

**MACHINE LEARNING APPROACHES OF SOCIAL MEDIA ADDICTION AMONG
THE BANGLADESHI STUDENTS**

BY

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This report presented for Partial Fulfilments for the degree of Masters in Computer
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DAFFODIL INTERNATIONAL UNIVERSITY

DHAKA, BANGLADESH

AUGUST 2025

APPROVAL

This Project/Thesis titled Machine Learning Approaches of Socid Media Addiction Among Bangladeshi Students, submitted by Shuvro Das, ID No: 232-25-032 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 M.Sc. in Computer Science and Engineering and approved as to its style and conterds. The presentation has been held on 13-09-2025.

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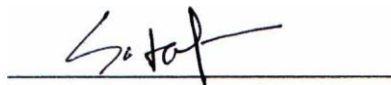


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DECLARATION

I hereby acknowledge that, with the guidance of **Dr. S. M. Aminul Haque (Sir)**, a professor and associate head in the Department of Computer Science and Engineering, I completed this machine learning research. Additionally, I certify that no portion of this project has ever been submitted for credit toward a degree or diploma

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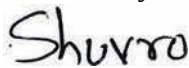
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Acknowledgement

First and foremost, I would want to express my gratitude to **Dr. S. M. Aminul Haque, my supervisor and the associate head of the CSE department**. I finished the machine learning project under his guidance and discovered the ideal accuracy. My understanding of machine learning was quite limited. Using my limited understanding of machine learning, I recently finished the entire project. Because I much benefited from the assistance of my supervisor, sir, in determining which algorithm would be the most important and previous in my machine learning model. Aside from this, anyone or any student can use the model I created because it is very socially acceptable. Finally, I would like to express my gratitude to **Professor Dr. Sheak Rashed Haider Noori, Head of the Department of CSE**, for his gracious assistance in completing my thesis. I also want to express my gratitude to the entire Daffodil International University faculty. Lastly, I want to thank my parents for their unwavering support and patience.

Abstract

Using excessive use of social media can use many kinds of mental health issue. In my project work I was trying to build a machine learning project that can help students their social media addiction status. In my project I used about ten machine learning algorithms which is significant works with better accuracies. Logistic Regression accuracies accuracy come 85% and Random Forest accuracy level is 98%. Most of the feature's value if textual. And I have this model can help student verry well. Even parents can understand or detect their children addiction status. So therefore, this research can help people and can contribute to the society very well.

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Chapter 1

Introduction

1.1 Introduction

Human has created many things or technologies to improve quality life. In this technologies internet is the most powerful and useful or potent tool that can make their life comfortable. Our life has revolved around the internet. We utilize the internet in variety of ways to improve our quality of life. Purchase a lot of things from online, apart from these we use many platforms to order foods. Internet has become popular because of it's reliability and simple activity. Internet user now have greater opportunity and freedom of speech than ever before the thanks to the proliferation of social media network, the accessibility information and communication technologies and the widespread use of computer and smartphone technologies. Additionally, users of social media frequently have option to conceal their identities which facilitates abuse of the tools at the disposal. One of the most and prevalent problems of social networking is the usage of derogatory language [1]. Excessive use of social media can cause severe disease. Such as depression, anxiety etc. Basically, students or youth are addicted to excessive use of social media. Most of the users of social media are the students or young generation. Spending so much time with media, both online or offline, deprive high achieving youth of real-world experiences and can lead to a number of negative outcomes, including poorer academic performance and increase risk of depression and reduction in sleep duration and more. Ages between 14 to 16 students spends at least 10 to 12 hours per day on social media. Even most of the college students of Bangladesh spends much time on social media. And this high amount of time on spending on social media can make a student detention to his studies. Eventually he became depressed on his or her life. That is why excessive internet use turns into compulsive addiction and it makes student depressed. In real world scenario KFF (Kaiser Family Foundation) which is a non-profit organization reports that about 21% of young people are classified as heavy media users. That's means they use social media more than 16 or 17 hours per day. In additional 63% of youth are classified as moderate users of social media. Apart from those young people who use at least 4 to 5 hours every day are consider to be light users [2]. The impact of social media on brain are significantly high alarming. Social media physically and psychologically impact on the brain due to it's impact. On the other

hand, it can cause severe problems in the future. If someone use social media in an extreme way he will suffer in the long run. Decision and feelings are influenced by the brain reward region it will make hamper in the future. Neurons in the primary dopamine producing regions of the brains when someone consume or addicted to the extreme level of addictive substances. This is the evident in how people use social media when they use social media and use their extreme level of interest. And even when they receive or get any notification or remark their brain like flooded with dopamine, when is then sent down reward pathways, making them feel good. Eventually the medication or actions that brain receives with associated with proper use of social media. And proper use of social media can make someone very healthy life. Even in the future there are many ways that people can adapt to improve their social media addiction [3]. There are many pros and cons of social media. The use of social media can be even beneficial to us. If we use social media in a certain level, it can be good for the education purpose though. You can connect with those people who do have same choice or same interest like yours. During your difficult times you can ask for any help. Someone can enjoy their leisure time using social media. Otherwise they also have some cons or disadvantages of social media which can make every one anxious and it and eventually it will make great danger for his or her [4]. Because people could not get any job to do or even, they had to stay a long time. In addition, younger people used different platforms of internet which may cause great addiction on these platforms [5]. Again, using extreme level of social media can make a person depressed, anxiety. Eventually this addiction makes them to take suicide attempt and take step to do serious crime.

1.2 Motivation

During pandemic the world become integrated with social media because there only one hope which is depending on social media. Not only in pandemic time social media addiction now a days is a common scenario. My research perspective is not focusing on pandemic period but on use of extreme level of social media use of Bangladeshi students [5]. Mostly I have focused the stressfulness, anxiety, and depression among Bangladeshi student while they became addicted to social media. This leads them to serious problem. And they become obsessed of those social media platforms with instance level. Using extreme level of social media can be fatal for the human psychology and brain [6].

1.3 Justification of the Research

The machine learning project that I have built can be very promising. I hope it can prevent the social media addiction or it can help at least screen time of those students. Machine learning techniques is the perfect tools to make my research suitable or valuable. Machine Learning models helped a lot to identify to addiction level among students.

1.4 Questions of the Research

- Procedure of data collection of my research.
- What types of data will be suitable for my research work?
- How much data I need to collect for my work?
- Which types machine learning technique will be suitable for my research work?
- Will our dataset be suitable for machine learning techniques?
- How we will aware people social media addiction?

1.5 Anticipated Results

If a person who is addicted to social media can be harmful of social life. He can create serious problem or can attempt serious crime in a society. I have used many machine learning algorithms for my project work, in some research work I have seen that the accuracy of the rate is quite low because they have used very small features to predict the addiction. But I have used at least 27 features for my machine learning project and the outcomes of the result or accuracy 100%. So, I hope that my research work can help to identify addiction level very precisely. Besides the searching the dataset or building of the data set is slightly difficult to make the accurate features for the machine learning techniques.

1.6 Management and Finance for the Project

My honorable supervisor helped me to understand all the process. And that's makes me successful on my work. I am really grateful to my supervisor. Basically, cost of my research was not that enough because I have used a secondary and I am collected it from a particular site. So, there was not any certain cost of my research work. All the research work was done by me.

1.7 Scheme of the Report

In all chapters I have covered up all the main topics that is really necessary of this research. Such as in chapter 1 I have covert up introduction, Anticipatory result, justification of the research etc. This is how I have cover all the terms in all chapters.

Chapter 2

Literature Reviews and Background Studies

2.1 Summary

I have listed a numbers of research work that will identify the accuracies, and those methodology that I have investigated. These are the related works which will contribute to my research work. In research summary a table will be given below that will be the scenario of the related work and my work. That will show that main compare of these thesis purpose.

