

# The Impact of Instagram on Mental Health and Well-Being of Indian Youth: Artificial Intelligence Intervention in Detecting InstaStress

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**Abstract:** Social media platforms have become important tools for modern communication, self-expression, and social interaction. Of the many social media platforms available, Instagram is gaining popularity among the youth. Instagram, initially designed for photo and video sharing, has evolved into a strong tool for personal branding, networking, and marketing. Among Indian youth, Instagram has gained widespread popularity, influencing their social dynamics, creativity, and aspirations. However, the pervasive use of the platform has led to a new phenomenon – ‘InstaStress’ – that is Instagram-induced stress characterised by stress resulting from excessive engagement with Instagram. This stress gets generated from various factors, including social comparison, pressure to post frequently, cyberbullying, and the fear of missing out (FOMO). Instagram’s design, with its continuous feed, notifications, and algorithms, encourages addictive behaviour, which exacerbates mental health issues among young users. The results of excessive Instagram use are significant, with negative impacts on academic performance, social well-being, and overall mental health. As Instagram addiction becomes a growing concern, it is crucial to understand its effects and promote healthier social media usage habits.

This paper explores the relationship between Instagram addiction and mental health issues among Indian youth, highlighting the urgent need for the intervention of artificial intelligence (AI) and the development of instruments to handle and mitigate the harmful effects (that is, stress) generated due to excessive social media consumption. The development of an instrument would play an important role in fostering a sustainable environment in several meaningful ways for youngsters.

**Keywords:** Instagram addiction, InstaStress, Mental health, Social media impact, Youth well-being.

## I. INTRODUCTION

### A. Social Media

The term ‘social media’ refers to digital platforms that allow users to create and share content while getting connected to and interacting with other users. In detail, they can create (their digital profile) and share (their stuff, that is, photos, videos, thoughts, write-ups) online in the form of posts, stories, snaps, and many more options and interact (with each other

in the form of sending messages, chatting, snapping, likes, comments, and so on). Social media includes popular social networking service (SNS) applications and sites such as Facebook, Twitter, Instagram, TikTok, and LinkedIn. SNS enables individuals and businesses to connect with audiences, sharing information, and being involved in conversations. It has dramatically transformed how people communicate, build communities, and access the news, making it a core part of modern life and digital culture. Being one of the most widely used social media platforms, Instagram has been instrumental in driving this transformation [1].

### *B. Instagram*

Instagram is a popular social media platform initially conceived, designed, and developed for sharing photos and videos [1]. Instagram was launched in 2010 by co-founders Kevin Systrom and Mike Krieger, and it is currently owned by Meta Platforms, Inc, the parent company of Facebook. Meta acquired Instagram in 2012. It allows users to create visually engaging content. The key features of Instagram include – stories (short-lived content), reels (short videos), and IGTV (long-form videos). Wide use of Instagram is for personal expression, networking, and marketing among billion active users globally.

Except photo uploading and linking capabilities, Instagram's success lies in its role as a platform where users can swiftly and easily gain popularity and team up with opinion leaders to create value. This is the reason for Instagram's higher engagement rate compared with other SNSs. The platform periodically launches new features that allow users to interact and build deeper connections with friends, celebrities, and their favourite brands.

Instagram has become a widely used social media platform for digital communication and personal branding in India. It has gained fame among younger demographics, influencers, and brands. They use it for various reasons such as promoting their business, personal expression, and connecting with a diversity of spectators.

### *C. Instagram Usage Among Youth*

Instagram is a widely used social media platform, especially among young people, boasting over a billion active users globally. Its popular uses are expressing selves, discovering new interests, and sharing content such as photos, videos, and stories that keep them connected with friends and followers. The app also contributes to social connectivity, trend setting, influence, and creativity in the youngster's life.

The app has become deeply rooted in youth culture, with many young ones devoting an excessive amount of time to its usage. Instagram has created a special place in their lives that it sometimes appears that youngsters are living their lives primarily for the platform, rather than for themselves.

