

**An Advance Data Mining Approach on Gaming Addiction of Teen Age
in Modern Era**

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This Report Presented in Partial Fulfillment of the Requirements for the
Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled “An Advance Data Mining Approach on Gaming Addiction of Teen Age in Modern Era”, submitted by **FAISAL MAHAMUD SHANTO, RAKIB AHSAN RAHAT and HARESUR RAHAMAN SHOBUZ** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 25th January 2023.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of **Nazmun Nessa Moon, Associate Professor, Department of CSE** Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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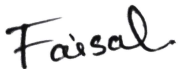
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ABSTRACT

Addiction is a complex condition characterized by the compulsive use of a substance or engagement in a behavior despite negative consequences. Determining addiction involves assessing an individual's patterns of substance use or behavior, as well as any related physical, psychological, and social problems. This assessment can include interviews, self-report measures, and physiological tests. There are a huge number of internet users world-wide. Almost every mobile user has a mobile game installed on their mobile. Most of mobile users play mobile games, while adolescents are very specific and keen users of mobile games. Around 67% of people use mobile devices globally. A mobile game is installed on almost every user's device.. This essay discusses teen mobile game addiction and the differences between computer games, video games, console games, and Employing data mining tools, it examines the effects of mobile games on male teenagers, both good and negative. Video games are age and gender appropriate, very popular, but like other enjoyable activities, they can have negative effects, which are discussed.. Research on Internet addiction has shown that users can become addicted to it. In this paper, we've collected data to see the user is game addicted or not . For that reason after collecting data we pre processed data set and used 3 types of algorithms. Here we've used Gradient Boosting Classifier, Decision tree Classifier and Random Forest. The best accuracy was 83% which was got with the help of Radom forest. After getting best accuracy we also test the data with the help of algorithms.

Key Word: *Video game addiction, Internet addiction, Online video games.*

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Addiction to social media has become the core reason for the excessive use of smart devices. Many types of research were implemented to get a clear vision of the reasons for using mobile phones as well as the bad impact of smart devices. This study examines the connection between social media addiction and the behavioral facts of humans. Artificial Neural Network (ANN) is used in this research to measure the hypothesis and find out the accuracy of the data. Importantly how a person feels without a smartphone and how he or she reacts against interruption while using smart devices are thought to be analyzed through this study. According to the findings, the person who spends more time using the smart device has social media addiction in most cases, it interrupts their sleep and hurts their eyes as well as they yell or act annoyed when someone interrupts while using smart devices and they feel bored without smart devices. This study comes up with some information that, those who have a smart device and social media addiction think they can block their disturbing thoughts of life with it but they feel low stem as a result of excessive use of smart devices. Relating to the previous studies it is confirmed that the term addiction to a smart device and social media addiction causes mental health problems in most cases. The literature review is provided to represent the existing works on the term addiction to social media and smart devices. The findings indicate that most of the users agreed about the late-night use of mobile phones and the impact of it on their health and behavior. Moreover, there is a separation of facts of using a smart device where one is for social media addiction and the other is for general purposes. Also, gaming is another term for the excessive use of smart devices. Whatever the fact is, the negative impact of the fact on the socialization and country as the present generation is the motivator for the upcoming generation.

1.2 Motivation

So many studies are there on the terms smart device and social media addiction. But the fact is that smart devices and social media addiction are related to each other. Social media addiction is one of the reasons for using excessive smart devices but the smart device is the only key to using social media. In the virtual world, people find happiness nowadays. As a result, behavioral effects are being spread in the real world. This research indicates the effect of smart devices and social media addiction on human mental health.

1.3 Research Questions

- How does a person act if someone interrupts while using the smart device?
- What is the best accuracy?

1.4 Research Outcome

- To analyze how it affects a person without a smartphone who has an addiction on it.
- To test the accuracy.

1.5 Thesis Organization

This report varied in a total of six different chapters. Which are capable of extending the understanding of “Game Addiction” more briefly.

In the first sector, We’ll mention the introduction, motivation, and research questions and the last one is the expected outcome.

After that, We’ll briefly about some related works, and which types of challenges we faced.

This was the most important part because here we’ve mentioned the model, and how it worked. After collecting data how we implemented our data. Also mentioned is the result

analysis. Discuss the result After analyzing the data we'll complete our thesis. In this part, we'll mention the overall summary of our whole thesis.

CHAPTER 2

BACKGROUND STUDY

2.1 Introduction

These researches we study about the psychological factor, whether that is factor to the online game addiction among students. Unlike with substance abuse, the biological aspect of video game addiction is uncertain. Research suggests gambling elevates dopamine, but there's more to addiction than brain chemistry (Rooij, Online video game addiction: identification of addicted, 2010). The addict suffers from a psychological component to the addiction. Online gaming allows a person to escape the real world and change the perception of self-worth (Rooij, Online video game addiction: identification of addicted, 2010).

2.1.1 What is Machine Learning?

Around the game of checkers, one of its own is credited with coining the term "machine learning." The majority of the time, machine learning algorithms are developed utilizing accelerated solution development frameworks like TensorFlow and PyTorch. Node layers, also known as neural networks or artificial neural networks, are made up of an input layer, one or more hidden layers, and an output layer. Deep learning algorithms or deep neural networks are neural networks that include more than three layers. The use of labeled datasets to train algorithms to categorize data is what distinguishes supervised machine learning [4]. The model modifies its weights as input data is fed into it until it is well-fitted. Various scale-up real-world challenges can be solved by companies with the use of supervised learning. An algorithm that is taught without requiring sample data is known as unsupervised machine learning. The lack of sufficient labeled data for a supervised learning system can be resolved via semi-supervised learning [4]. There is a picture of machine learning learning is give below in Figure 2.1.



Figure 2.1: Machine Learning [5]

2.1.2 Types of machine learning

In the field of machine learning (ML), we create algorithms to teach a machine to perform a task without actually performing any calculations on it. Building algorithms that can take input data and apply statistical analysis to predict an output while updating outputs as new data becomes available is the fundamental idea behind machine learning [5]. There are three types of machine learning. Those are given below:

- **Supervised Machine Learning [5]:** A finite collection of data containing the correct responses for each of the input values is given to the algorithm in supervised learning. The machine's job is to accurately analyze the dataset and

forecast the correct responses. An illustration of supervised learning As evidenced in the sample above, we first took some data and labeled them as either "Tom" or "Jerry." The training supervised model uses this labeled data; the model is trained using this data. Once it has been trained, we can test our model by using a few test emails to see if it can accurately predict the desired result.