2.2 Literature Reviews

I will represent recent related works will show recent related works which is done by many researchers to predict the social media addiction. I have followed and analyzed their work and worked on my own paper. Although they have better accuracies on their work but I have found out the best accuracy for my own work. But the strategies that they have followed for their work. I also follow the same strategy for my paper.

Leong et al [7] (2019) investigated the determinants addiction to social media a theoretical framework combining the Bing Five Model (BFM). Which is included neuroticism, extraversion, openness and experience, agreeableness and consciousness, is used to examine how personality traits influence social media addiction. Using ANN, the model accuracy of this papers is about 86.6 percent. The author of this paper used hybrid Structure Equation Model and Artificial Neural Network to find the better accuracies. The dataset size of this paper is about 665. The researcher has focused on the 665 Facebook user to find out addiction result. Mim et al. [8] (2024) In this paper works on anxiety, depression, frustration and other mental health issues. Investigation of behavioral patterns and identifying various mental problem basically this is the main purpose of this paper. There are many machines learning algorithm are used in this paper. That's mean many machine learning classifiers are used in this model. Accuracy is about 82% in that model The data collection process is questionnaire. And the dataset size is about 1417. Illahi, M at el. [9] (2022) The ensemble machine learning approach priors search on stress detection using NLP and another

machine learning algorithm to increase its accuracy. Deep learning advanced technique are also used for the accuracy of the paper. Such as LSTM and CNNetc. The accuracy of this paper is about 85%. Problem's domain of the work is stress detection of social media use. The data set collection for the research is questionnaire. The survey data is 1,90000. Rahmatullah And Ahmed Zia at el. [10](2021) In this paper I have seen that about about 330 people are participated in that works. But al those people who are addicted most of them are female. Probability sampling method are used in that survey. Mustafa et al. [11] This paper is also important for its research quality. Several machine learning algorithms are used and several statistical methods in this survey work.

This works was based on social media addiction such as Instagram etc. People who are using this model are extremely happy. In this survey I have seen that mostly 90% people are using this site. And the age gap of the people who are using this model is nearly 14-16 (2021. Hayder et al. [12] (2021) A statistical algorithm are used in this model such as ANOVA test and even regression method is also used in that model. In that research work about 207 people are also participated on that survey. There were 60 male and 197 female ware participated on that survey. Sabbir alam et al. [13] This research study was conducted in bangladesh during covid 19 period. In that time how many people are using social media that was the main term on this research work. Deep learning algorithms are used in that research work. And the accuracy was about 96.7%. The classes were (anxiety, depression and, angriness) (2020). Wahyo and Inda Mulyani et al [14] the research that these guys did is about social media addiction basically the Instagram addiction. About 250 people took part at this survey and that accuracy rate is about 60.6% (2020). Jahura Khatun et al. [15] this paper was included to betel nut addiction among nearly 810 records for the training set. Many machine learning algorithms are used in that model. Logistic regression is one of them. RF that's refers to random forest have the most accuracy 96% (2020). Islam and Zahirul et al. [16] mainly eight or nine machine learning algorithms are used in this model. This research work was mainly facebook social media addiction and the. And among all these algorithms SVM surpassed all the accuracy level with 89%.

2.3 Literature reviews and comparative analysis

In this portion I have discussed about the comparative analysis among those literature reviews. In many research works there were many addiction and the accuracy level are detected and many machine learning and statistical approach are used in that works. Basic comparison are given bellow Table 2.1

Table 2.1 Summary of Literature Review

SL	Author	Objectives	Issue of the Domain	Dataset	Methods	Accuracy
1	Leong et al.(2019)	Social Media addiction	Analyze	665	Hybrid Structure equation model, ANN	86.6%
2	Mim et al. (2024)	Media addiction	Detection	1417	K-NN, SVM, RF	82%
3	Illahi, M at el. (2022)	Stress Detection on using social media	Detection	190000	NLP, several deep learning algorithms	85%
4	Authors (2021)	Afghanistan student's social media addiction	Analyze	330	Statistical Analysis such probability sampling	N/A
5	Author (2021)	Media addiction of Turkish people	Analyze	5000	Logistic regression	N/A
6	Anonymous (2021)	Social media addiction among nurses	Analyze	207	Regression, Pearson model	N/A

7	Sabbir et al. (202)	Analysis of Bangladeshi people's emotion	Prediction	1121	CNN	96.7%
8	Authors (2020)	Instagram addiction among young people	Prediction	443(total) Type D	Logistic Regression classifier technique	66.6%
9	Authors (2020)	Addiction for chewing belet nut	Prediction	1100	Random forest	96%
10	Authors (2020)	Social media addictin	prediction	1016	SVM	89%

Many machine learning algorithms are used for finding the better accuracies in a machine learning model. There are many classic machine learning algorithms that are basically used. In my machine learning model, I have used KNN, SVM, Cat Boost, GB, Extra tree classifier etc.

2.4 The Extend of the Issue

In my machine learning work I was trying to build a machine learning that is analysis data of and applying machine learning that can predict social media addiction. Young people are basically use extreme level of social media.. People who are addicted can cause serious issue for social life. Why I am mentioning it because addicted to social media can be very dangerous for human nature. Addicted people can do any crime which will not be good for the society. But in my research work I have used machine learning algorithm that can predict and analysis risk of addiction of media.

2.4 Challenges

Those people who are interested in using this machine learning model to identify their addiction on social media he can easily test by himself about their addiction level by this machine learning model. Many parents who are basically worried about their children's addiction to social media addiction they can use this model by their purposes. During doing this research work I was very enthusiastic to work with mental patient but the hospital authority did not accept my proposal. We read a lot of newspaper so that I can get better understanding about social media addiction. Although I have used secondary dataset. But the questionnaire part of my research work was little bit difficult for collecting the data. For experiencing the addicted people habit I went to a mental hospital and talk to those patients who were extremely addicted to social media once's. At first, I didn't understand several machine learning algorithms but my honorable supervisor and co-supervisor sir helped me lot to understand those algorithms and eventually I stand my analytical machine learning model for better accuracies.

Chapter 3

Research Methodology

3.1 Preliminaries

If someone addicted to social media, then his addiction level will be classified on this model. Many machines learning model is used to stand this model, apart from this model will work on the daily use social media. To identify the social media addiction, we use users' various information to identify their addiction level. In order to identify their addiction level, I utilized many machine learning algorithm such as DT, RF, MLP (Multi-Layer Perceptron), Cat Boost, SVM, XG Boost etc. All those classifications I have used is for classification purposes. I have used at least twenty-seven features to identify the proper result for my machine learning model. I have proposed my dataset before doing my machine learning project. I have used all the machine learning algorithm to find out the perfect accuracy. I have used all the feature to find out the perfect accuracy. I have used at least ten algorithms to find out the perfect accuracy.

3.2 Procedure of Data Collection

Al though I have used a secondary dataset of my project but finding the proper dataset was verry difficult. To finding the appropriate research paper is the most important work to build the efficient research work. If I consider the research question of this project is given bellow. Data collection procedure.

1. What is your gender gender?
2. What is your body mass index?
3. Your educational qualification?
4. What is your medium of education?

5. Your economical impression?
6. Where do you live in or your residence?
7. People who with you live?
8. Your location or division
9. Smoking status
10. Your internet connectivity status?
11. Which kind of device you use for surfing social media?
12. Which plat form you spend most of your time?
13. How often you spend time on online when you'd like to sleep?
14. How often do you feel tense, irritated or stressed if you can not use internet for as long as you want?
15. How often does it happen to you that you wish to decrease the amount of time to spent online but you do not succeed?
16. How often do you try to conceal the amount of time spend online?
17. How often do people in your life complain about spending too much time on online?
18. How often does it happen to you that you feel depressed, moody, or nervous when you are not on the Internet and these feelings stop once you are back online?
19. Your obsession?
20. Your neglect from the people?
21. How do you control from social media?
22. Little interest or pleasure in doing things?
23. Feeling Down depression or hopeless?
24. Trouble feeling, or staying asleep or sleeping too much?
25. Poor appetite or having little energy?
26. Feeling bad about yourself that you are failure or have let yourself or your family down?
27. Trouble concentrating on things, such as reading the news paper or watching the television?
28. Thoughts that you would be better dead or of hurting hurting yourself in some ways?