They take pride in showcasing their life updates, achievements, and positive news (mostly) on the platform. After the tremendous popularity of the platform, youth are taken over by it and it has become their priority. For example, if someone is enjoying his/her trip to some place, he/she will not be anticipating seeing the place or feeling the vibes of the place. Rather, they will be indulging in taking photographs/videos that they can share on social media later and get some likes and comments. Overall, Instagram is deeply woven into the fabric of daily life for many Indian youngsters, influencing their social interactions, interests, and aspirations. The extreme interaction with the platform can elevate their stress level by interfering with their day-to-day activities and relationships, ultimately leading to a harmful impact on their psychological health.

### *D. Stress*

As per the World Health Organization (WHO), stress can be defined as “a state of worry or mental tension caused by a difficult situation. Stress is a natural human response that prompts us to address challenges and threats in our lives”. Stress in humans is related to mental health and well-being. It is the biological response to a situation such as a threat,

challenge, or physical and psychological barrier. Everyone experiences stress in one way or another. The way we respond to stress makes a big difference to our overall well-being. Stress affects our mind and the body. Sometimes, to some extent, stress is good and can be helpful in performing routine activities. However, excessive stress can cause health problems. Stress-coping mechanisms can help us while supporting one's mental and physical well-being. Stress generates some strange emotions including anxiety and irritability. Long-lasting stress can aggravate pre-existing health problems. Stressful situations may also cause anxiety and depression that need to be dealt with. [2].

Stress can be generated due to any condition or event present in or around an individual (which may tend to trigger stress), which is called a stressor. People often adapt to stress, viewing it as manageable, but this can lead to neglecting the harmful effects of prolonged exposure – even at low levels. It is crucial to recognise the common warning signs of stress overload, as chronic stress can increase the risk of major depression in vulnerable individuals. Signs and symptoms of stress overload are: cognitive symptoms (constant worrying, anxious thoughts, forgetfulness, poor concentration, and so on), physical symptoms (aches, pains, nausea, dizziness, frequent colds, flu, digestive issues, chest pain, rapid heart rate, and so on), emotional symptoms (feelings of tension, irritability, anxiety, depression, general unhappiness, moodiness, and so on), and behavioural symptoms (sleep problems, changes in appetite, avoiding responsibilities, and so on) [3].

As per the National Psychological Corporation, some scales are available for measuring personal/physical stress. They are the anxiety depression and stress scale, students stress scale, stress management scale, Bisht battery of stress scale, stress coping strategies scale, academic stress scale, and stress scale developed by various personalities [4]. Perceived stress scale (PSS) is the most relevant and regularly used scale for measuring personal stress [5]. Lately, moving slightly from physical stress and touching the area of digital stress, some of the scales were developed to cope with the changing form of stress. One of them is multidimensional digital stress scale

(MDSS), which effectively measures the impact of digital stress on mental health and psychosocial functioning [6], [7], [24].

A study that took another scale into use for working on digital stress and stressors was the digital stressors scale (DSS). It is a measurement instrument developed to assess perceptions of digital stress in the workplace. The DSS is designed to capture the complexity of digital stress and provides a higher-order construct that consolidates these stressors into a comprehensive measure. It is validated against existing measures of digital stress, demonstrating strong construct validity and reliability. It also suggested some relevant categories of stressors such as information/communication overload, performance pressure, social comparison, and digital distraction [8].

Stress can be triggered by both physical and emotional factors, with its causes differing from one individual to another. The body responds to stress through intricate physiological and behavioural processes. Although everyday stress is unavoidable, various environmental and emotional factors can shape its impact and our ability to cope with it effectively. As India undergoes digital transformation, social media platforms, especially Instagram, have become one of the major environmental factors in shaping the influence of stress levels on a vulnerable section of society, that is, the youth, and controlling their abilities to cope with it.