- **Unsupervised Machine Learning [6]:** Unsupervised learning is a type of machine learning where the users don't have to watch over the model. Instead, it enables the model to reason independently and uncover previously hidden patterns and information. It mostly addresses unlabeled data. Unsupervised learning uses data without labels. The program recognizes and learns the patterns present in the dataset. Depending on their density, the algorithm divides the data into different clusters. It allows for the viewing of high-dimensional data. The Principle Component Analysis is an illustration of this type of machine learning technique. K-Means Clustering is an additional unsupervised learning method that separates the data into groups based on the similarity of order. The way that unsupervised learning involves learning
- **Reinforcement Learning [6]:** Along with supervised learning and unsupervised learning, reinforcement learning is one of the three fundamental machine learning paradigms. One of the most common and rising categories of machine learning algorithms is reinforcement learning. It is utilized in many autonomous systems, including automobiles and commercial robotics. This algorithm's goal is to accomplish a task in a changing environment. Based on the number of prizes that the system offers, it can achieve this aim. The programming of robots to carry out independent tasks makes heavy use of it. Making clever self-driving cars also makes use of it.

2.1.3 How Machine Learning works

Machine learning's overarching objective is to create models that replicate and generalize data. For these models to produce the correct results, they must learn how to discriminate between different items. Simply put, machine learning employs a range of methods, to

accomplish a particular objective, these techniques use algorithms. Machine learning's task is to determine that the object being delivered to it is fruit. The clearest explanation of how machine learning functions comes from Interactions' Senior Vice President of Natural Language Research, Jay Wilpon, who uses the example of fruits [7].

2.2 Related works

Md. Saiful Islam, et al., submitted a study article based on PSPU and PSMU scores. Their techniques included descriptive analysis, association, and hierarchical regression analysis. The average PSPU and PSMU scores were 20.8 6.8 out of 36 and 14.7 4.8, respectively out of 30. A hierarchical regression analysis found that PSPU and PSMU were positively connected with younger age, insufficient sleep, social media use, television viewing, anxiety, and depression. Additionally, PSMU was connected to being male, being married, having a lower-income family, and drinking alcohol, whereas PSMU was connected to being female, having a nuclear family, residing in an urban area, engaging in irregular physical activity, performing poorly on academic assignments, and avoiding earning activities.

Naveen Gupta et al., examined how mobile phone usage affects students' mental health, sleep patterns, and academic performance at a medical university. They employed statistical analysis and sample data collection. A total of 1,000 students had mobile phones, with 76.4% of those having smartphones. While some people mostly used their phones for downloading games, music, and videos as well as for fashion, others used them for communication, planning events, and in emergencies. The use of a mobile phone at night was significantly $p < 0.0001$ linked to sleepiness in the morning, exhaustion, a deterioration in study habits, difficulties concentrating, an increase in missed courses, and being late for class. Total time spent on mobile devices was substantially $p < 0.05$ and highly significantly $p < 0.001$ related to a deterioration in study habits, a rise in missing classes, and coming late for classes.

According to Md. Mahbobor Rahaman, In response to the question about whether they spend more time with their mobile phone than their friends and family members on average, 19.7% of respondents strongly agreed and 26.6% agreed. This study found that

46.3% of respondents believed they used their phones more frequently. The impact of mobile phones on our society, neighborhood, and nation is significant. This outcome revealed the terrible news that because people were cut off from society, they were trying to think bad thoughts that could endanger human life in Bangladesh. One of the main reasons for the rise in crime in Bangladesh is that the majority of the younger generation spends more time on their phones than on volunteer activities.

Abu Shams Mohammad Mahmudul Hoque [8] asserts that Bangladeshi SME performance is significantly impacted by addiction to digital devices. Accordingly, the beta coefficient for the effect of digital device addiction on the Bangladeshi Gen Z lifestyle was .864, meaning that for every unit rise in digital device addiction, the Bangladeshi Gen Z lifestyle increased by .864. Therefore, the theory was verified.

Lai-Ying Leong et al [9]. The research model's accuracy in predicting addiction to social media is 86.67%. Gender, time spent, entertainment, agreeableness, and addiction all have linear relationships. Neuroticism and addiction to social media have a nonlinear relationship. Their techniques included sample data collection, AI, and SEM-neural networks.

A/P Munusamy and AkmarHayati Ahmad Ghazali, Kalaivani [10], The results indicated a mild degree of smartphone addiction. The results indicated that young people's dependence on cell phone use can have an effect on their day-to-day activities. The statements were ordered from highest to lowest based on their average scores.

The studies that were discovered n = 290 primarily addressed "problematic mobile phone use" dependence/addiction and "problematic mobile phone use" frequency or length of use in relation to mental health symptoms, according to Sara Thomée. such as depression, anxiety, and sleeplessness. There has been a notable increase in the quantity of articles published over the past five years in particular.

2.3 Research Summary

According to experimental studies, the Nave Bayes model outperforms other models in terms of game addiction. An online gaming addiction is not that far from drug addiction. Both are searching for a way to make they feel better. The lure of a fantasy world is especially pertinent to online role-playing games. These are games in which a player assumes the role of a fictional character and interacts with other players in a virtual world. An intelligent child who is unpopular at school can feel dominant in the game. The virtual life becomes more appealing than real life. Too much gaming may seem relatively harmless compared with the dangers of a drug overdose, but experts say video game addiction can ruin lives. Children who play four to five hours per day have no time for socializing, doing homework, or playing sports leaving little time for normal social development.

2.4 Scope of the Problem

We've reviewed some papers & articles. There they mentioned & applied different approaches. withdrawal effects when playing is prohibited or taken away, such as unhappiness, worry, or irritation. a requirement to play video games for an increasing amount of time to experience the same degree of satisfaction giving up other once-enjoyed pursuits and social connections because of gaming. The system's primary goal is to determine whether a person id game addicted or not.

2.5 Challenges

We implemented three algorithms. So, it was very challenging for me to learn all the algorithms. We practiced more and more. On the other hand, We had no knowledge about f-1 score, recall, precision. So, We learned how to find out that topic's results.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

In this part, We will quickly describe the steps We took to accomplish our study project. With the help of our project, we'll be able to know whether a person is game addicted or not.

