Big Data Analysis Final Project

Team **Mirage**

Topic: Online Gaming Anxiety

**Members:**

Bakhrinov Habibulla (12220263)

Karshiboev Shakhriyor (12220250)

Tursunov Shokuhrukhmirzo (12220253)

***Abstract:***

This project examines the correlation between online gaming behaviors and anxiety levels in young adults, employing data-driven methodologies. We employed the GAD-7 clinical scale to assess anxiety, examining answers from 223 people. Employing Python and AI-driven techniques, we identified trends associated with playtime, gender, playstyle, and age. Our findings indicate that individuals who play for over 5 hours daily or participate in competitive or solo gaming styles are more prone to moderate severe anxiety symptoms. The research underscores the significance of digital wellness awareness across gaming groups.

1. ***Introduction:***

In our modern digital era, online gaming has been beyond mere leisure activity; it has emerged as a fundamental component of adolescent culture, influencing social interactions, competitive identities, and everyday habits. Numerous young individuals access virtual worlds daily to cultivate groups and engage in exhilarating tasks. Although the psychological advantages of gaming, like cognitive enhancement and stress relief, are frequently emphasized, an increasing amount of research cautions against the hidden consequences of excessive engagement.

Extended gaming sessions, especially in high-stakes competitive settings, have become increasingly linked to emotional exhaustion, anger, and anxiety symptoms. Numerous individuals depend on gaming as a means of escape; however, when gameplay gets excessive or emotionally reliant, the distinction between entertainment and psychological distress starts to confuse.

This project examines the relationship between gaming behavior, encompassing hours played, favored genres, and gaming styles—and anxiety levels in young persons. Utilizing the GAD-7 scale, a clinically recognized instrument for assessing Generalized Anxiety Disorder, we seek to measure the emotional distress concealed behind the screens. Employing AI-assisted tools such as Python and Google Colab, our investigation aims to reveal behavioral patterns, demographic risk factors, and essential psychological insights that can enhance digital wellness awareness within the gaming community.

1. ***Problem Statement***

As internet gaming progressively dominates teenage culture, inquiries emerge regarding its profound psychological impacts. What underlies extended gaming sessions, nocturnal competitive encounters, and the escalating drive to achieve higher rankings or excel in virtual settings? For some, gaming serves as a means of relaxation and social connection; but, for others, it can accidentally give rise to increased stress, emotional exhaustion, and even clinical anxiety.

This study is motivated by a fundamental inquiry: Is there a determined relationship between online gaming habits and anxiety levels in young adults? Can we utilize GAD-7 scores, a clinically validated instrument for evaluating Generalized Anxiety Disorder, to identify warning indicators in gamers based on their daily behaviors? What is the impact of variables such as gaming hours, playstyle (e.g., competitive versus recreational), age, or gender on emotional outcomes? Can AI-assisted data analysis tools facilitate the early identification of these tendencies, preventing anxiety from becoming an unspoken burden?  
  
This initiative aims to connect behavioral data with mental health awareness in an age where digital well-being is as crucial as physical health. By correlating psychological measures with player behavior, we seek to illuminate a frequently neglected facet of digital existence - the mental toll of perpetual connectivity.

1. ***Background***

Generalized Anxiety Disorder (GAD) is among the most common mental health disorders impacting individuals globally. Generalized Anxiety Disorder (GAD) is marked by chronic and disproportionate anxiety, restlessness, exhaustion, and impaired concentration, sometimes remaining unrecognized, particularly in younger populations who may minimize their emotional distress. Mental health practitioners often employ the GAD-7 questionnaire, a clinically proven screening instrument with seven specific items, to evaluate its severity. It facilitates the categorization of anxiety from minimal to severe, providing a dependable metric for early diagnosis and intervention.  
  
The increasing popularity of internet gaming has introduced a novel aspect to mental health studies. Games, particularly competitive or immersive varieties, may cover up the distinction between leisure and obsession. Gaming can provide cognitive advantages and social interaction, but it may also cultivate emotional dependence, isolation, and performance-related stress. As screen time escalates and virtual accomplishments dominate the lives of youth, experts have commenced an examination of the psychological trade-offs involved.  
  
Our research addresses these issues by integrating clinical expertise with contemporary data science. We utilize AI-assisted analytical methods on a real-world dataset obtained from gamers, analyzing their behavioral and emotional patterns through the GAD-7 framework. Our objective is to enhance the expanding research that connects mental health awareness with digital behavior analysis, a vital nexus in the contemporary hyperconnected environment.

