*i*Journals: International Journal of Software & Hardware Research in Engineering (IJSHRE)
ISSN-2347-4890
Volume 10 Issue 8 August 2022

URESHII- Improving one's Mental Wellbeing

Shiv Mehta
Dhirubhai Ambani International School
Mumbai,MH,India

Reetu Jain
On My Own Technology Pvt. Ltd. Mumbai,
MH,India
reetu.jain@onmyowntechnology.com

Abstract -Ureshii (Happiness in Japanese) is a mental health app. Based on behavioral activation therapy, it uses machine learning technology with clustering algorithms to recommend the apt activities and create the best mental health path for each user. The app starts by asking you 5 questions (based on the PHQ-9 test) everyday to monitor your dopamine, serotonin, oxytocin, and endorphin levels and scores and tracks your responses. Our app tracks which activities improve your hormonal levels more and uses the "K nearest neighbors" machine learning algorithm to cluster people with similar profiles and a similar difference in scores together. Based on this, our app uses a recommender system to suggest similar activities which it thinks will help improve your mental wellbeing. For example if 'user A' finds dancing to be a rewarding activity and has shown to have a score of 5/10, the app will cluster them with someone ('user B') who also finds dancing to be a rewarding activity and who also has a score of 5/10. If 'user B' finds yoga to be another rewarding activity, the app will recommend yoga to 'user A' as well. It learns from the user's responses and changes its recommendation as well as the cluster the user has been put in once it notices that the user is not being affected positively. Beyond recommending activities to the user, the app also keeps track of their mental health, provides easy-access to trained therapists, and helps people take control of their mental health.

Keywords- Mental health, Teenage behavioral issues, Mental state assessment, Machine learning, Web-app, ML based mental health analysis, Clustering algorithm

Introduction:

Experts say that mental problems in teens are at an all-time high. One in 5 teens has a diagnosable mental health ailment, such as depression or tension. And these teen intellectual issues are at the upward push.

Apart from depression and anxiety, Teenagers face many other mental health issues like trauma, borderline personality disorder, schizophrenia. Furthermore, teenage behavior disorders like abuse and eating disorders also come under the psychological disorder category.Let us discuss them in detail:

Major Depression:

A major depressive episode is a duration of at least weeks of low mood that is found in maximum conditions. signs encompass low confidence, loss of hobby in usually enjoyable activities, and issues with sleep, strength and attention. Young adults with primary despair find it hard or impossible to do ordinary daily activities, such as operating, studying, snoozing, and ingesting. Furthermore, the ones who have had one episode of major depressive ailment are at excessive risk of getting another.

In line with a brand-new record, the prognosis of foremost depression has risen by 33 percent

for the reason that in 2013 teen intellectual fitness facts

show that this fee is rising even quicker amongst millennials—up by forty seven percent. Moreover, the rates of primary melancholy in teenagers have extended via forty seven percent for boys and 65 percent for ladies.

Melancholy is likewise referred to as primary depressive disorder or scientific despair. It's one of the forms of melancholy that has the maximum excessive symptoms. Consequently, it can rise up in bouts and final for long intervals of time. Therefore, it extensively affects the best of existence for teenagers.

Warning signs:

- Feeling persistently sad, anxious or empty
- Experiencing hopelessness or pessimism
- Struggling with irritability
- feeling guilty, worthless or helpless
- Losing Interest in hobbies or activities that used to be enjoyable

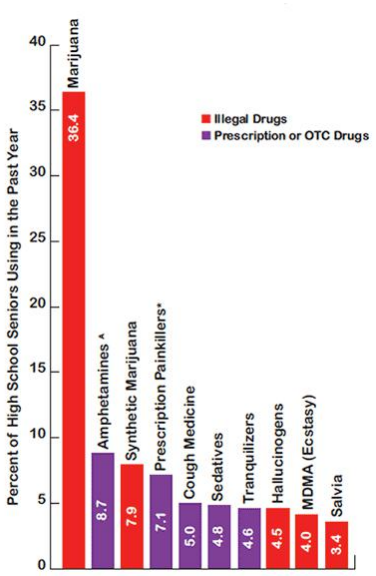
Generalized Anxiety Disorder:

