to poor mental health at some time or the other in their life. Without mentioning mental health, the term "health" cannot be fully defined. Even while there is already some awareness of it, there is still much work to be done in terms of diagnosis, treatment, and most importantly elimination of societal stigma. We cannot help but talk about the interaction between gender and mental health when we consider societal elements of how an illness is treated, who are more susceptible, who is supported, and who is demonised.

One's gender significantly influences how mentally healthy one is in a culture where there is a substantial gender split and firmly established standards for each. The gender variations in mental illness patterns are startling.

The World Health Organization (WHO) states that gender inequalities are notably present in the prevalence of somatic symptoms, depression, and anxiety. These illnesses, which are more common in women, impact 1 in 3 residents of the town and pose a severe public health issue. While women are twice as likely to have unipolar depression, males are more likely to experience alcoholism and antisocial personality disorder. Our society's gender norms, as well as unpleasant previous experiences and events, can be connected to this disparity. Let's now examine some gender-specific factors that affect a person's mental health.

Let's now examine how various personalities impact both men's and women's mental health. Taking into account Group 1 quality, which includes the research's top 5 personalities.

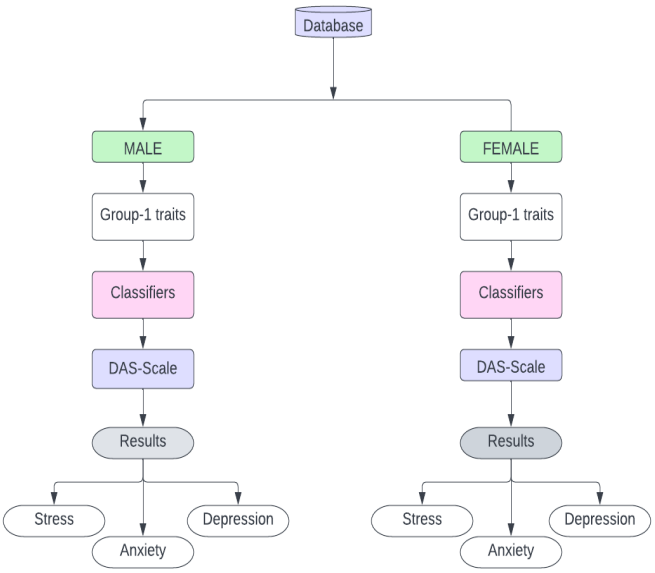

Figure 3.1

Male

Reading and processing male data for classifiers.

Logistic Regression	Random Forest	SVM
0.6919077023074424	0.6421839454013649	0.6928826779330517

Table 3.7

Scores of Stress, Anxiety and Depression.

Stress	Anxiety	Depression
0.5398115047123822	0.7640558986025350	0.7058823529411765

Table 3.8

Female

Reading and processing female data for classifiers.

Logistic Regression	Random Forest	SVM
0.7464483958980148	0.7196349609558754	0.747765547088155

Table 3.9

Scores of Stress, Anxiety and Depression.

Stress	Anxiety	Depression
0.6115344811365133	0.7689307767305817	0.7130492050051745

Table 3.10

4. Results

Traits	Stress	Anxiety	Depression
Group 1	0.599554	0.84089929	0.713690561
Group 2	0.54545211	0.83623042	0.680505677
Group 1-Male	0.539811504	0.764055898	0.7477655470
Group 1-Female	0.611534481	0.7689307767	0.7130492050

From the above table, a clear observation can be made when compared to the stress and depression anxiety gives a higher accuracy so it can be stated that anxiety depends on one's personality.

IV. Conclusion

From the above observation, humans possess different emotions and these emotions directly or indirectly affect the mental health of an individual. This paper brings a connection between personalities and emotions. In this study, machine learning algorithms were used to analyse how various personalities are affected by stress, anxiety, and depression. A basic questionnaire evaluating the common signs of stress, sadness, and anxiety was used to gather the data (DASS-42). Then, three distinct classification methods were used Support Vector Machine, Logistic Regression, and Random Forest Tree (RFT) (SVM). Both Logistic Regression and Support Vector Machines were found to have better accuracy when compared to Random Forest. From the above results, we can conclude that anxiety is more accurate when compared to stress and depression.

V. **Future Work**

Everyone's top concern should be raising awareness about mental illness because it is a major problem that needs to be addressed. Due to a lack of adequate resources, there is now a dearth of data that can be studied. Predicting stress, anxiety and depression should be made more accurate with the appropriate symptoms.

VI. Conflicts of Interest

The authors declare no conflict of interest.

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