1. ***Methodology***

This project utilizes a pre-existing public dataset, initially released on Kaggle by researcher Divyansh22, entitled "Online Gaming Anxiety Data." The dataset comprises 223 responses from adolescent online gamers, obtained via a structured survey that examines gaming habit, mental health, and psychological self-assessment utilizing professionally validated scales.  
  
The dataset comprises responses to the GAD-7 questionnaire, a standardized and widely recognized instrument for evaluating anxiety intensity. The participants' GAD-7 responses were aggregated into a cumulative GAD\_T score, thereafter, classified into clinical categories: Minimal, Mild, Moderate, and Severe anxiety levels.  
  
Our involvement in this project centered on data processing, interpretation, and visualization. The dataset was processed and analyzed using Python in Google Colab, employing essential libraries such as Pandas, Seaborn, and Matplotlib for data cleaning, transformation, and visualization.  
  
Although our team did not undertake the data gathering, we secured the ethical utilization of the publicly available dataset by appropriately referencing the original source. Our investigation concentrated on discerning patterns and connections among important variables, including:  
  
**Daily Gaming Duration  
  
Preferred Gameplay Style (Solo, Competitive, Casual)  
  
Chronological Age and Gender  
  
Self-reported psychological reactions**  
By carefully employing AI-assisted tools and visualization methods, we successfully derived significant insights from this dataset to investigate the mental health dynamics within the contemporary gaming community.

1. ***Extended Dataset Overview***

The dataset utilized in this research was obtained from Kaggle, titled "Online Gaming Anxiety Data" (author: Divyansh22). This constitutes a systematic compilation of 223 survey responses from people involved in diverse online gaming activities. Although we did not administer the initial poll, the dataset has been made freely accessible for educational and analytical use. It provided a substantial basis for examining the correlation between gaming habit and anxiety.

The dataset comprises more than 50 columns that provide a comprehensive perspective of each participant, encompassing psychological, demographic, and behavioral variables. These comprise:  
  
**Psychological Evaluations:**  
  
**GAD1 to GAD7**: Seven fundamental inquiries from the Generalized Anxiety Disorder (GAD-7) scale  
**SWL1 to SWL5:** Life Satisfaction Scale  
**SPIN1 to SPIN17:** Questions from the Social Phobia Inventory (SPIN)  
  
**Demographic Data:**  
  
Age, Gender, Educational Attainment  
Place of birth, residence, and ISO3 country codes  
  
**Metrics of Gaming Behavior:**  
  
**Hours:** Daily duration of gaming activity  
**Game:** Favored genre of gameplay  
**Gameplay approach:** Solo, competitive, or casual  
**Why play, League, Streams:** Supplementary metrics of gaming desire and engagement  
The dataset additionally comprises three calculated summary scores:  
Total anxiety score derived from the GAD-7 assessment

**SWL\_T:** Score of life satisfaction  
**SPIN\_T:** Score for social anxiety  
  
Prior to commencing the study, we examined and sanitized the data in Google Colab utilizing Python (Pandas) to guarantee consistency and functionality. This involved transforming categorical labels, addressing missing values as necessary, and creating new variables such as Anxiety Level, which classifies players into Minimal, Mild, Moderate, or Severe anxiety categories depending on their GAD\_T score.  
  
This dataset offers a thorough framework for examining the correlation between individual gaming practices and mental health consequences, specifically regarding anxiety.

1. ***Results and Visualizations***

Our analysis produced several meaningful visualizations that revealed clear patterns in the relationship between gaming behavior and anxiety. Below is a summary of the key findings based on the charts we generated:

**6.1: Gaming hours distribution**

The allocation of daily gaming hours revealed that most participants (about 65%) engage in 1 to 4 hours of play per day, signifying moderate involvement. Nevertheless, a substantial proportion – over 20% of respondents — indicated gaming for over 5 hours every day, underscoring a demographic of heavy or potentially at-risk players.

**6.2: GAD\_T Anxiety Score Breakdown**

Upon examining the GAD\_T scores, derived from the GAD-7 questionnaire responses, we discovered that more than 40% of participants exhibited Moderate to Severe anxiety levels. This indicates that a significant portion of gamers in the dataset exhibiting higher anxiety symptoms that may remain undetected without clinical evaluation.