3.2 Data Collection Procedure

First of all, a survey paper was created through Google Forms. The survey consisted of 22 multiple-choice questions the first 2 questions were about the person and the rest 20 were related to the majorly needed information for research. The goal was to collect survey responses from 1061 users and we were able to collect all responses from the survey. Questions asked in the survey were:

1. How old are you?
2. Are you _Male/Female_ ?
3. Are you a current student?
4. What class do you read in?
5. Your last academic result?
6. How much time do you spend for reading daily?
7. How much time you spend on mobile phone?
8. Do you prefer reading instead of Playing games?
9. Do you play games daily?
10. Your favorite game type?
11. Which game like you best?
12. Do you play paid game ?
13. Have you personal smartphone ?
14. If not, whose phone do you play games with ?

15. If you don't have a phone, if you want to take a phone from someone else in the family ,do they let you use it or it secretly ?
16. Are you eager to complete the daily tasks of the game ?
17. Feeling mentally dissatisfied if you can't complete the daily tasks ?
18. Do you prefer playing instead of outing from home or chatting with friends ?
19. Which game mood you prefer ?
20. Have you got any illness due to spending time in the game ?
21. Have your behavior changed since starting playing the game ?
22. How have your behavior changed ?

All data were stored in a .csv file before being sent to ml. Following that, machine learning produced the output and transmitted that to the report generator, where all conclusions were drawn in accordance with the information provided by Machine Learning.

3.3 Research Methodology

For the coding part We took some steps:

- Data Collection
- Data Pre-processing
- Model Selection & Evaluation
- Get the best accuracy
- Result
- Testing

3.3.1 Flow Chart of our project

The research process aimed to investigate the psychological and behavioral factors for excessive use of smart devices and social media addiction. The overall research process was dedicated to obtaining at least one objective as an outcome. For the purpose of obtaining outcomes and fulfilling the objectives, the quantitative method was used to

collect data. It accepted user input for details about the addict's identity, like Gender, and Study uses time of social media and other related stuff. In Figure 3.1 the flow chart is given below.

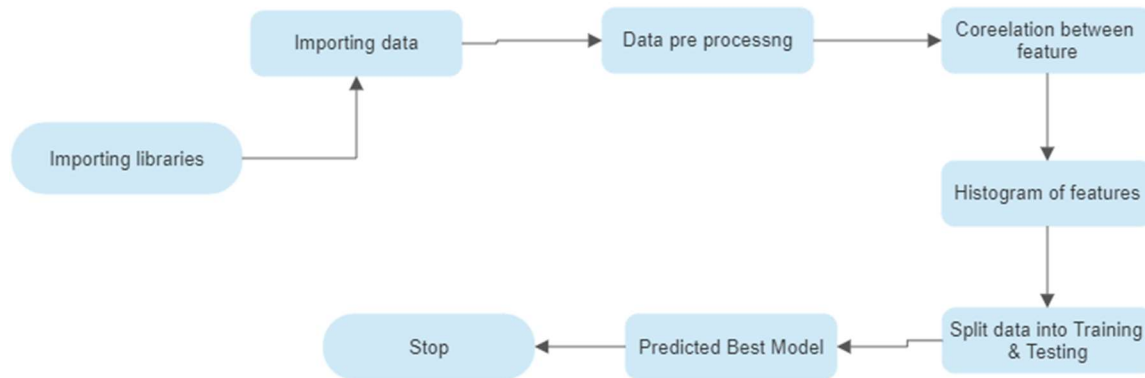


Figure 3.1: Flow chart of our project

3.3.2 Proposed Model

In this research, we attempt to create a flexible user interface with visual concepts connected by a browser interface. Our aim is to use a machine learning model to classify master card fraud using data obtained from Cagle as accurately as possible. Once we had done our initial research, we had a tendency to know that the Random Forest would provide the most accurate results.

- **Data Collection:** We collect the data in a google form. We arranged 22 questions. After getting the data, we convert it into CSV format In Figure 3.2 is given below.

Timestamp	Username	Total score	Age	Gender	Student	Class	CGPA	Spend_reading	Spend_on_mobile	...	Personal smartphone	Whose phone	Use_other	Eager
2022/07/29 10:08:46 AM GMT+6	skorbantakaful@gmail.com	0.00 / 0	15	NaN	Yes	Class 8	4	NaN	less 2 hour	...	No	Bother	use it in secret	
2022/08/01 12:38:43 PM GMT+6	saikat15-11913@diu.edu.bd	0.00 / 0	23	Male	Yes	Class 12	4.02	1 hour	8 hour	...	Yes	NaN	use it in secret	
2022/08/01 12:40:37 PM GMT+6	thuhidhassan10@gmail.com	0.00 / 0	19	Male	Yes	Class 12	04:58:00	8	3	...	Yes	NaN	Lets use	
2022/08/01 12:46:05 PM GMT+6	sifatdynamo100@gmail.com	0.00 / 0	17	Male	Yes	Class 9	4	3/4 hour., 20/30 minutes	4/5 hour 0 minutes	...	No	Other	Lets use	

Figure 3.2: Head part of our Project

- **Data Pre-processing:** In this part, I cleaned the data. Missing values in the collected data could result in discrepancies. Preprocessing of the data is necessary to improve outcomes and the algorithm's efficiency. I must transform the variables and remove the outliers. To overcome these concerns, we use the chart function. In Figure 3.3 is mentioned.

```
df1.isnull().sum()
Age                0
Gender             2
Spend_reading     2
Spend_on_mobile   0
Reading_instead_Play 1
Game you like     0
Play_paid_game    0
Spend_on_game     413
Eager_to_complete_tasks 0
Feeling_mentally_dissatisfied 0
Prefer_play_instead_of_outing 0
Game_mood         0
Any_illness       93
Behavior_changed  0
What_behavior_changed 262
dtype: int64
```

Figure 3.3: Train & Test cleaning

- **Correlation:** Based on the association between the traits, it was shown that they were more likely to repay their loans. Individual and significant characteristics

can include property kind, educational attainment, loan amount, and initial credit history, which is significant since it is regarded as such by perception. Using the Python platform's core plot and boxplot functions, you may connect the correlation between attributes. The correlation diagram is given below in Figure 3.4 .