For detection of social media addiction these are some cases which can be used[18][19][20][21]

3.3 Research Instrumentation

Prediction model can help people to understand the upcoming situation. Even I am using their personal information to build my research model. I have used various machine learning algorithm to identify the sophisticated output. I have used at least ten algorithms to identify the proper output or finding out the perfect accuracy for that model. Those algorithm I have used are RF, Decision Tree, K-NN, SVM, MLP, Logistic Regression, XGB, Gradient Boosting, Naive Bayes, Ada Boost , Extra Tress, Cat Boost, TunedGB, Tuned_CatBoost etc. The programming language that I have is python. Apart from this I have sued Google Collab to build my machine learning project.

3.3.1 Proposed Methodology

My dataset for the machine learning model is about 492 peoples information. And I have more than 30 features. I have used at least 10 methods for the better accuracy rate. Those machine learning algorithms are Logistic Regressions, SVM , K-NN, Randon Forest, Decision Tree, XGB, GB, Naïve Boost , Ada Boost, Extremely randomize tress classsifire (Extra Tress Classifier), Cat boost , MLP, Tuned_CatBoost, Tuned_GB, Which I have used to build my machine learning project to find out the better accuracy for that dataset. Eventually I can say that I have selected the perfect machine learning algorithm to evaluate the performance of each method and classifier.

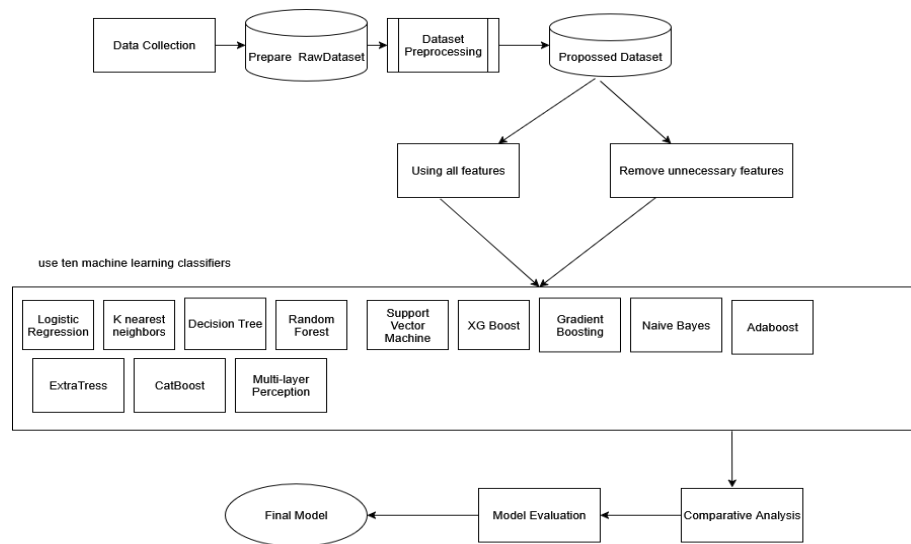


Figure 3.3.1: Proposed methodology

3.3.2 Data Preprocessing

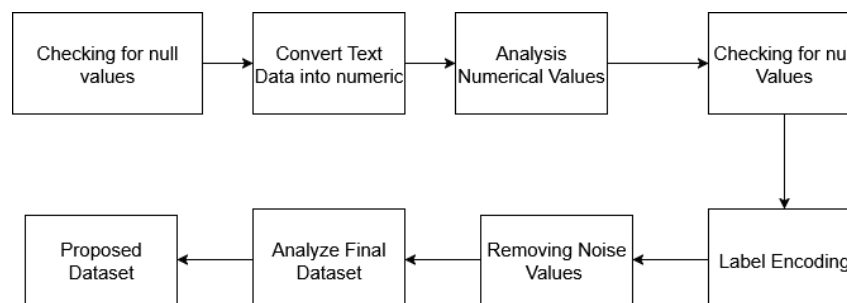


Figure: 3.3.2 Data Preprocessing

The first and most crucial step in creating a machine learning model is data preparation, which includes preparing raw data for machine learning algorithms. Machine learning techniques can never be used to an inappropriate dataset. Therefore, the most crucial and critical activity for a machine learning project is data pretreatment [17]. Label encoding is used for transforming textual into numerical. I can identify issues with missing values in my dataset. After that, I examined the co-relation-heatmap. It is the process of integrating data on your own dataset. I eliminated the noisy data. After that, I examined the co-relation-heatmap. It is the process of integrating data on your own dataset. I have eliminated noisy data that causes machine learning algorithms to provide erroneous results. To determine whether the dataset had any noisy values, I employed a box plot. I have utilized multiple histograms for each feature in my suggested dataset. I developed every machine learning model using “Google Collab”.

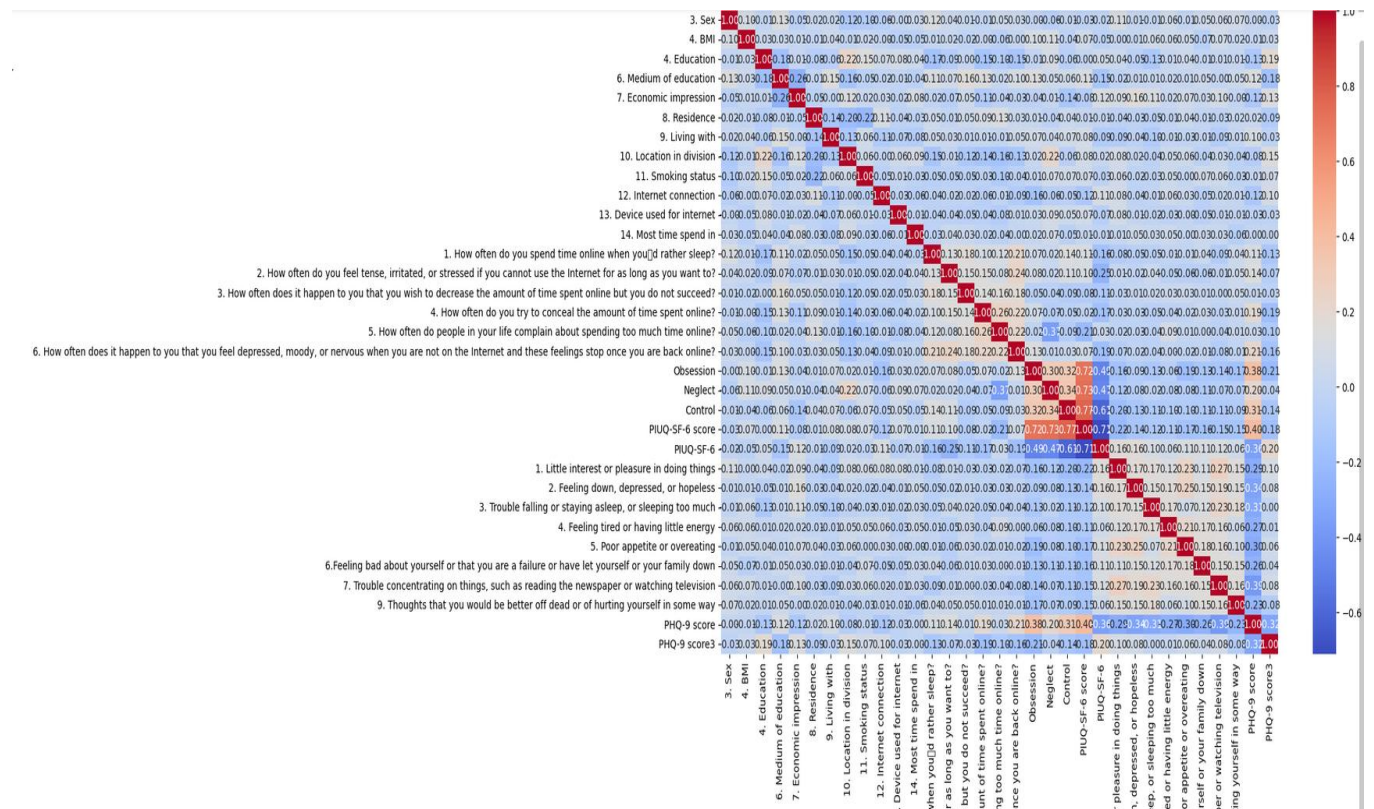


Figure 3.3.3: Correlation Heatmap

3.4 Arithmetical Exploration

I have created more than thirty features for my proposed dataset. The survey are shown below table 3.4