Generalized Anxiety Disorder (GAD) is the maximum commonplace teen tension disorder. This kind of anxiety in teens includes immoderate anxiety or worry over regular events. Furthermore, the tension lasts for an extended time frame. Teens with generalized tension enjoy intense emotional strain, in addition to a number anxiety-related signs and symptoms. Moreover, teenagers with GAD enjoy excessive annoyance and also low self-esteem.

Young adults with a tension ailment revel in specifically high stages of anxiety. Furthermore, those emotions worsen over time, instead of enhancing on their own.

Substance Use Disorder:

The list of youngsters' mental problems includes substance use sickness. That's because young adults use capsules and alcohol to self-medicate despair, tension, trauma, low self-confidence, and different underlying situations. Substance use becomes an unhealthy and threatening coping mechanism for symptoms of youngster intellectual disorders. And extended use can develop into addiction.



Borderline Personality Disorder:

Young adults with borderline personality sickness lack a strong sense of self. Consequently, teens with borderline personality disorder don't know the way to process emotions. Subsequently, without a company identity, humans with borderline character ailment have intense emotional instability.

Eating Disorders:

Youngster consuming problems include anorexia, bulimia, and binge-ingesting sickness. Anorexia nervosa has the best demise fee of any mental ailment, on account of hunger, metabolic crumble, or suicide. Therefore, it's far one of the most risky teenager mental problems. Therefore, teenager eating disorders produce intense disturbances in teenage ingesting behaviors and therefore bodily fitness. However, in addition they affect teenage intellectual health. Ingesting disorders almost continually coexist with other intellectual health troubles.

Schizophrenia:

Schizophrenia is a chronic, lifelong sickness. In addition, schizophrenia behaviors start to expand in adolescence. In step with the countrywide Institute of mental health, signs and symptoms of schizophrenia frequently start in folks that are younger than 30. Teens affected by schizophrenia have trouble

processing non-public feelings and they often become indifferent.

There are many other mental diseases that teenagers face like:

- Trauma and PTSD
- Narcissistic Personality Disorder
- Obsessive-Compulsive Disorder
- Histrionic Personality Disorder
- Dissociative Identity Disorder
- Gaming Disorder

Causes:

- Scientists have located correlations among display time and teen mental problems. immoderate use of era takes time and energy faraway from relationships, schooling, and extracurricular activities. "when you consider that 2010, iGen youngsters have spent more time on new media screen activities and less time on nonscreen sports, which may additionally account for the increases in depression and suicide," the researchers concluded.
- **Social media** is a primary supply of anxiety and strain for youth. Teens become depressed after they compare their lives unfavorably to the human beings they comply with on FB, Twitter, and Instagram.
- Many teenagers enjoy some degree of instructional strain. Therefore, an unsure economic system and hard opposition for college, grad school, and jobs make that strain worse.

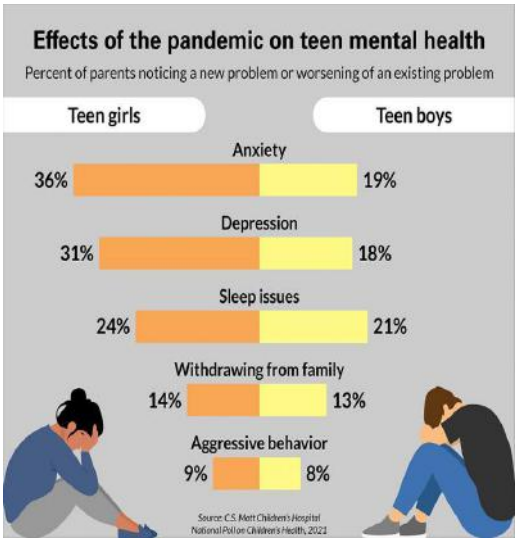
Effect of Pandemic:

ANN ARBOR, Mich. - For teens, pandemic restrictions may additionally have intended months of virtual school, much less time with buddies and canceling activities like sports activities, band concert events and promenade.