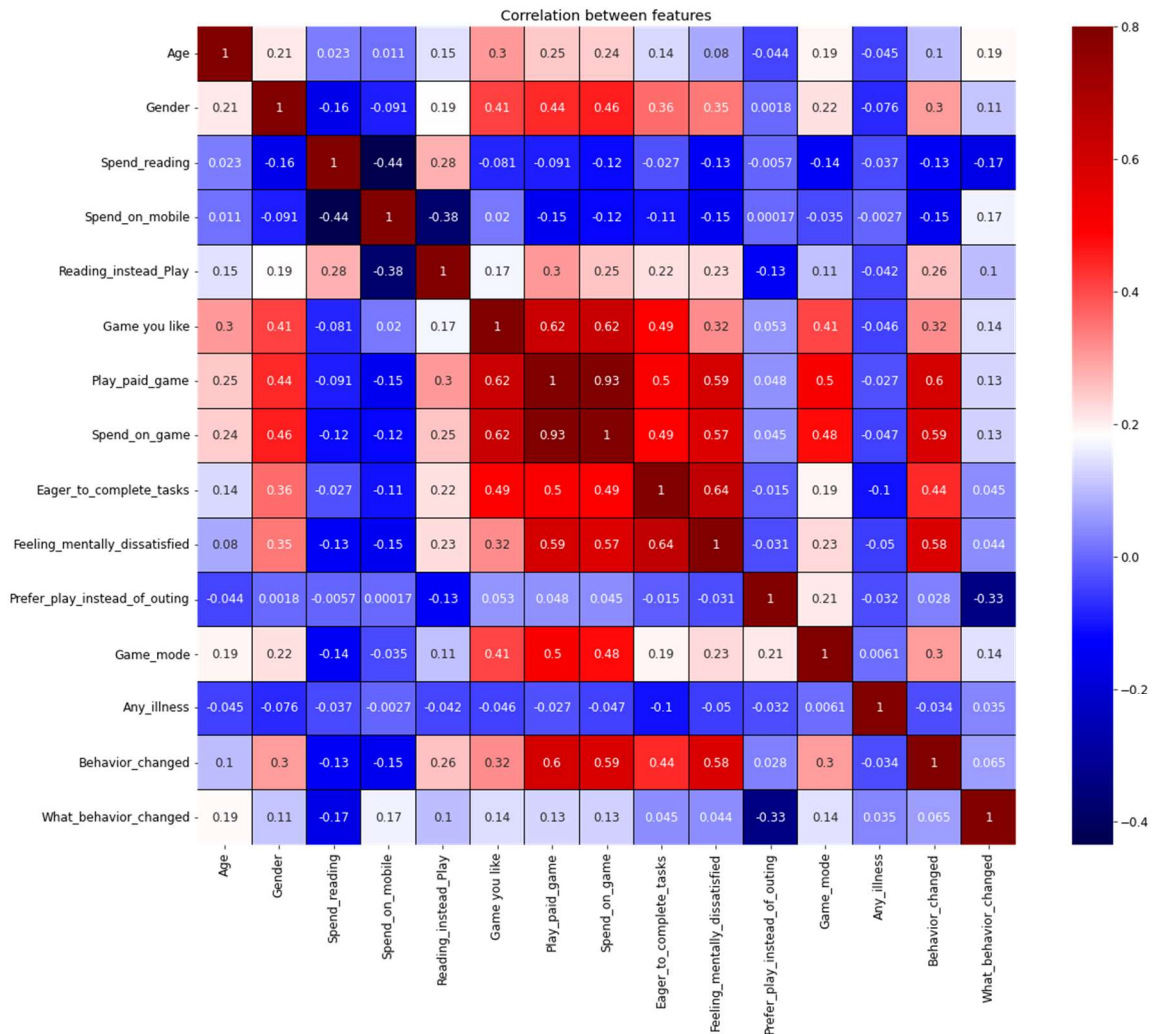


Figure 3.4: Co-relation

- **Histogram of Age:** In essence, a histogram is used to display data presented in the form of several groupings. It is an accurate way for displaying the distribution of numerical data graphically. It is a type of bar plot where the X-axis shows the bin ranges and the Y-axis provides frequency information. The first step in

creating a histogram is to establish a bin for each range of values. Next, divide the entire range of values into a series of intervals, and then count the values that fall into each interval. Bins are distinguished as a series of non-overlapping, successive intervals of variables. To calculate and produce the histogram of x , use the `matplotlib.pyplot.hist()` function. In Figure 3.5 the histogram of ages is given below.

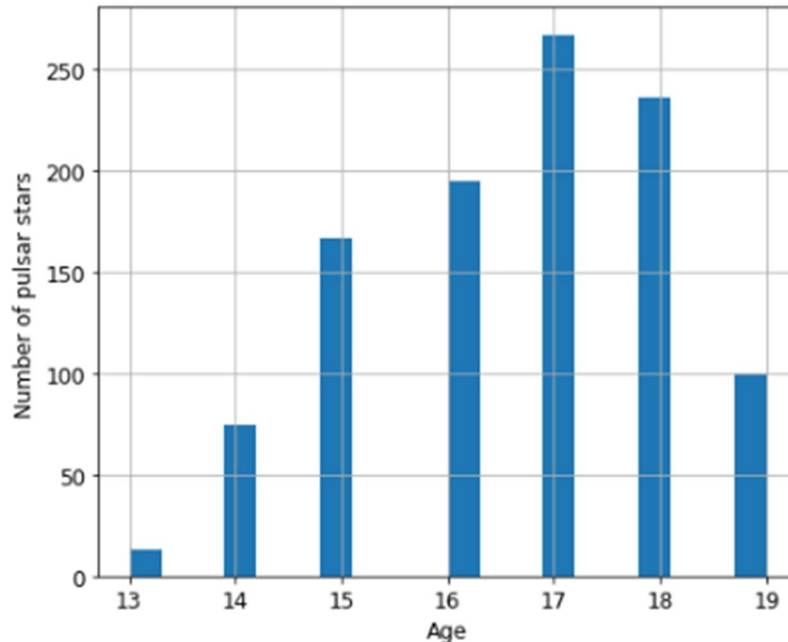


Figure 3.5: Histogram of Age

It is a type of bar plot where the X-axis shows the bin ranges and the Y-axis provides frequency information. The first step in creating a histogram is to establish a bin for each range of values. Next, divide the entire range of values into a series of intervals, and then count the values that fall into each interval. Bins are distinguished as a series of non-overlapping, successive intervals of variables. To calculate and produce the histogram of x , use the `matplotlib.pyplot.hist()` function. In Figure 3.6 the histogram of spending time on reading is given below.