Table 3.4: All the features in accordance of the survey questions

SL	QUESTIONS	FEATURES NAME
1	What is your age?	age
2	What is your gender?	sex
3	What is your body mass index?	BMI
4	Your educational qualification?	Education
5	Your economical impression?	Economical impression
6	What is your medium of education?	Medium of education
7	Where do you live in or your residence?	Residence
8	People who with you live?	People who with you live
9	Your smoking status?	Smoking status
10	Your location or division	Location or division
11	Your internet connectivity status?	Internet connectivity Status
12	Which kind of device you use for surfing social media?	Device

13	Which platform you spend most of your time?	Platforms
14	Spending time on internet except sleeping	Spending time on online when sleeping
15	How often do you feel tense, irritated or stressed if you cannot use internet for as long as you want?	Feeling tense, irritated or stressed while you can not use internet
16	How often does it happen to you that you wish to decrease the amount of time to spent online but you do not succeed?	How often does it happen to you that you wish to decrease the amount of time to spent online but you do not succeed?
17	Your obsession?	Obsession
18	Your neglect from the people?	Neglect
19	How do you control from social media?	Control
20	Feeling uneager while doing some thing?	Feeling uneager while doing some thing?
21	Do you feel depressed?	Do you feel depressed?
22	Feeling unhappy?	Feeling trouble?
23	Poor appetite or weak feeling?	Poor appetite or weak feeling?
24	Feeling bad about your self ?	Feeling bad about your self?
25	Feeling tired and having little energy	Feeling tired and having little energy

26	Unease for concentration	Unease for concentration
27	Thoughts for committing suicide?	Thoughts for committing suicide?
28	PIUQ-SF score	PIUQ-SF score
29	How often do you try to conceal the amount of time Spend online?	How often do you try to conceal the amount of time Spend online?
30	How often do people in life compalin about spending to much time online	How often do people in life compalin about spending to much time online
31	Moody or getting nervous	Moody or getting nervous
32	PIUQ-SF-6 score	PIUQ-SF-6 score
33	PHQ9-score	PHQ9-score
334	PHQ-9 score3	PHQ-9 score3

3.4.1 Conversion of Text Attributes into Numerical

Table 3.4.1 Descripting of numerical value which were converted

SL	Feature Name	Value Name	Description	Figure Number
1	Age	1	Age range: 14-16	
		2	Age range: 13- Oct	
2	BMI	1	Normal	1
		2	Obese	
		3	CED	
3	Sex	1	Girl	2
		2	By	
4	Education	1	Nine	3
		2	Ten	
		3	Eight	
		4	Seven	
		5	Six	
5	Education Medium	1	Bangla	4
		2	English	
6	Economic Impression	1	High	5
		2	Medium	
		3	Low	

7	Residence	1	Urban	6
		2	Rural	
8	Living With	1	With family	7
		2	Without Family	
9	Location or Division	1	Dhaka	8
		2	Rajshahi	
		3	Chittagong	
		4	Rangpur	
		5	Barishal	
		6	Khulna	
		7	Shylet	
		8	Mymensingh	
10	Smiking Status	1	Non-Smoker	9
		2	Smoker	
11	Internet Connectivity Status	1	Mobile Data	10
		2	WIFI	
12	Mobile used for the Internet	1	Mobile	11
		2	Laptop	
		3	Desktop	
		4	TV	

13	Most time spend in	1	Social media	12
		2	Games	
		3	Education	
		4	Others	
		5	Movie	
13	Spending time on online while taking rest	1	Rarely	13
		2	Sometimes	
		3	Often	
		4	Never	
		5	Always	
14	Feeling depressed	1	Sometimes	14
		2	Rarely	
		3	Often	
		4	Rarely	
		5	Always	
15	How often does it happen to you that you wish to decrease the amount of time to spent online but you do not succeed?	1	Sometimes	14
		2	Always	
		3	Rarely	
		4	Never	
		5	Always	

17	Feeling tense, irritated or stressed while you cannot use internet	1	Sometimes	16
		2	Rarely	
		3	Often	
		4	Never	
		5	Always	
18	Conceal time on spending on online	1	Sometimes	17
		2	Rarely	
		3	Often	
		4	Never	
		5	Always	
19	Peoples objection	1	Sometimes	18
		2	Often	
		3	Rarely	
		4	Always	
		5	Never	
20	Feeling depressed mody, or nervous when you are someone not in the internet	1	Sometimes	19
		2	Rarely	
		3	Often	
		4	Never	
		5	Always	
21	Obsession	Fequency 2-10	Value range 2-10	20

22	Neglect	Data Frequency 2 -10	Value range: 2- 10	21
23	Control	Frequency 2 -10	Value Range : 2-10	22
24	PIUQ-SF-6 score	6-25	Frequency: 6-25	23
25	PIUQ- SF-6	1	At risk Group	24
		2	No Risk Gp	
26	Feeling uneaser for everyting	1	Several Day	25
		2	More than half the day	
		3	Nearly every day	
		4	Not at all	
27	felling depressed	1	Several Day	26
		2	Nearly every day	
		3	More than half the day	
		4	Not at all	

28	Trouble feeling or staying asleep or sleeping too much	1	Several Day	27
		2	More than half the day	
		3	Nearly every day	
		4	Not at all	
29	Feeling tired or having little energy	1	Several Day	28
		2	More than half the day	
		3	Not at all	
		4	Nearly every day	
30	Poor appetite or over eating	1	Several days	29
		2	More than Half the day	
		3	Nearly every day	
		4	Not at all	
31	Feeling bad about your self	1	Several Day	30
		2	More than half the day	
		3	Nearly Every Day	
		4	Not at all	

32	Trouble concentrating Things Such as Reading the news paper or watching television	1	Several day	31
		2	More than half the day	
		3	Nearly every day	
		4	Not at all	
33	Thoughts that you would be better dead or of hurting hutting yourself in some ways	1	Not at all	32
		2	Several day	
		3	More than half the day	
		4	Nearly every day	
34	PHQ-9 Score	Value range: 0 - 27	Value range: 0- 27	33
35	PHQ-9 Score3	1	Mild Depression	34
		2	Moderate Depression	
		3	No Depression	
		4	Severe Depression	

3.4.2 Arithmetical Exploration of age

The age range in between 14-16 and 13- Oct. This is an object type data which would be not that important of the machine learning model. Basically, my machine learning project is based on any age's Bangladeshi students. Some one can be a high school student or someone can be a university student. But most of them who are using social media are basically girl. In assumption about 60-65% students are girls.