And for younger people who rely closely on social connections for emotional guidance, those adjustments may also have taken a heavy toll on mental health, a brand-new national ballot shows.

Forty-six percent of parents say their teen has shown symptoms of a brand new or worsening intellectual fitness circumstance since the beginning of the pandemic in March 2020, which is consistent with the C.S. Mott kids medical institution nationwide ballot on children's health at Michigan medicine.

Parents of teen girls are more likely to mention their kids had a new onset or worsening of depressive signs and symptoms of anxiety than the parents of teen boys.



The nationally representative document is based on responses from 977 mother and father of teens a while 13-18.

One in three young women and one in five teen boys have experienced new or worsening anxiety, the ballot suggests. Extra, dad and mom of teen ladies than dad and mom of teen boys observe an increase in tension/worry (36% vs. 19%) or melancholy/unhappiness (31% vs. 18%).

However, similar proportions of mothers and fathers record poor adjustments of their teenager's sleep (24% for ladies vs. 21% for boys), chickening out from their own family (14% vs. thirteen%) and competitive conduct (8% vs. nine%).

Recent studies have shown youngster melancholy throughout the pandemic to be associated with teenagers' very own fears and uncertainties, in addition to high degrees of parental strain, Freed notes.

1. Literature Review:

Mental health affects 1 in 3 people globally of which 64% are below the age of 18. The current pandemic has further exacerbated mental wellness related health issues to 73% of the world population due to social distancing, lock down, stress and anxiety.

The World Health Organization (WHO) recognizes the importance of psychological well-being, defining health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" and includes "subjective well-being, perceived self-efficacy, autonomy, competence, intergenerational dependence and recognition of the ability to realize one's intellectual and emotional potential"

Mental wellness is the silent killer as its root cause of stress, depression, mental and psychological disorders and related chronic illnesses including increase in life threatening diseases like diabetes, high blood pressure, heart attack, strokes, kidney and liver related challenges.

Teenagers' Stress Detection Based on Time-Sensitive Micro-blog Comment/Response Actions:

Correctly detecting mental strain in time is a massive problem in contemporary society, especially for children who aren't mature enough to deal with pressure properly. Micro-weblog gives a brand new channel for young adults' stress detection, when you consider that more and more teenagers these days favor to specific themselves on the lively digital social networks. preceding work especially trusted tweeting contents to locate tweeters' mental stress. However, a tweet is confined to 140 characters, which can be too quick to provide sufficient statistics to accurately determine its tweeter's strain. To overcome the limitation, this paper proposes to leverage info of social interactions between tweeters and their following pals (i.e., time-touchy comment/reaction actions under a tweet) to aid pressure detection. Experimental results through a real person observe display that point sensitivity of remark/reaction acts plays an extensive function in pressure detection, and involving such interplay acts can improve the detection performance through 23.five% in F-measure over that without such interactions.

Perception Differences between the Depressed and Non-Depressed Users:

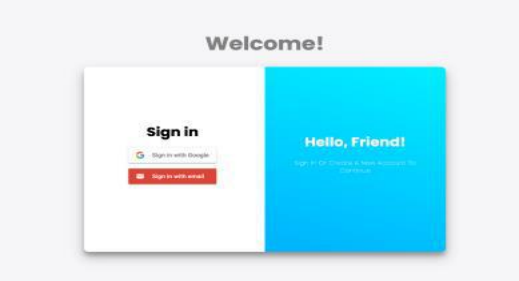
One's nation OR STATE of mind will influence her perception of the sector and those within it. In this paper, we explore attitudes and behaviors towards on-line social media based totally on whether one is depressed or not. We carried out semi-dependent face-to-face interviews with 14 active Twitter users, half of whom had been depressed and the alternative half non-depressed. Our outcomes highlight key variations among the 2 agencies in phrases of belief in the direction of online social media and behaviors inside such structures. Non-depressed people perceived Twitter as an records ingesting and sharing device, whilst depressed people perceived it as a device for social cognizance and emotional interplay. We talk about several design implications for future social networks that could better accommodate users with despair and provide insights closer to helping depressed users meet their needs through online social media.