### *E. InstaStress*

'InstaStress' refers to the stress that is generated from excessive use of Instagram or the stress generated through Instagram content. It is a term used to describe the psychological distress and negative emotions that can shoot from the use of Instagram and other social media platforms. It is the word that is gaining popularity, and people slip from use to overuse, which ultimately becomes an addiction. InstaStress can be generated from various factors such as comparing oneself to others, feeling pressure to post frequently, dealing with negative comments or cyberbullying, and FOMO (fear of missing out).

Brod [9] identified two mechanisms of technostress: pressure to accept technology and overidentification with it, leading to behavioural changes. The research proposes that addiction to Instagram works as a mediating aspect in the relationship between excessive use of Instagram and InstaStress. Furthermore, it asserts that Instagram addiction mediates the relationship between excessive Instagram use and emotional exhaustion. The study also describes avenues for future research, such as inspecting the effects of user engagement and brand relationships within the framework of Instagram overuse and addiction. Also, it proposes a research gap of limited generalisability due to the focus on Instagram only and the lack of exploration of additional antecedents and outcomes [10].

The need to be informed about the up-to-the-minute information on Instagram indulges youth mostly to make excessive usage of the platform, ultimately leading to Instagram addiction, which in turn induces stress and emotional fatigue.

### *F. InstaStress Among Indian Youth*

Recently, Instagram has established itself as a major player in shaping the experiences and viewpoints of young Indians [11]. Instagram addiction among youth is a matter of serious concern due to its negative impact on mental health and overall well-being. Many young people are gaining popularity on Instagram by sharing reels that receive numerous likes and comments. As a result, they have begun to associate social validation with online engagement. When a post receives fewer likes or comments, they often feel disheartened. This can lead to emotional distress and negatively affect their mental well-being.

As youth devote more time to the app, they become increasingly reliant on it for virtual social validation, leading to compulsive use and addiction. This kind of addiction plays an important role in many aspects such as decreased academic performance, social isolation, and other negative outcomes. Furthermore, if we see several aspects of the app, its features, functionalities, and algorithms are designed to encourage addictive behaviour, such as constantly refreshing the feed, sending notifications,

and promoting engagement through likes and comments. Instagram's filters and editing tools allow users to drastically alter their appearance, often leading youngsters to feel insecure about their natural looks. Augmented reality features contribute to unrealistic beauty standards, prompting constant self-comparison. As a result, many rely on these tools to feel accepted, which can damage their self-esteem and mental well-being. The app is conceived and designed totally on the concepts of psychology that helps it to glue the user and get them to spend as much time as possible on the app.

Despite the potential negative consequences, many young people cannot resist it and continue to prioritise Instagram use over many other significant facets of life, leading to addiction and other mental health issues. So, it is crucial to address the problem of Instagram addiction among youth and promote healthy social media habits to progress their mental health and well-being [12].

## II. LITERATURE REVIEW

There is no doubt that Instagram has significantly transmuted the way people communicate, and the influential role of social networks is widely recognised. However, not all aspects of Instagram use are positive. While plentiful research highlight the advantages individuals can gain from the platform, research has also pointed to its budding negative impression on mental health and overall well-being.

Nowadays in youngsters, the stressors are very different from what they are for other age groups. They are often connected to the virtual world with which they are tightly coupled. Instagram is one of the key performers in their life space, which gives them enough reasons to be stressed; this is referred to as InstaStress. As per the literature available, we can backtrack InstaStress to its ancestry causes – Instagram addiction and dependency. Several factors may contribute to Instagram addiction among young people. The app's highly attractive visual nature includes posting photographs and videos from their routine lives, which leads to a potential urge to be connected and seek validation after posting anything on the app. Instagram is a kind of immediate reward

provider in the form of likes, comments, and followers that can encourage a sense of gratification that prop up an addictive behaviour of the user. Another reason is Instagram's constant flow of content, which is continuously served to you on the screen, and can be gripping and distracting, capable of leading a user to excessive use as individuals seek to pass their spare time. In addition, a human psychological trait of comparing one's life with others plays a major role in it; this is fulfilled by Instagram very aptly. This comparison on the platform can evoke feelings of insufficiency or pressure to keep up with peers [12].