3.4.3 Arithmetical Exploration of Sex

Among 492 students nearly 65 percent are girls and rest of them are boys

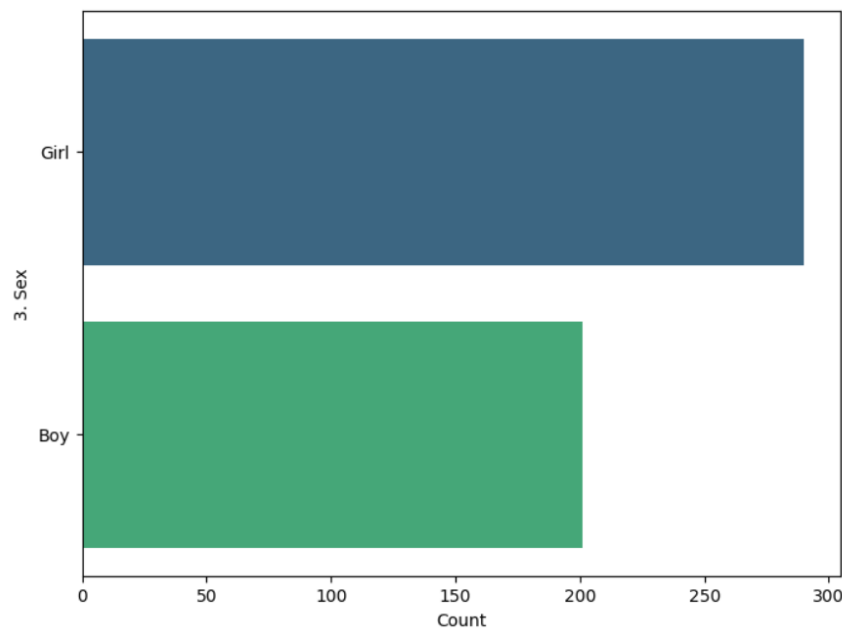


Figure 3.4.3: Bar graph of sex

3.4.4 Arithmetical Exploration of Other Features

Here are rest of the features like educational qualification and spending time online or others are given below. In figure 3.4.4 to 3.4.33 is shown statistical analysis of others features.