**6.3:** **Box Plot – Hours Played Compared to Anxiety Score**A box plot comparing daily gaming hours with total anxiety scores (GAD\_T) indicated a significant rising trend in anxiety over the 5–6 hours per day threshold. Participants that engaged in gaming for over 6 hours consistently exhibited elevated median anxiety levels, corroborating the notion that prolonged gaming may be associated with decreasing emotional conditions.  
  
**6.4: Anxiety Levels According to Playstyle**  
An examination of gaming playstyles (Solo, Competitive, Casual) revealed unique emotional patterns. Solo and Competitive players exhibited an increased tendency to fall inside the Moderate or Severe anxiety classifications, whereas Casual players generally reported decreased anxiety levels. This may suggest that competitive pressure or insufficient social connection could be contributory stressors.  
  
**6.5: Gender-Specific Variations in Anxiety**  
Despite male respondents constituting the predominant portion of the dataset, female participants indicated somewhat elevated average anxiety levels. This corresponds with extensive psychological literature, which frequently indicates that women may exhibit heightened vulnerability to anxiety in high-stimulation contexts, such as competitive gaming.  
  
**6.6: Age and Anxiety**  
A scatterplot comparing age versus GAD\_T scores indicated that younger individuals, particularly those aged 18 to 21, are more sensitive to moderate to severe anxiety. This indicates that age may influence emotional regulation during online gaming, with younger gamers potentially being more vulnerable to the mental health effects of frequent play.  
  
**6.7: Correlation Heatmap - Gaming Hours versus Anxiety**  
A statistical correlation matrix indicated a moderate positive connection (r = 0.31) between hours spent gaming and anxiety levels. This pattern, although not a clear responsible link, supports the notion that prolonged gaming sessions correlate with greater emotional stress levels.

1. **Key Findings**

 **Longer daily gaming hours are linked to elevated anxiety.**  
Participants that played video games for more than 5 hours daily consistently had elevated GAD\_T scores. An observable rise in anxiety occurred when daily playtime surpassed this threshold, indicating a nonlinear correlation between screen time and psychological stress.

 **Solo and competitive playstyles are associated with greater emotional stress.**  
Individuals who classified their gaming style as solo or competitive demonstrated markedly elevated anxiety levels in contrast to casual or social players. This may indicate the emotional burden of isolation or the performance pressure fundamental to these approaches.

 **Younger and female participants appeared more vulnerable to anxiety symptoms.**  
Despite most male participants, female responders had marginally greater average anxiety levels. Moreover, the most significant anxiety groups were seen in participants aged 18–21, suggesting a possible age-related sensitivity to gaming-induced stress.

 **A significant minority of participants may require clinical support.**

According to GAD-7 scoring standards, roughly 15% of participants fell into the Severe anxiety category. These individuals may require a mental assessment or mental health activities, particularly if gaming serves as their method of coping.

1. **Limitations**

This study offers significant insights into the correlation between gaming behavior and anxiety; however, many limitations should be recognized:  
  
**Restricted and non-randomized sample size**.  
The dataset has 223 participants, suitable for exploratory research but insufficient for generalizations to larger groups. The sample was not randomized and may represent only a particular section of the gaming community.

**Dependence on self-reported information**.  
All results, encompassing psychological symptoms and gaming behaviors, were self-reported. The data may be affected by personal bias, memory errors, or social desirability influences.  
  
**Age-restricted emphasis**.  
The survey predominantly targets young folks, particularly those aged 18 to 25. Consequently, the results may not precisely reflect the emotional effects of gaming on older or younger populations.  
  
**Gender and cultural disparity.**  
The dataset has a pronounced bias toward male participants, with a diminished representation of female and non-binary responses. Furthermore, the regional or cultural variety was constrained, potentially impacting on the universality of the identified trends.

1. **Conclusion**

This study demonstrates a distinct and observable correlation between internet gaming habits and anxiety levels in young people. Employing the GAD-7 framework, we transferred self-reported survey data into medically relevant insights, uncovering patterns that may otherwise stay hidden in the daily activities of gamers.  
  
The results indicate that prolonged gaming durations, specifically above 5–6 hours daily, correlate with increased anxiety levels. Likewise, individuals who like solitary or competitive playstyles demonstrate increased emotional vulnerability. Additional risk indicators encompass younger demographics and female participants, both of whom exhibited elevated average anxiety levels.  
  
This study doesn't claim the causal relationship; however, the discovered connections indicate significant areas of concern. As gaming increasingly becomes a prevalent mode of social and recreational interaction, understanding its mental health consequences is essential. We hope for our research to enhance game design, improve mental health support services for players, and promote a wider debate on digital wellbeing within gaming culture.