Research indicates that excessive social media use can negatively impact one's mental health [13], contributing to various symptoms such as anxiety, depression, and diminished self-esteem. Instagram addiction can aggravate these problems by encouraging the need for validation and comparison.

Depression is mostly caused when people start assessing themselves with society and the materialistic world [14]. It is also said that it leads to lowered self-belief in people. As the study portrays that it boosts social comparison traits, the use of social media has increased drastically, and this makes them believe that others have better lives, and they are more successful, thus reducing self-confidence [15]. Such states or social positions have more value than their satisfaction. When one considers his qualities inferior to others, it disturbs their mindset and self-esteem is affected [16]. Anxiety and depression arise when a person assesses and compares oneself with others [14].

According to research published by the APA, studies have linked Instagram to depression, body image concerns, self-esteem issues, social anxiety, and other problems. By design, the app capitalises on users' biological drive for social belonging and nudges them to keep on scrolling [17].

If we take it in the form of health, it is studied that engaging with Instagram before bedtime can interfere with sleep, potentially causing insomnia. For youngsters, continuous use of the platform can be responsible for diverting attention from academic responsibilities, resulting in lower academic

achievement [18]. Furthermore, it is also studied from the growth and development perspective that heavy Instagram use can reduce opportunities for real-life social interactions, preventing the development of social skills and the capability to make actual, real-world, one-on-one relationships. Also, spending extended time on Instagram can negatively affect physical health, which may include issues such as obesity, poor posture, and eye strain [12].

A study on Instagram use and mental health found that excessive use is linked to increased loneliness, FOMO, and lower social support, particularly from interactions with off-campus friends or strangers. It also revealed a strong connection between Instagram use, negative body image, and disordered eating, especially among users posting selfies or consuming fitspiration content. The relationship between Instagram use and well-being indicators such as life satisfaction and happiness showed mixed results, highlighting the requirement for future research. The study employs systematic reviews to scrutinise the relationship between Instagram use and mental health, categorising existing literature based on psychological factors and outcomes. Key psychological variables include social comparison (impacting self-esteem and body image), self-esteem (influenced by Instagram interactions), body (dis)satisfaction, self-presentation (curating profiles affecting mental health), and belongingness (Instagram's role in fulfilling social needs and providing a sense of belonging) [19].

With the kind of life we are leading, the kind of food we are eating, and the habits we have in present times, it is common to feel stress; this should not be a common occurrence though in an ideal situation. However, if it penetrates our lives, we must address it and find some measures to deal with it. This is exactly what is happening with the young generation and the impetus for the elevation of the stress level in their lives is majorly Instagram addiction. Therefore, there is a crucial need to address this issue. This can only be possible by developing an appropriate artificial intelligence (AI)-based learning system for correctly detecting the stress level of youngsters. This will help in understanding the type of psychological interventions required.

## A. How is AI-ML Useful in Stress Detection?

AI-based learning systems have been known for their predictive capabilities, and in recent years, AI models with deep learning (DL) architectures have been successfully applied to achieve unprecedented accuracy. Some of the mechanisms make AI algorithms valuable tools for improving stress prediction across various applications, including healthcare and personal stress management.

According to [20], AI algorithms enhance the accuracy of stress prediction through several key mechanisms such as data-driven insights (AI analyses large datasets to uncover patterns and correlations that traditional methods may miss, leading to a profound cognition of stress levels based on physiological and psychological indicators), advanced machine learning (ML) techniques (utilising shallow and DL models, AI captures complex relationships within data, with DL particularly excelling in identifying intricate patterns), feature selection and extraction (AI automatically selects and extracts relevant features from raw data, minimising the necessity for manual engineering and ensuring the usage of the utmost informative variables in predictions), integration of

multimodal data (by combining data from various sources – physiological signals, behavioural data, self-reports – AI creates a comprehensive model of stress, improving prediction accuracy), real-time analysis (many AI systems provide real-time data processing, enabling immediate feedback and intervention, which is especially beneficial in wearable technology for stress management), continuous learning and adaptation (AI algorithms can continuously learn from new data, adapting to changing patterns and enhancing prediction accuracy over time), and personalisation (AI tailors predictions to individual differences, such as personal history and physiological responses, increasing the relevance and accuracy of stress assessments).