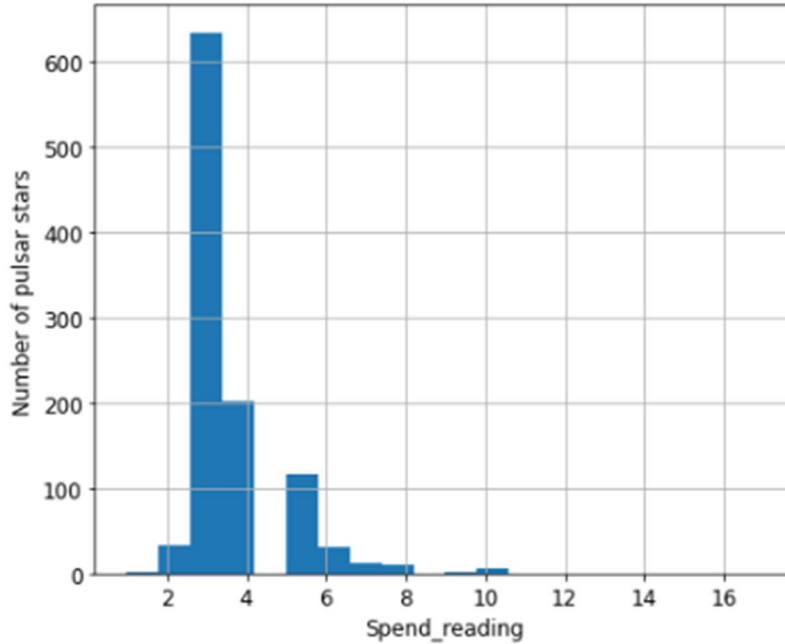


Figure 3.6: Spending time on reading

It is a type of bar plot where the X-axis shows the bin ranges and the Y-axis provides frequency information. The first step in creating a histogram is to establish a bin for each range of values. Next, divide the entire range of values into a series of intervals, and then count the values that fall into each interval. Bins are distinguished as a series of non-overlapping, successive intervals of variables. To calculate and produce the histogram of x , use the `matplotlib.pyplot.hist()` function. In Figure 3.7 the histogram of spending time on mobile is given below.

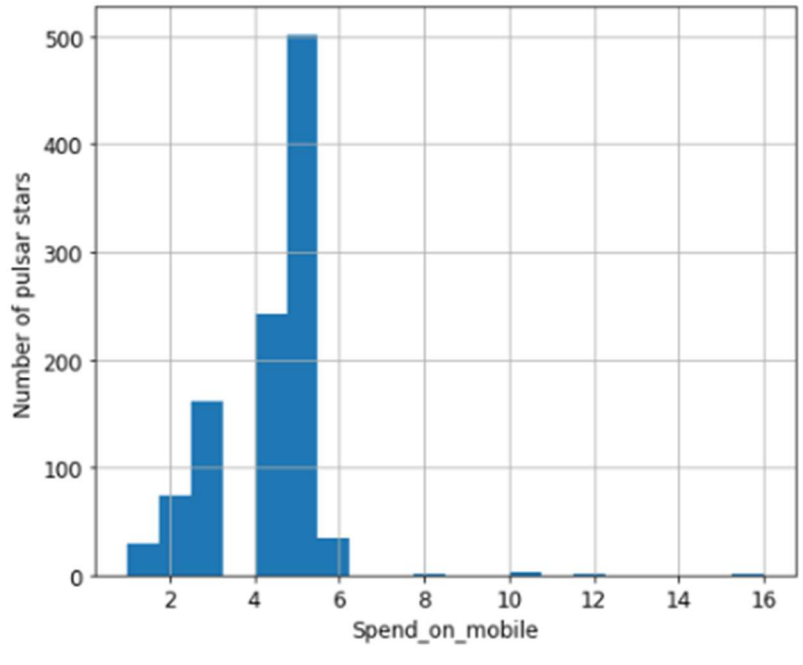


Figure 3.7: Spending time on Mobile

It is a type of bar plot where the X-axis shows the bin ranges and the Y-axis provides frequency information. The first step in creating a histogram is to establish a bin for each range of values. Next, divide the entire range of values into a series of intervals, and then count the values that fall into each interval. Bins are distinguished as a series of non-overlapping, successive intervals of variables. To calculate and produce the histogram of x , use the `matplotlib.pyplot.hist()` function. In Figure 3.8 the histogram of spending money on game is given below.

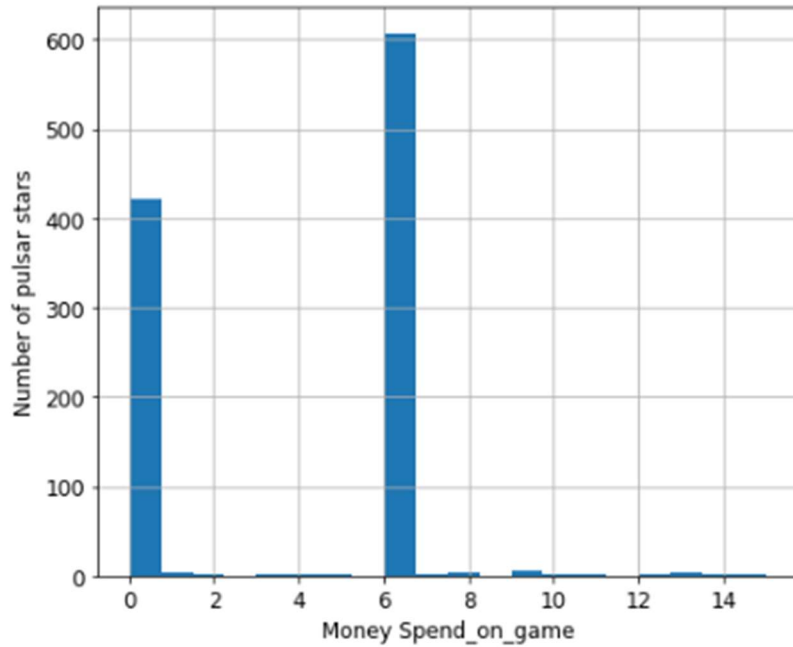


Figure 3.8: Spend Money On Game

In figure 3.9 is used for seeing the any illness. When a person overuse the mobile, spend most of the time on game. Then she/he faces different types of physical problems.