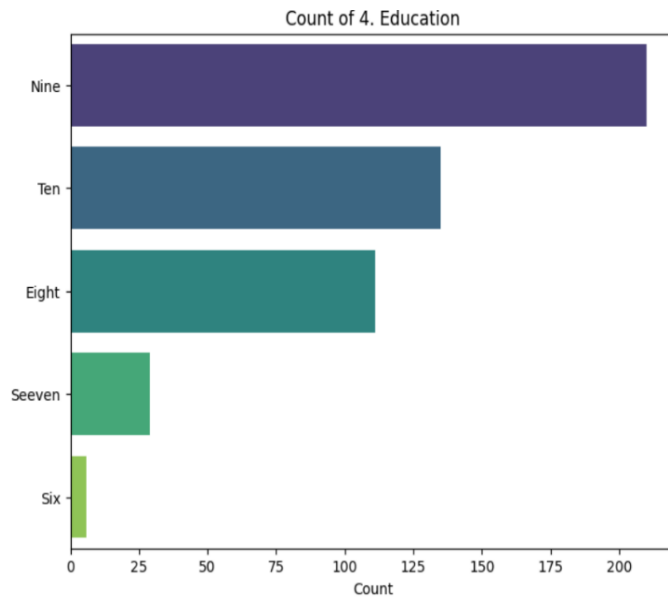


Figure 3.4.4: Bar graph of Education

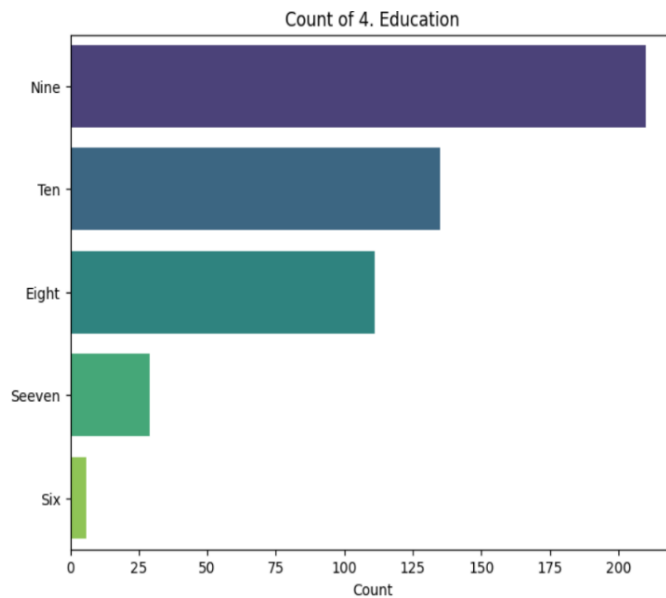


Figure 3.4.4: Bar graph of Education

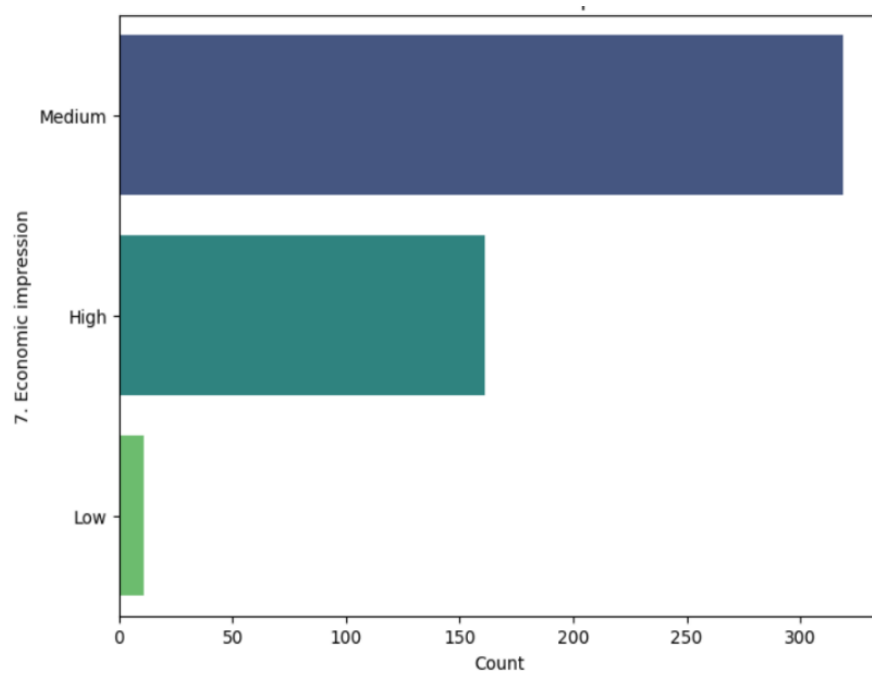


Figure:3.4.5: Bar graph of Economic impression

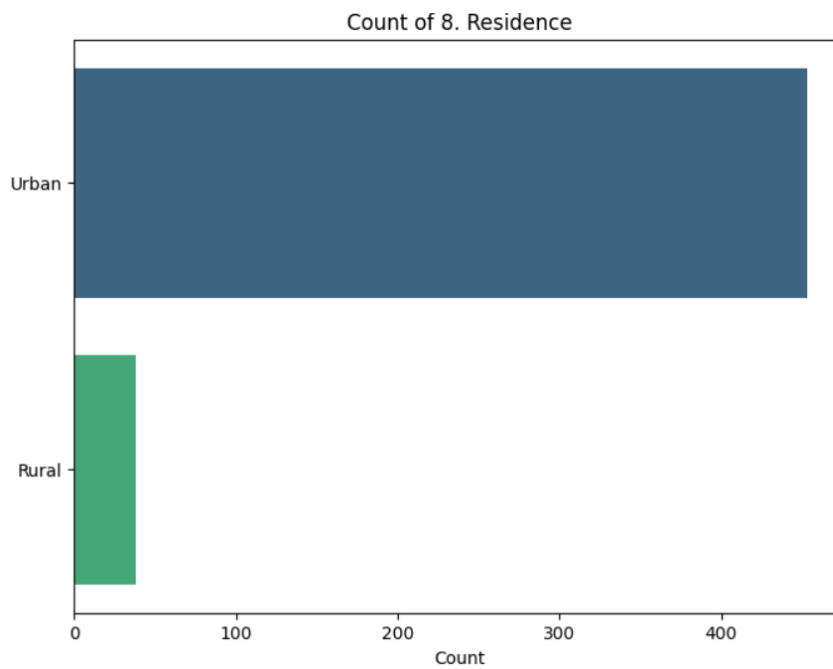


Figure: 3.4.6: Bar graph of residence

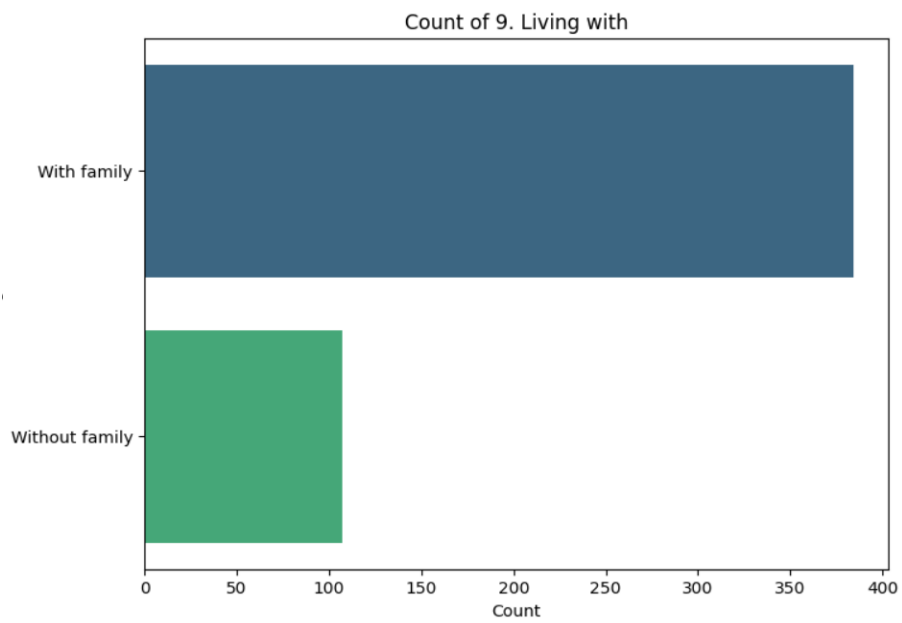


Figure: 3.4.7: Bar graph of Living with

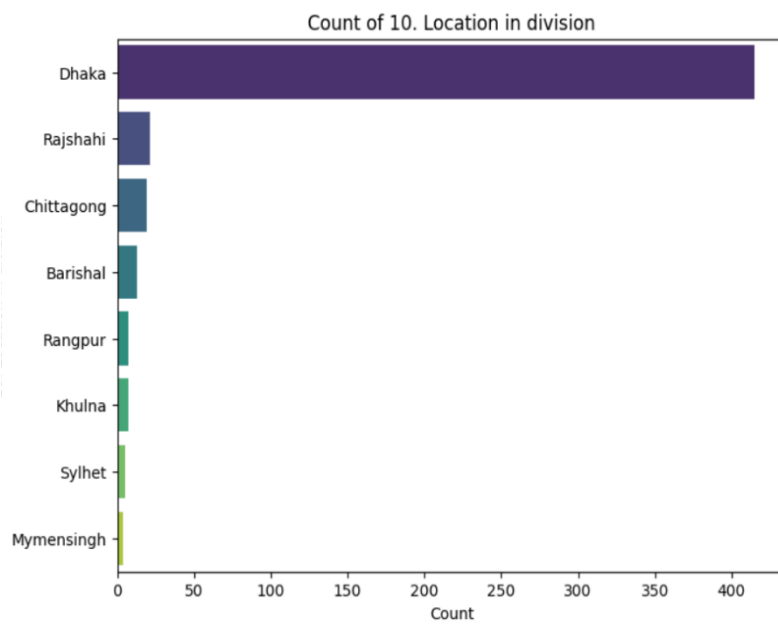


Figure 3.4.8: Bar graph of location or Division