Analyzing and Identifying Teens' Stressful Periods and Stressor Events From a Microblog

In this paper, They define the trouble modern identifying teens' disturbing intervals and stressor events from the open social media microblog. starting from a case, have a look at modern day young people' posting behaviors all through traumatic school activities, they have constructed a Poisson-based possibility version for the correlation among stressor events and stressful posting behaviors through a chain of cutting-edge posts on Tencent Weibo). With the model, they found out teens' maximal disturbing periods and further extracted information about contemporary possible stressor events that motivate the stressful durations. It generalizes and gives the extracted stressor activities in a hierarchy primarily based on common strain dimensions and event types. Taking 122 scheduled annoying have a look at-related activities in a excessive school because the floor fact, they checked the approach on 124 students' posts from January 1, 2012 to February 1, 2015 and gain a few promising experimental effects: The most distinguished stressor activities extracted are within the self-cognition domain, observed by means of the school life domain. This conforms to the adolescent mental research that problems in college life generally followed with teens' internal cognition troubles.

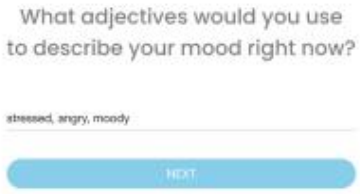
3. Our Solution(URESHII)

The solution we have developed is an AI enabled Mental Wellness platform called - Ureshii (Happiness in Japanese). Ureshii uses Machine Learning and Cognitive Psychology to track, predict and prescribe solutions for living a healthy mental lifestyle. It is based on the PHQ9 research developed at Columbia University and is an application of behavioral activation therapy.



Essentially, Ureshii tracks your mental health and recommends activities to improve your mental wellbeing. With Ureshii our plan is to empower everyone to actively track, manage and take care of one's mental well being.

Ureshii simply asks you a few questions each day to track your mental health. Our machine learning algorithm then clusters you with others who have similar profiles. Users in similar clusters are given similar activities to improve their mental health.

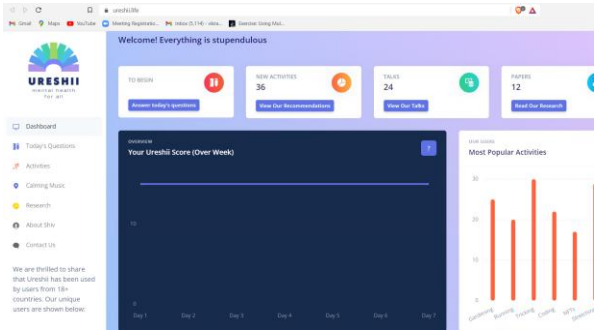


Ureshii's success is measured in incremental improvement of the 'Ureshii Index' that tracks a user's mental wellbeing based on the 5 key metrics it monitors, The 5 key metrics are - Sleep, Nutrition, Physical Activity, Hobbies, and Social Interaction.

Step 1 is to create a Ureshii Index that will take above 5 metrics and help measure the individualized score a person needs to maintain their mental wellbeing. Step 2 will be to reach out and have 1000 daily active users - as the more people the stronger the ML algorithm will get and the more range of activities will be able to be suggested. Step 3 will be to reach an accuracy level of 95%, where 95% of the times an activity is recommended it actually improves that person's mental well being and this will also prove that clusters are more accurate. Final step is to build a strong Ureshii community - allowing for free workshops, drives and Ureshii run initiatives for student's mental well being across the world.