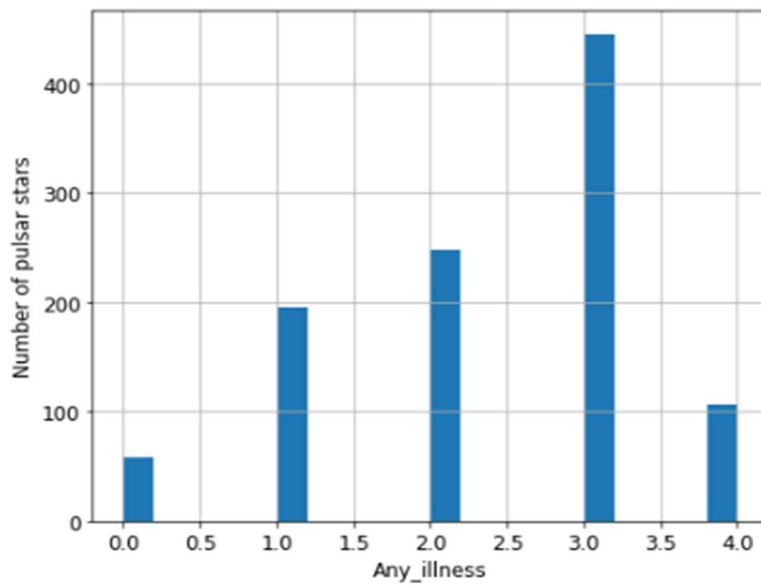


Figure 3.9: Any illness

It is a type of bar plot where the X-axis shows the bin ranges and the Y-axis provides frequency information. The first step in creating a histogram is to establish a bin for each range of values. Next, divide the entire range of values into a series of intervals, and then count the values that fall into each interval. Bins are distinguished as a series of non-overlapping, successive intervals of variables. To calculate and produce the histogram of x, use the matplotlib.py plot.hist() function. In Figure 3.10 the histogram of what behavior changed is given.

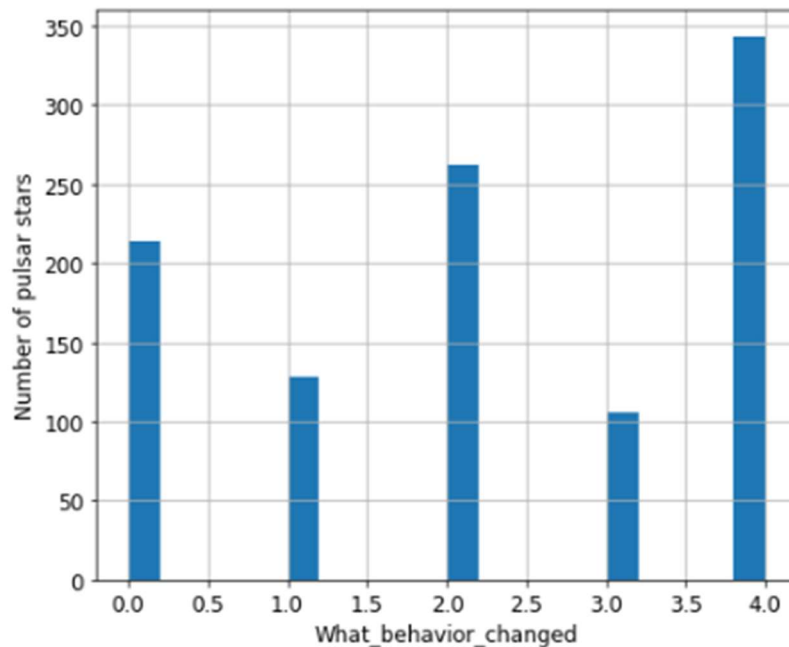


Figure 3.10: What Behavior Changed

3.4 Machine Learning Model

A subtype of artificial intelligence called machine learning teaches machines to think and act like humans without being explicitly taught. We employ supervised techniques in this paper. For the prediction of Android applications, five machine-learning classification models have been applied. The models can be found in free source Python software. Below are brief descriptions of each model.

- Random Forest [20]:** The bagging method is extended by the random forest algorithm, which uses feature randomness in addition to bagging to produce an uncorrelated forest of decision trees. The random subspace method, also known as feature bagging, creates a random subset of features that guarantees a low correlation between decision trees. The main distinction between decision trees and random forests is this. Random forests merely choose a portion of those feature splits, whereas decision trees take into account all possible feature splits. Picture is given below in Figure 3.11.

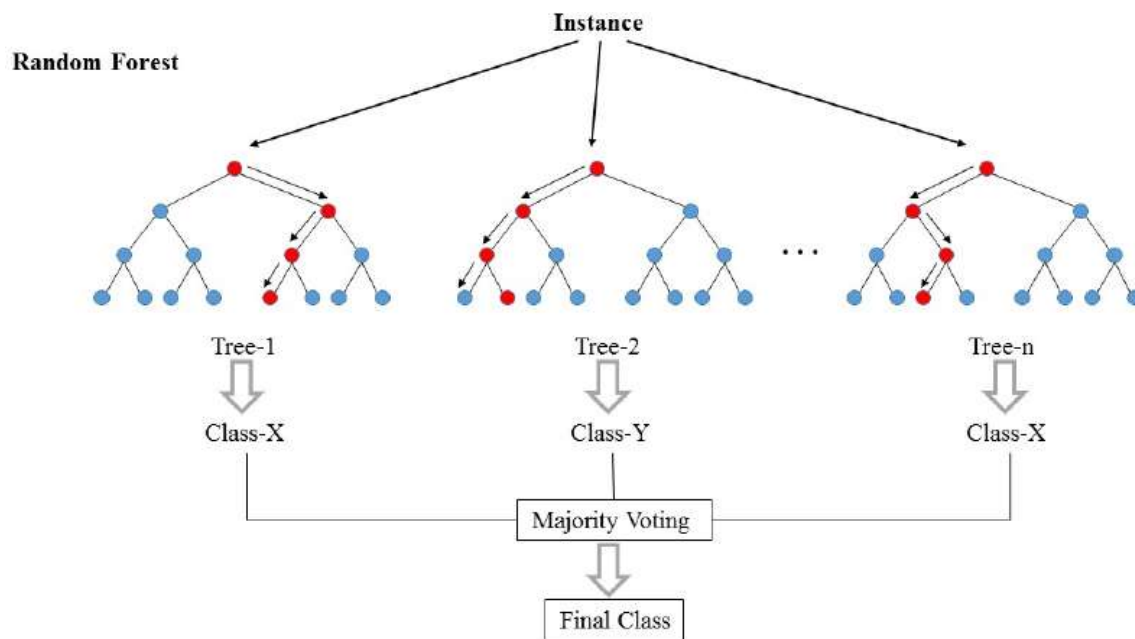


Figure 3.11: Random Forest[18]

- Decision Tree [16]:** A decision tree is a graph that realizes the problem and makes judgments based on conditions. It shows each potential result of a choice and ultimately forecasts the result. For instance, every eCommerce website that allows you to make purchases will provide you with many choices based on your search criteria. Here, the classification process is carried out using a decision tree method.