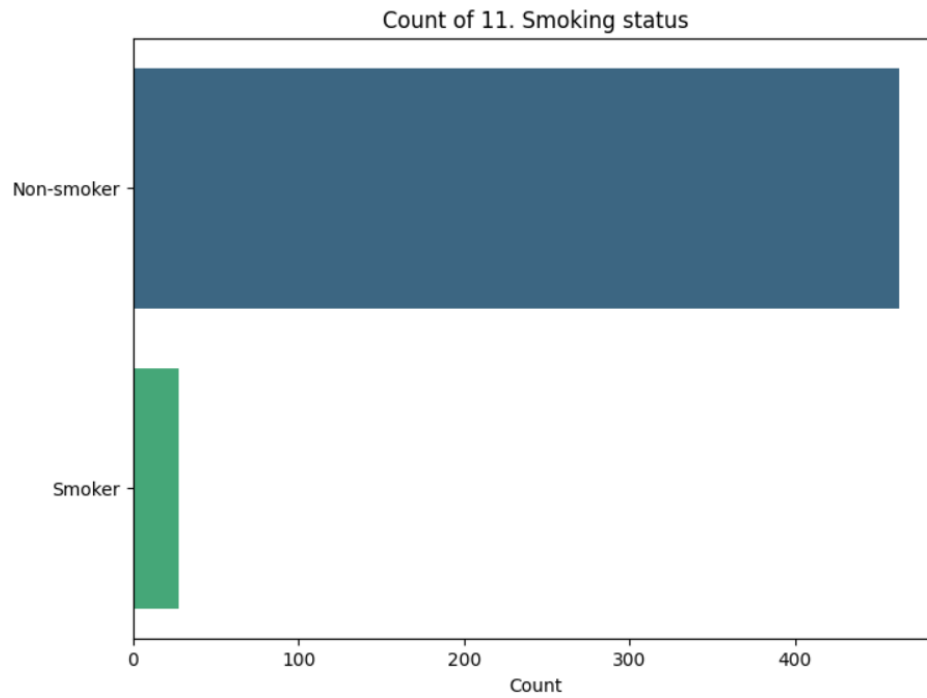


Figure 3.4.9: Bar graph of Smoking status

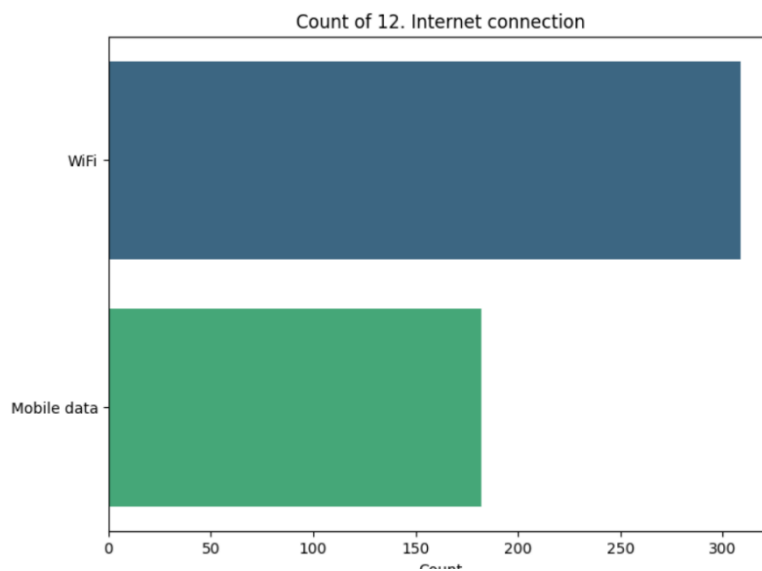


Figure 3.4.10: Bar graph of Device used for internet

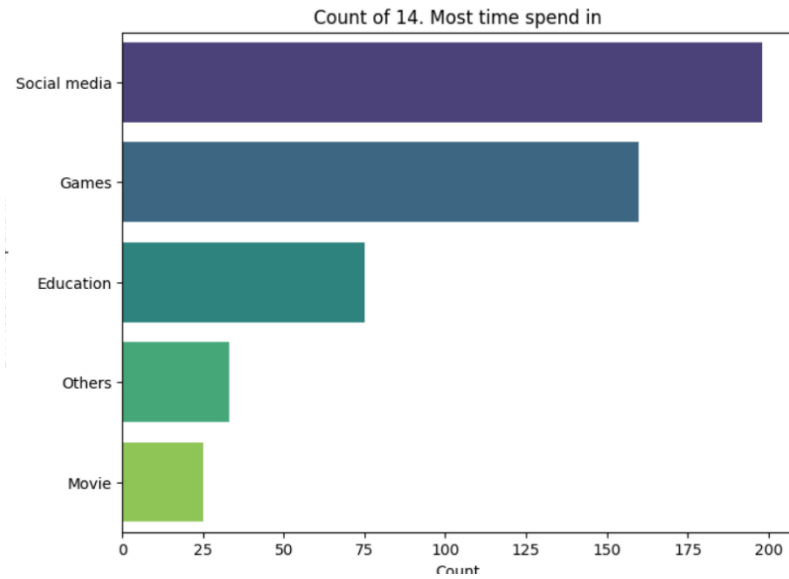


Figure 3.4.11: Bar graph of the platform

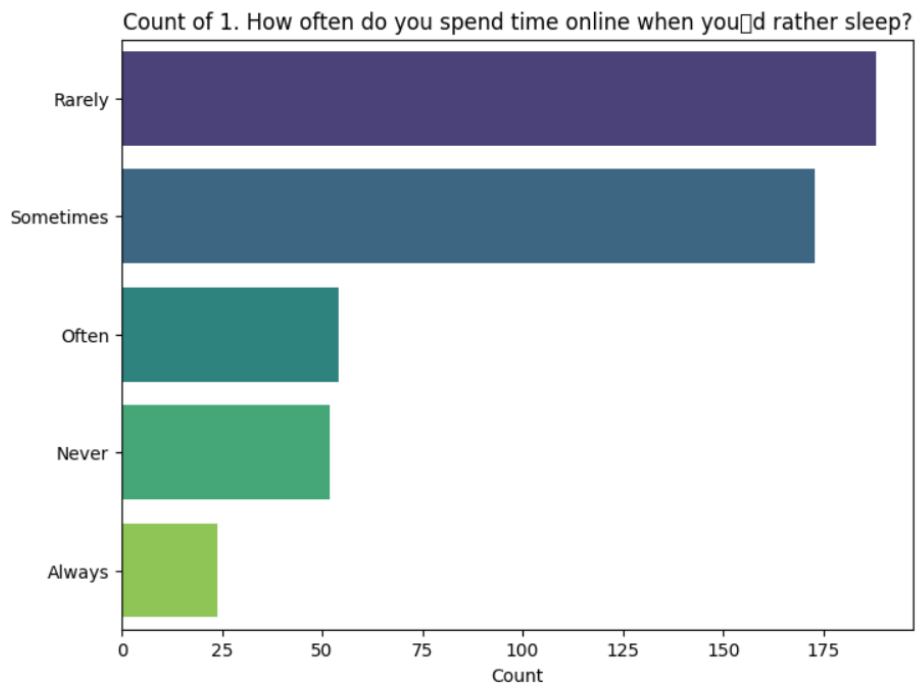


Figure 3.4.12: Bar graph of Spending time on online while you'd sleep

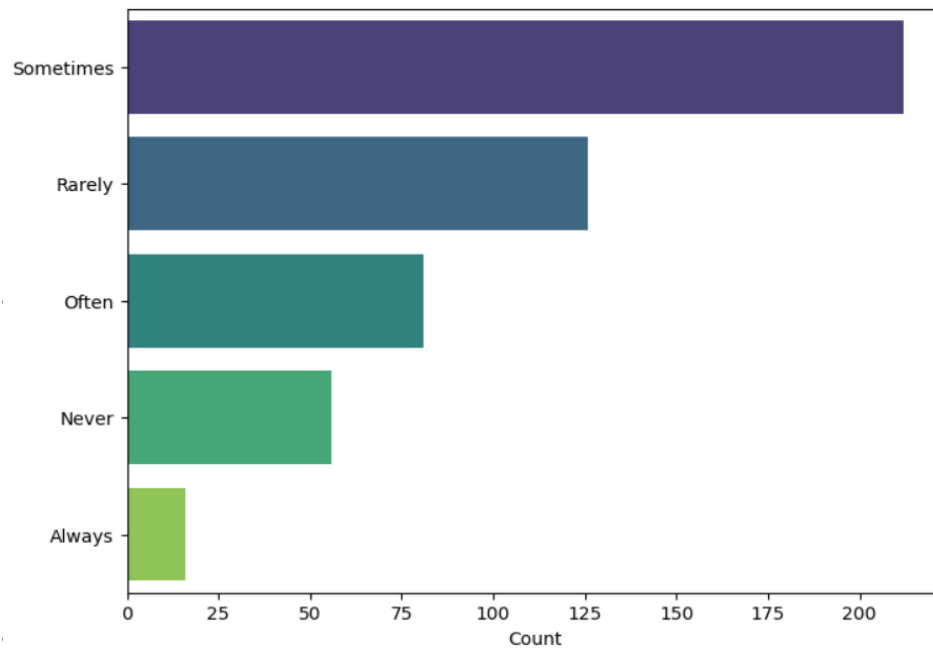


Figure: 3.4.13: Bar graph Tensed irritated or stressed while using internet

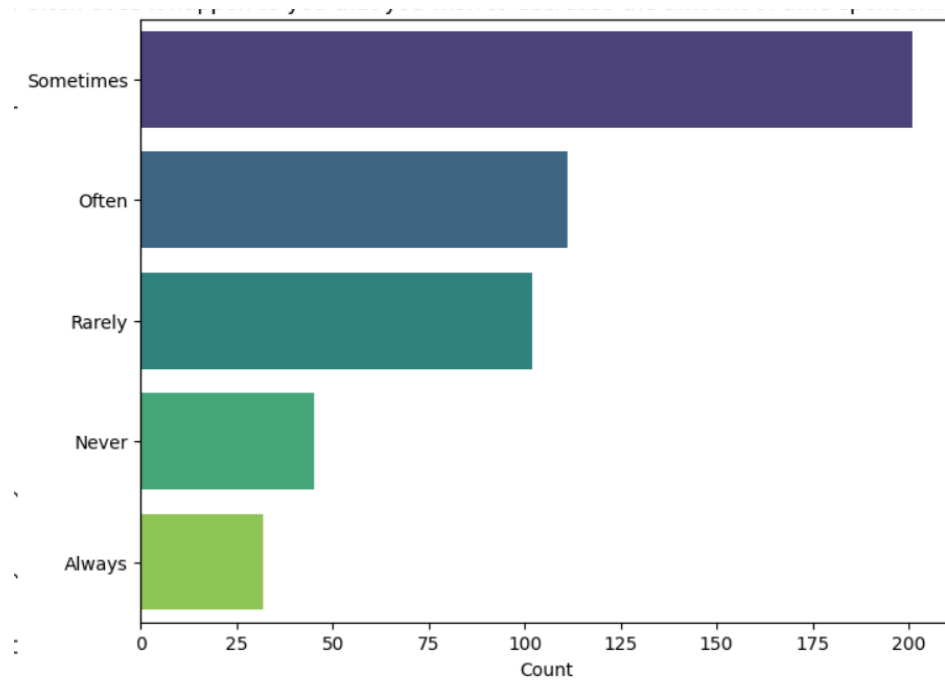