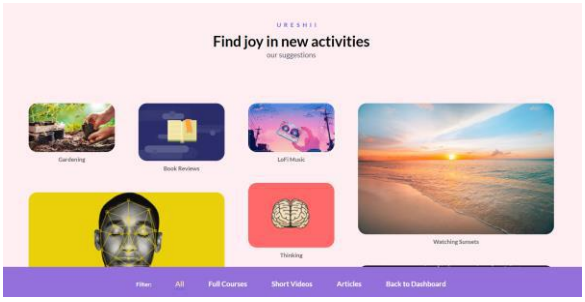
Along with Ureshii (the app), I created the Ureshii Awareness Club. Each month we invite mental health specialists to speak about the importance of mental well-being and how to actively take care of the same addressing students, teachers, parents, professionals and others. We have interviewed professionals like Dr
Sachin Pendse, Research Assistant at Brown University and Rhode Island Hospital, about how to maintain and improve mental health and how our hormones impact mental health.

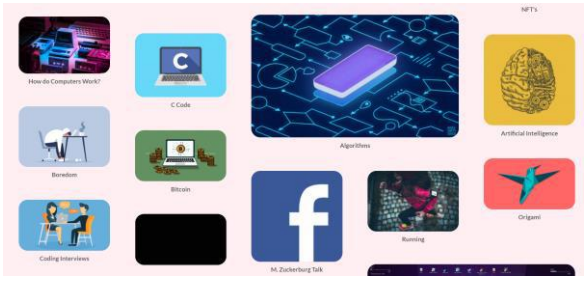
Website:
We have designed a website to access the URESHII solution that covers multiple aspects.
It has multiple webpages solving different purposes.
Dashboard:
This webpage is the main window which provides access to multiple things that can be used to either calculate the mental state or some helpful exercises



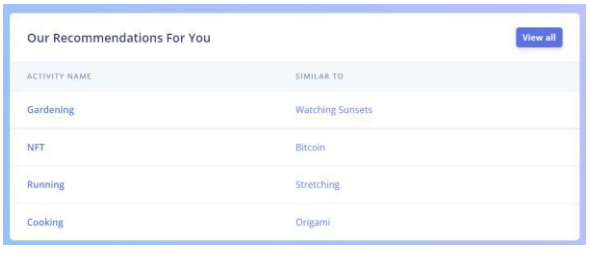
Daily new activities:

There is a special webpage designed which promotes healthy activities for better mental health. It includes listening to soft music, gaming, social activities, playing outside, cycling etc.



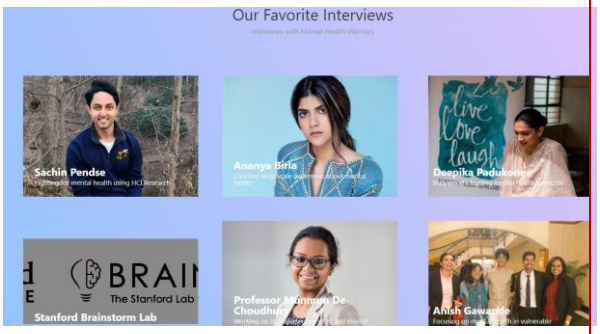


This web page is updated routinely to provide fresh activities for the user to try along with the daily recommendations.



Motivational talks:

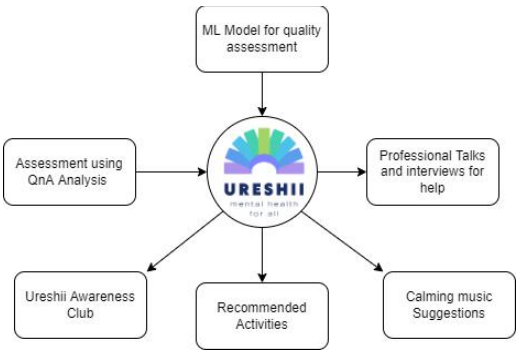
We have also designed a special page with motivational talks by famous personalities for the better knowledge and to boost the morale of the user. We keep updating the videos available on the page routinely.