Based on the above-mentioned superpowers AI-ML has, we can rely on it to find some solutions followed by designing a curated instrument that can help handle Instagram (or any other social networking platform)-induced stress.

According to [20] and [21], AI and ML algorithms that are useful for stress prediction by analysing data and predicting stress levels based on various physiological and psychological indicators [3] are available. Fig. 1 shows the list of the algorithms.

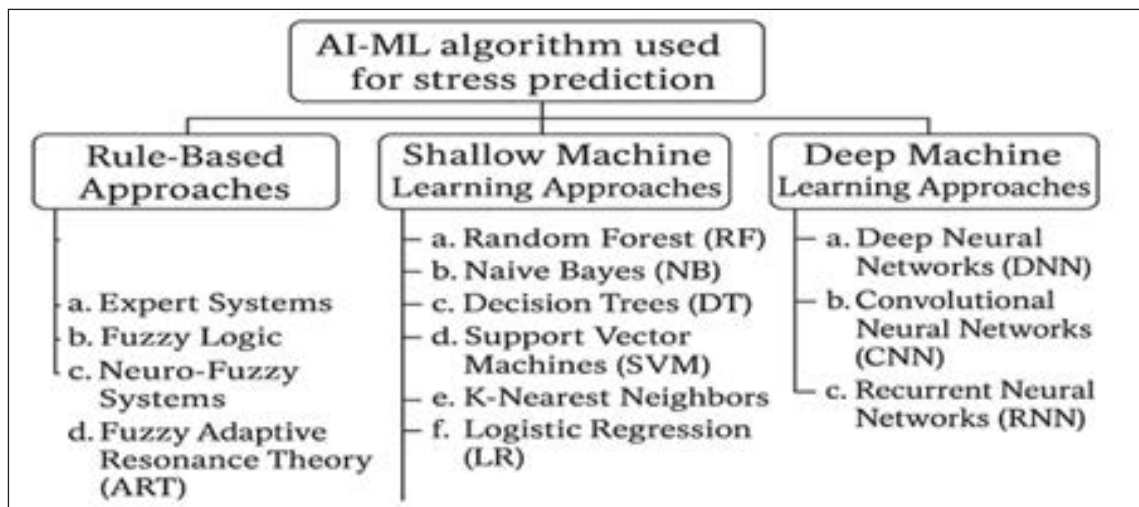


Fig. 1: AI-ML Algorithms for Stress Prediction

A study used ML algorithms to analyse factors contributing to stress in university students, focusing on exam pressure and internet usage. Data

from 206 students at Jaypee Institute of Information Technology were collected using the perceived stress scale (PSS). Algorithms such as random

forest, naive Bayes, support vector machine (SVM), and k-nearest neighbour (KNN) were employed to classify students into stress categories. The findings showed that SVM was the most effective in predicting stress levels, demonstrating the potential of ML for mental health assessment and early intervention [21], [22]. The SVM algorithm outperformed others, achieving 85.71% accuracy, 100% specificity, and 75% sensitivity. Random forest followed with 83.33% accuracy, 66.66% specificity, and 100% sensitivity. The study highlighted SVM's effectiveness in classifying stress levels in university students, particularly related to exam pressure and internet usage, and emphasised the value of the PSS for initial stress assessment [21], [25].