CHAPTER 4

EXPERIMENTAL RESULTS AND DISCUSSION

4.1 Experimental Setup

We used a Co-lab notebook for our coding part. Our useable language was python. For getting accuracy I uploaded some libraries.

4.2 Experimental Result and Analysis

The model has to be tested after it has been trained. The model is evaluated using the data that we divided during the test-trained module. Confusion metrics, precision, recall, accuracy, and F1 score techniques are mostly used in utilized to assess the classification issue.

4.2.1 Confusion Matrix

4.2.1.1 True Positive

An outcome where the model properly predicted the positive class is referred to as a true positive. Similar to a genuine positive, a true negative is a result for which the model accurately foresees the negative class. We get True Positive rate 61, 83, and 81 for Gradient Boosting Classifier, Decision Tree Classifier, and Random Forest respectively. All these data are shown in the table 4.1.

Table 4.1: True Positive

Algorithm	TP
Gradient Boosting Classifier	61
Decision Tree Classifier	83
Random Forest	81

4.2.1.2 False Positive:

A false positive is a result that suggests the presence of a condition when it is not. This could be a false positive warning in manufacturing where there isn't actually a problem with the system. We get the result of False Positive. All these results are shown in the table 4.2.

Table 4.2: False Positive

Algorithm	FP
Gradient Boosting Classifier	43
Decision Tree Classifier	21
Random Forest	23

4.2.1.3 False Negative

A test result that shows a person doesn't have a certain illness or condition when they actually do, despite the fact that they do. We get False Negative rate 27, 41, and 32 for Gradient Boosting Classifier, Decision Tree Classifier, and Random Forest respectively. All these data are shown in the table 4.3.

Table 4.3: False Negative

Algorithm	FN
Gradient Boosting Classifier	27
Decision Tree Classifier	41
Random Forest	32

4.2.1.4 True Negative

An outcome where the model properly predicted the positive class is referred to as a true positive. Similar to a genuine positive, a true negative is a result for which the model accurately foresees the negative class. A false positive is a result where the model predicts the positive class incorrectly. We get True Negative rate 171, 180, and 185 for Gradient Boosting Classifier, Decision Tree Classifier, and Random Forest respectively. All these data are shown in the table 4.4.

Table 4.4: True Negative

Algorithm	TN
Gradient Boosting Classifier	171
Decision Tree Classifier	180
Random Forest	185

4.2.2 Accuracy

Accuracy is capacity of an instrument to measure the precise value. It refers to how closely the measured value resembles a reference or true value. We get accuracy rates of 78, 80, and 83 for Gradient Boosting Classifiers, Decision Tree Classifier, and Random Forest respectively. All these data are shown in the table 4.5.

Table 4.5: Accuracy

Algorithm	Accuracy(%)
Gradient Boosting Classifier	78
Decision Tree Classifier	80
Random Forest	83

4.2.3 Recall

The recall is determined as the proportion of Positive samples that were correctly identified as Positive to all Positive samples. The recall gauges how well the model can identify positive samples. The more positive samples that are identified, the larger the recall. For the Gradient Boosting Classifier, Decision Tree Classifier, and Random Forest, respectively, we obtain Recall rates of 0.87, 0.81, and 0.85. The table 4.6 displays all of these statistics.

Table 4.6: Recall

Algorithm	Recall
Gradient Boosting Classifier	0.87
Decision Tree Classifier	0.81
Random Forest	0.85

4.2.4 Precision

Precision, or the caliber of a successful prediction made by the model, is one measure of the model's performance. Precision is calculated by dividing the total number of positive predictions by the proportion of genuine positives. For the Gradient Boosting Classifier, Decision Tree Classifier, and Random Forest, respectively, we obtain precision rates of 0.81, 0.89, and 0.89. The table 4.7 displays all of these statistics.

Table 4.7: Precision

Algorithm	Precision
Gradient Boosting Classifier	0.81
Decision Tree Classifier	0.89
Random Forest	0.89

4.3 Result Discussion

With the help of the Random Forest, We got the best accuracy, which was 83%. With certainty, it can be said that the Random Forest is quite effective and produces better results than other models. It functions properly and meets. This technology calculates the outcome correctly and precisely. It accurately forecasts whether a person is game addicted or not.

CHAPTER 5

IMPACT ON SOCIETY, ENVIRONMENT AND SUSTAINABILITY

5.1 Impact on Society

Every human feeling may be linked to the words we view on a daily basis on various online platforms in the digital world. In this case, it is critical for these platforms to have a mechanism in place to discern which are genuine emotions and which are pre-programmed aggressiveness. This is why We've decided to focus on one of the most fascinating genres of all time, by doing so, we can expect to create a more definitive and diverse digital era. An addiction to video games can have disastrous societal repercussions. Relationships with friends and family might be severely strained. Lying about how much time is spent playing video games and ignoring others to play them obsessively can lead to friction, confrontation, and even marriage dissolution.

5.2 Impact on Environment

Due to the complexity of the network system of openness, sharing of resources, system, linking the variety, the uneven distribution of the terminal, network agnostic, and other barriers, computer networks continue to exhibit their distinctive benefits. Computer's cause. The biggest issue is security, which is one of the numerous issues brought on by the network. Predicting game addiction is not so easy. Sometimes we see that the person who is game addicted she/he faced different types of difficulties. Everybody thinks it is a normal issue. But it is not. So that's why We decided to work on it.