Algorithm:

To make the web solution we have designed the full website using HTML, JS and CSS .

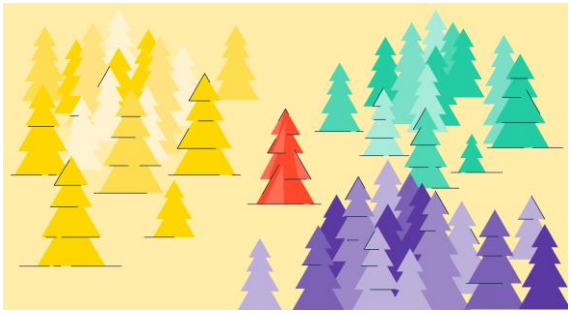
Flow Chart:



The code is written in the HTML and CSS for the front end and the back end of the website is managed by the PHP and java script. The logic of the code is controlled using the ML algorithm as discussed below.

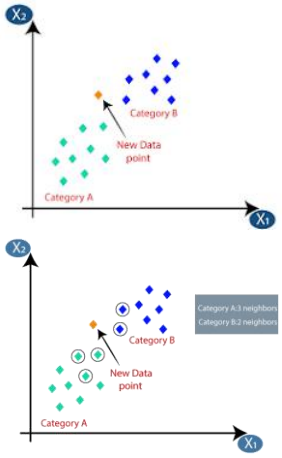
Machine Learning model:

We have used machine learning to do quality assessment of the user's mental state. using our web-app, we are doing an assessment of the user by asking 5 basic questions. Then after that we are using a clustering algorithm for machine learning. We are using the K-nearest neighbor method which is a data classification method for estimating the likelihood
that a data point will become a member of one group or another based on what group the data points nearest to it belong to.



The k-nearest neighbor algorithm is a type of **supervised machine learning** algorithm used to solve classification and regression problems. However, it's mainly used for classification problems.

Our app uses a recommender system to suggest similar activities which it thinks will help improve your mental wellbeing. For example, if 'user A' finds dancing to be a rewarding activity and has shown to have a score of 5/10, the app will cluster them with someone ('user B') who also finds dancing to be a rewarding activity and who also has a score of 5/10. If 'user B' finds yoga to be another rewarding activity, the app will recommend yoga to 'user A' as well. It learns from the user's responses and changes its recommendation as well as the cluster the user has been put in once it notices that the user is not being affected positively.



IMPACT:

Along with Ureshii (the app), I created the Ureshii Awareness Club. Each month we invite mental health specialists to speak about the importance of mental well-being and how to actively take care of the same addressing students, teachers, parents, professionals and others. We have interviewed professionals like Dr Sachin Pendse, Research Assistant at Brown University and Rhode Island Hospital, about how to maintain and improve mental health and how our hormones impact mental health. After seeing the firsthand benefits of adopting Cheeto (my cat), I realized that everyone can improve their mental wellness simply by interacting with furry animals. According to the United Kingdom Mental Health foundation, interacting with furry animals like cats and dogs releases oxytocin (the cuddle chemical) in the human body. This inspired me to start to 'Adopt A Cat Drive' at my school. Currently both platforms are in 5 schools around Mumbai and 2 internationally.

Conclusion:

We have implemented our solution to a good level and received really good feedback. We are thrilled to share that Ureshii has been used by users from 18+ countries. Till now we have 12000+ users who visit our website and use our app to help themselves. We also do the routine analysis of the traffic on the website and accordingly suggest the best content to the users. To conclude we can say that our solution is doing fine and has proven an implementable and effective solution in helping teenagers reduce mental problems like depression, stress and negative thinking. We are working on making it more useful by creating an index page for special health tracking, Improving the ML Model and reaching out at the accuracy level of above 95%.