The study contributed to the field of mental health and technology by demonstrating the effectiveness of ML algorithms in detecting mental stress among university students. By applying these algorithms to analyse stress levels based on data collected through the PSS, the research provides a framework for early identification of stress, helping in timely intervention. The results advocate that technology can play a substantial role in mental health assessments, offering a more objective and data-driven approach to understanding and addressing stress-related issues in academic settings. This integration of ML into mental health monitoring can lead to improved mental well-being among students and potentially reduce risks linked with depression and anxiety [21]. Taking a break from Instagram is suggested in the study performed by Dhiman [12]. It is also suggested that parents, educators, and mental health professionals must have open conversations with youngsters about the potential risks and benefits of using Instagram or any social media platforms, and mainly provide support and resources for those who may be struggling with the negative effects of Instagram or other social media platforms.

The study proposes future research directions to improve mental stress management in academic settings, emphasising key areas: expanding datasets to include diverse populations, integrating multimodal data for more accurate stress detection, developing and evaluating interventions to enhance student

well-being, and conducting comparative analyses of ML techniques versus traditional methods to identify optimal stress detection strategies [21], [22]. Also, developing a robust stress detection system to quantify mental stress in real-life applications, developing a model compatible to detect stress in students, and increasing the efficiency and accuracy of stress detection by using ML are proposed future research scopes [3].

Some studies have taken DL, a subset of ML, as a technological base and started enhancing stress detection through some contactless technologies such as rPPG, which uses videos of faces to extract health parameters. This study has some limitations that can be addressed and resolved as future research work, such as privacy concerns associated with use of cameras for data collection, improving signal extraction with alternative physiological tools, optimising parameters, and exploring additional augmentation techniques [23].

### B. AI - ML Models for Stress Detection [3] [20] [21]

Fig. 2 represents the models used for stress detection.

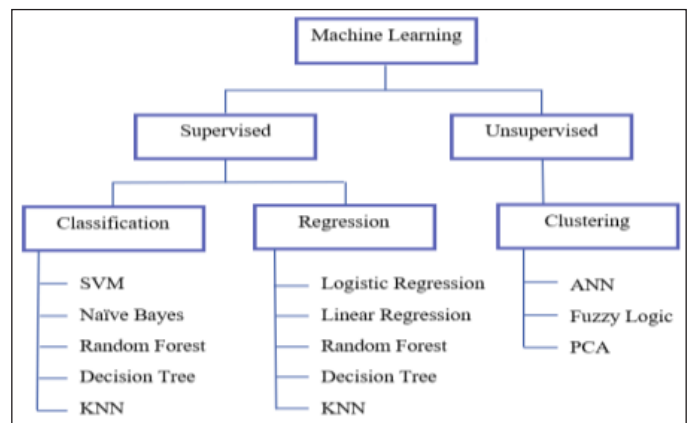


Fig. 2: AI-ML Models for Stress Detection

## III. DISCUSSION

From the review of literature, the following points emerged:

- It will not be an exaggeration to say that Instagram is an important part of youngsters' lives. They cannot imagine a day without it.

- The various research studies indicate that the excessive use of this platform is posing a threat to the mental well-being of youngsters.
- The studies related to AI-ML systems/ algorithms indicate that there are stress-measuring instruments/technologies, but there is no instrument for detecting InstaStress among youngsters.

By referring to the future research scope mentioned in the literature, there is a bright scope for developing an instrument that can measure the stress level of youngsters linked to Instagram usage. It can work as a meter by covering all the possible aspects of psychology followed by performing a psychometric analysis by taking the base of established and widely used scales. The instrument will be useful for various personal and academic aspects as well as provide the base for the researcher to undertake future research work on the same line.

Based on the above-mentioned points, a conceptual model is prepared that focuses on the relationship between Instagram usage, stress, and an AI/ML-enabled detection and recommendation system.

### A. Proposed Conceptual Model

The conceptual model presented in Fig. 3 illustrates the relationship between Instagram usage, stress, and an AI/ML-enabled detection and recommendation system. At the centre of the model is the user, represented as an ‘Indian Youngster’.