5.3 Ethical Aspects

Addiction to social media has become the core reason for the excessive use of smart devices. Many types of research were implemented to get a clear vision of the reasons for using mobile phones as well as the bad impact of smart devices. This study examines the connection between social media addiction and the behavioral facts of humans. Machine Learning is used in this research to measure the hypothesis and find out the accuracy of the data. Importantly how a person feels without a smartphone and how he or she reacts

against interruption while using smart devices are thought to be analyzed through this study. According to the findings, the person who spends more time using the smart device has social media addiction in most cases, it interrupts their sleep and hurts their eyes as well as they yell or act annoyed when someone interrupts while using smart devices and they feel bored without smart devices. This study comes up with some information that, those who have a smart device and social media addiction think they can block their disturbing thoughts of life with it but they feel low stem as a result of excessive use of smart devices. Relating to the previous studies it is confirmed that the term addiction to a smart device and social media addiction causes mental health problems in most cases. The findings indicate that most of the users agreed about the late-night use of mobile phones and the impact of it on their health and behavior. Moreover, there is a separation of facts of using a smart device where one is for social media addiction and the other is for general purposes. Also, gaming is another term for the excessive use of smart devices.

5.4 Sustainability

- There are over 2.3 billion active internet-based life clients worldwide.
- At least two internet-based life cycles are present in 91 percent of large business brands.
- When they can't access their online life profiles, 65 percent of individuals feel uneasy and uncomfortable.
- It will be a helping hand for the researcher.
- Able to gain more knowledge about loan prediction methods.

CHAPTER 6

SUMMARY, CONCLUSION, RECOMMENDATION, AND IMPLICATION FOR FUTURE RESEARCH

6.1 Summary of the Study

The purpose of this study was How can we predict whether the person is game addicted or not. This work implements function extraction and data processing for customer basic attribute data and downloads transaction data based on the scenario of a mobile phone uses. Addiction to social media has become the core reason for the excessive use of smart devices. Many types of research were implemented to get a clear vision of the reasons for using mobile phones as well as the bad impact of smart devices. This study examines the connection between social media addiction and the behavioral facts of humans. Machine learning is used in this research to measure the hypothesis and find out the accuracy of the data. Importantly how a person feels without a smartphone and how he or she reacts against interruption while using smart devices are thought to be analyzed through this study. According to the findings, the person who spends more time using the smart device has social media addiction in most cases, it interrupts their sleep and hurts their eyes as well as they yell or act annoyed when someone interrupts while using smart devices and they feel bored without smart devices. This study comes up with some information that, those who have a smart device and social media addiction think they can block their disturbing thoughts of life with it but they feel low stem as a result of excessive use of smart devices.

6.2 Implication for Further Study

- It will be a contribution.
- Easier.
- More flexible.
- User-friendly.

6.3 Conclusion

Around the game of checkers, one of its own is credited with coining the term "machine learning." The majority of the time, machine learning algorithms are developed utilizing accelerated solution development frameworks like TensorFlow and PyTorch. Node layers, also known as neural networks or artificial neural networks, are made up of an input layer, one or more hidden layers, and an output layer. Deep learning algorithms or deep neural networks are neural networks that include more than three layers. In addition to sleep disorders, insomnia, circadian rhythm abnormalities, depression, aggression, and anxiety, gaming has been linked to these conditions as well, but more research is needed to determine the validity and degree of this association. The drop in academic performance is frequently the easiest to spot, but it is frequently missed how playing video games affects softer factors like loneliness, loss, self-esteem, social anxiety, and social skills.

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APPENDIX

Survey Questions

- 1) How old are you? (আপনার বয়স কত?)
- 2) Are you Male/Female? (আপনি কি পুরুষ / মহিলা?)
- 3) Are you a current student? (আপনি কি বর্তমান ছাত্র?)
- 4) What class do you read in? (আপনি কোন ক্লাসে পড়াশোনা করেন?)
- 5) Your last academic result? (আপনার সর্বশেষ একাডেমিক ফলাফল?)
- 6) How much time do you spend for reading daily? (আপনি প্রতিদিন পড়াশোনার জন্য কত সময় ব্যয় করেন?)
- 7) How much time you spend on mobile phone? (আপনি মোবাইল ফোনে কত সময় ব্যয় করেন?)
- 8) Do you prefer reading instead of Playing games? (আপনি কি গেম খেলার পরিবর্তে পড়াশোনা করতে পছন্দ করেন?)
- 9) Do you play games daily? (আপনি কি প্রতিদিন গেম খেলেন?)
- 10) Your favorite game type? (আপনার প্রিয় খেলার ধরন?)
- 11) Which game like you best? (কোন ধরনের গেম আপনার ভাল লাগে?)
- 12) Do you play paid game ? (আপনি কি পরিশোধযোগ্য গেম খেলেন?)
- 13) Have you personal smartphone ? (আপনার কি ব্যক্তিগত মোবাইল ফোন আছে?)
- 14) If not, whose phone do you play games with ? (যদি না থাকে, তাহলে কার ফোনে গেম খেলেন?)
- 15) If you don't have a phone, if you want to take a phone from someone else in the family ,do they let you use it or it secretly ? (আপনার কাছে ফোন না থাকলে ,আপনি যদি পরিবারের অন্য কারো কাছে থেকে ফোন নিতে চান, তারা কি আপনাকে এটি ব্যবহার করতে দেয় নাকি গোপনে ব্যবহার করতে হয়?)
- 16) Are you eager to complete the daily tasks of the game ? (আপনি কি খেলার দৈনন্দিন স্তরগুলি সম্পূর্ণ করতে আগ্রহী থাকেন?)

- 17) Feeling mentally dissatisfied if you can't complete the daily tasks ? (দৈনন্দিন
স্বরগুলো সম্পূর্ণ করতে না পারলে আপনি কি মানসিকভাবে অসন্তুষ্ট হন?)
- 18) Do you prefer playing instead of outing from home or chatting with friends ?
(আপনি কি বাসা থেকে বাহিরে অথবা বন্ধুদের সাথে আলাপচারিতা করার পরিবর্তে গেম খেলতে
পছন্দ করেন?)
- 19) Which game mood you prefer(group/alone) ? (আপনি কিভাবে গেম খেলতে পছন্দ
করেন(দলগত/একাকী)?)
- 20) Have you got any illness due to spending time in the game ? (আপনি কি গেম খেলার
কারণে কোন অসুস্থতা বোধ করছেন?)
- 21) Have your behavior changed since starting playing the game ? (গেম খেলা শুরু করার
পরে থেকে আপনার আচরণের কোন পরিবর্তন হয়েছে?)
- 22) How have your behavior changed ? (আপনার আচরণের কি ধরনের পরিবর্তন হয়েছে?)

An Advance Data Mining Approach on Gaming Addiction of Teen Age in Modern Era

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