Future Scope and Plans:

Step 1 is to create a Ureshii Index that will take 5 metrics (Sleep, Nutrition, Physical Activity, Hobbies, and Social Interaction) and help measure the individualized score a person needs to maintain their mental wellbeing.

Step 2 will be to reach out and have 1000 daily active users - as the more people the stronger the ML algorithm will get and the more range of activities will be able to be suggested.

Step 3 will be to reach an accuracy level of 95%, where 95% of the times an activity is recommended it actually improves that person's mental well being and this will also prove that clusters are more accurate.

The final step is to build a strong Ureshii community - allowing for free workshops, drives and Ureshii run initiatives for student's mental well being across the world

Acknowledgement:

This is to acknowledge that the following mentors and advisors have helped me at various stages while working on the project:

1. Manu Chopra, Stanford Alumni, Founder and CEO of Project Mahatma - Helped in programming the app and setting up a fundraiser on RazorPay.

2. Dr Sachin Pendse, Research Assistant at Brown University and Rhode Island Hospital - Shared insight on human psychology and mental health and validated our algorithm to improve mental health.

3. Dr Ashita, Alternate Therapy Specialist & Radiologist - Gave feedback on the prototype and gave reassurance on the reliability of the app and algorithm.

4. Robin Bahl, Founding Team member of 221B Analytics - Helped me contact mental health experts and professionals.

5. Reetu Jain, Chief Mentor - On My Own Technology Pvt. Ltd. Mumbai = Helped in formulating the problem and solution. She also helped in the whole documentation

REFERENCES

1)**The therapeutic effectiveness of creative activities on mental well-being: a systematic review of the literature,** J. LECKEY RN RMN RNCT RNT BSc (Hons) MEd Pg Dip PSI Dip Group Work, First published: 17 February 2011 https://doi.org/10.1111/j.1365-2850.2011.01693.x

2)Rodríguez, Fernando M. and Garza, Sara E. 'Predicting Emotional Intensity in Social Networks'. 1 Jan. 2019 : 4709 – 4719.

3)Patel, Kuldeep Kumar,et al. "Mental Health Detection Using Transformer BERT." *Handbook of Research on Lifestyle Sustainability and Management Solutions Using AI, Big Data Analytics, and Visualization*, edited by Sailesh Suryanarayan Iyer, et al., IGI Global, 2022, pp. 91-108. https://doi.org/10.4018/978-1-7998-8786-7.ch006

4)Zhao, L., Li, Q., Xue, Y. *et al.* A systematic exploration of the micro-blog feature space for teens stress detection. *Health Inf Sci Syst* 4, 3 (2016). https://doi.org/10.1186/s13755-016-0016-3

5)Chancellor, S., De Choudhury, M. Methods in predictive techniques for mental health status on social media: a critical review. *npj Digit. Med.* 3, 43 (2020). https://doi.org/10.1038/s41746-020-0233-7

6)Anja Thieme, Danielle Belgrave, and Gavin Doherty. 2020. Machine Learning in Mental Health: A Systematic Review of the HCI Literature to Support the Development of Effective and Implementable ML Systems. ACM Trans. Comput.-Hum. Interact. 27, 5, Article 34 (October 2020), 53 pages. https://doi.org/10.1145/3398069

7)Teenagers' Stress Detection Based on Time-Sensitive Micro-blog Comment/Response Actions, Artificial Intelligence in Theory and Practice IV, 2015, Volume 465, ISBN : 978-3-319-25260-5,Liang Zhao, Jia Jia, Ling Feng, https://link.springer.com/chapter/10.1007/978-3-319-25261-2_3

8)Kilgarriff-Foster, A. and O'Cathain, A. (2015).Exploring the components and impact of social prescribing. Journal of Public Mental Health, 14(3), 127-134