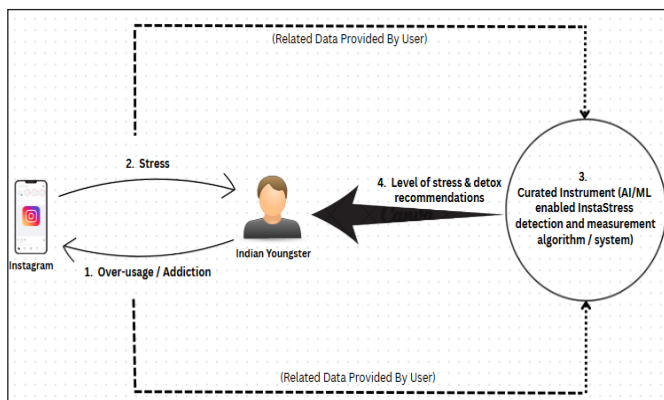


Fig. 3: Conceptual Model

On the left side, a mobile phone icon labelled Instagram represents the social networking platform in focus. Two arrows depict the interaction between the user and Instagram:

- *Over-Usage/Addiction* – A curved arrow from the user to Instagram signifies the excessive use of the platform, leading to potential dependency.
- *Stress* – A second curved arrow from Instagram back to the user represents the stress induced by excessive social media engagement.

On the right side, a circular shape represents a Curated Instrument (AI/ML-enabled InstaStress detection and measurement algorithm/system). This system analyses the user’s stress and over-usage/addiction-related data given by the user and provides insights that are represented by two arrows indicating data flow.

The system then processes this data and provides feedback to the user. A solid arrow labelled Level of stress & detox recommendations flows from the system back to the user, indicating the system’s role in offering personalised recommendations for stress management and digital detox strategies.

This model highlights the bidirectional relationship between Instagram usage and stress and proposes a technological intervention to observe and mitigate its effects through AI-ML algorithms.

### B. Applications

The expected contribution of stress detecting AI-ML algorithm/system towards a sustainable future:

In September 2015, at the UN General Assembly Summit, the United Nations legislated 17 Sustainable Development Goals (SDGs) as a worldwide call to action to eradicate poverty, protect the environment, and confirm that everyone experiences peace and prosperity by 2030.

The growth of AI-ML instruments for detecting stress in youngsters can directly support some of the major SDGs in the following way:

- *SDG 3 – Good Health and Well-Being*: By leveraging advanced algorithms to analyse

the impact of social media interactions and behaviours among youngsters, this research provides treasured perceptions into how the application impacts their stress levels. Thus, the early detection of stress will promote mental health interventions such as personalised coping strategies or resources for professional help, fostering emotional strength, and building youth-friendly and inclusive environments that support mental wellness.

- *SDG 4 – Quality Education*: Early detection of stress will help in fostering stress-aware learning environments among the young generation, which will in turn improve focus, reduce burnout, and lower dropout rates, resulting in better academic performance leading to healthier, more productive future generations.
- *SDG 10 – Reduced Inequalities*: The development of an AI-ML system can provide equal access to mental health support for youngsters irrespective of their social background.
- *SDG 12 – Responsible Consumption and Production*: AI-ML instruments will encourage mindful consumption and balanced lifestyles, key components of sustainable living; it can inform curriculum development in fields such as mental health, technology ethics, and data analytics, equipping students with the knowledge to navigate and address the challenges posed by digital interactions.

#### IV. CONCLUSION

There is a demanding need to conduct AI-ML-based research to develop an instrument specifically designed to detect stress levels among young Instagram users since current tools and frameworks do not adequately capture the negative psychological impacts of excessive Instagram engagement. Integrating this technology into social media platforms or as a third-party tool can help manage mental health proactively and foster a healthier online environment, ultimately supporting the well-being of young users and encouraging awareness around

Instagram-induced stress. Thus, AI intervention would play a noteworthy role in sustainability in several meaningful ways, especially when we expand the notion of sustainability beyond just environmental impact to include social and economic sustainability.

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