Figure 3.4.14: Bar graph the decrease the spending time on online

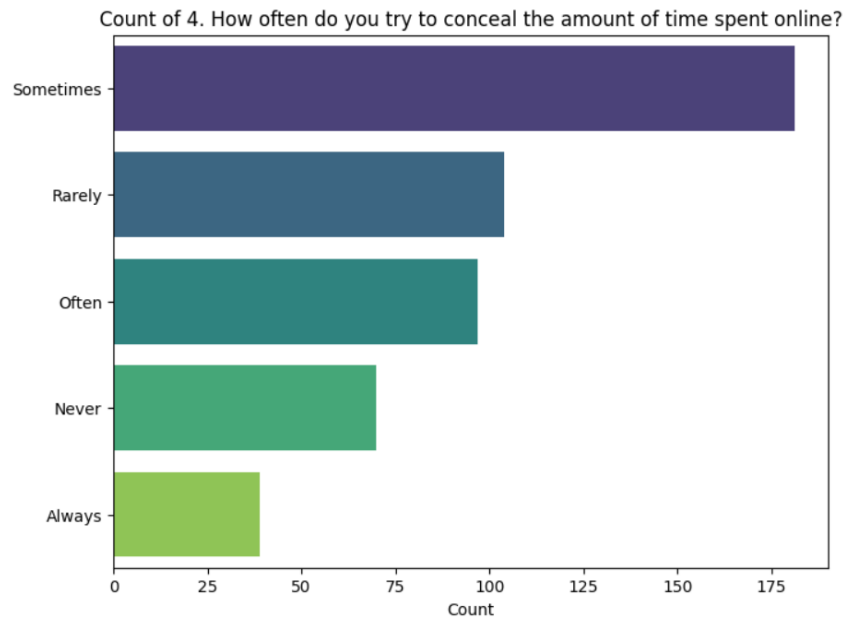


Figure 3.4.15: Bar graph of concealing the internet use

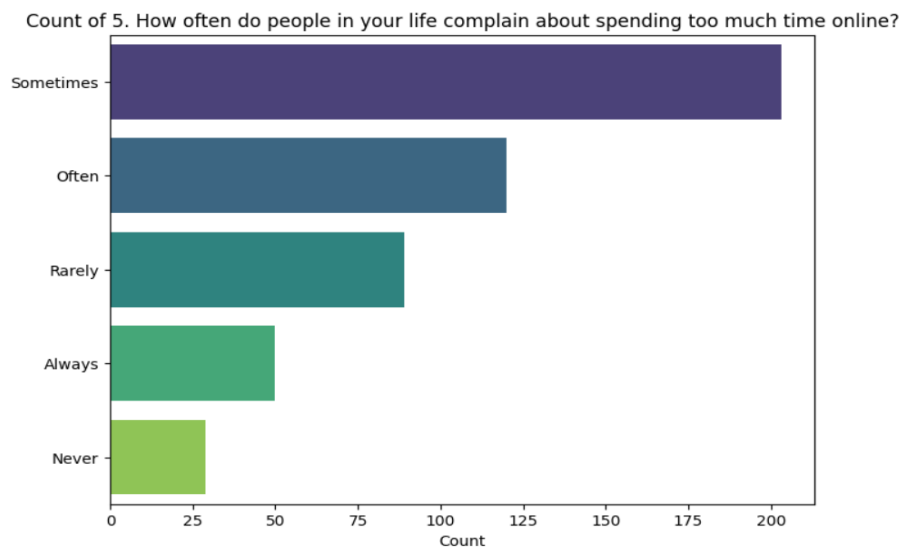


Figure 3.4.16: Histogram of complaining about spending time on online from others

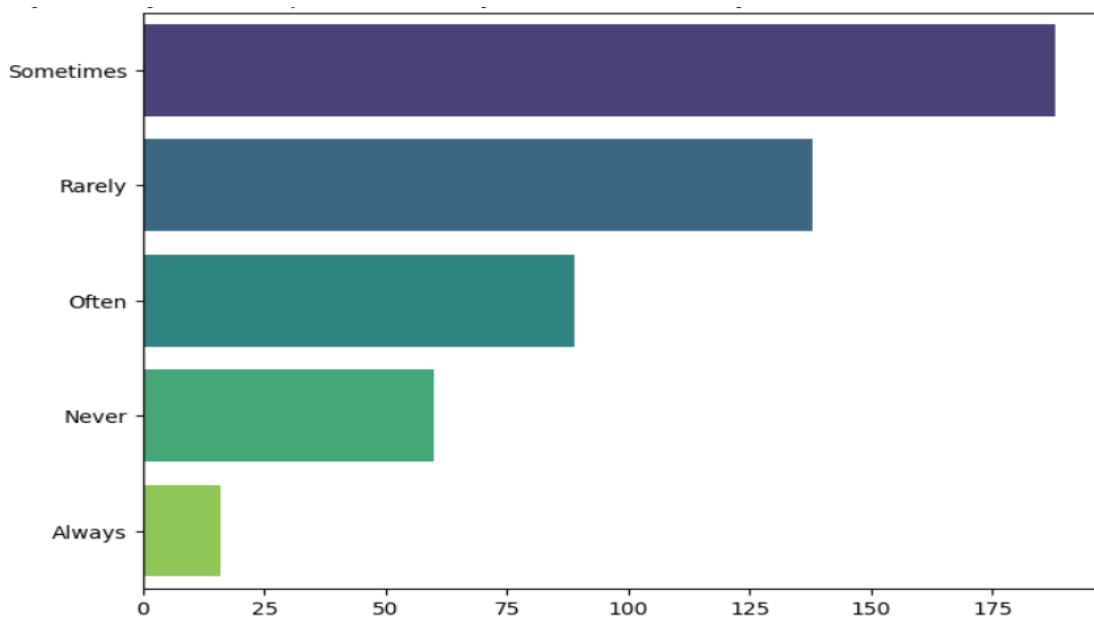


Figure 3.4.17: Bar graph of Depress moodey of nervous which some cannot use the internet

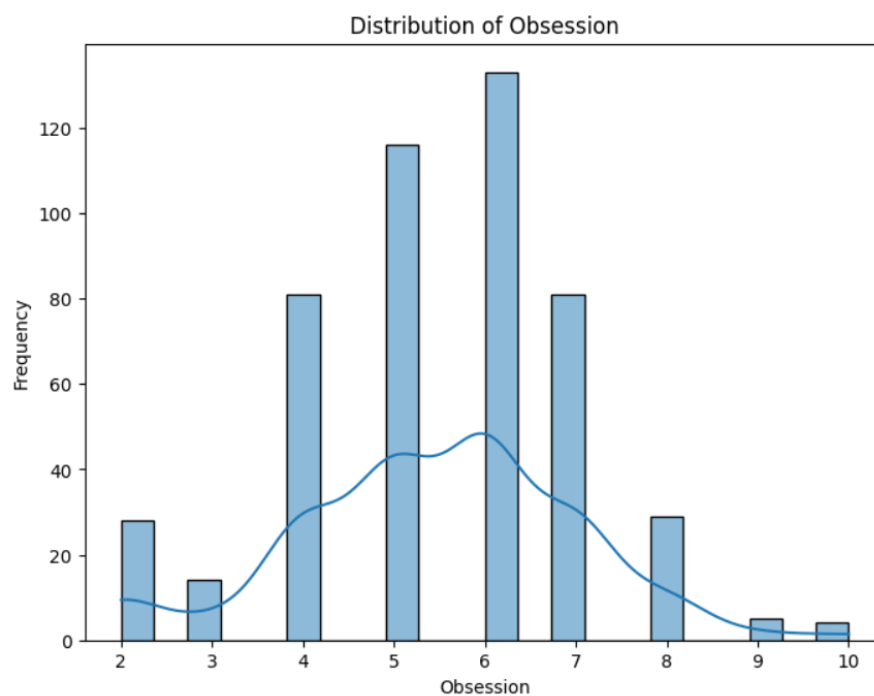


Figure 3.4.18: Bar graph of Obsessoion

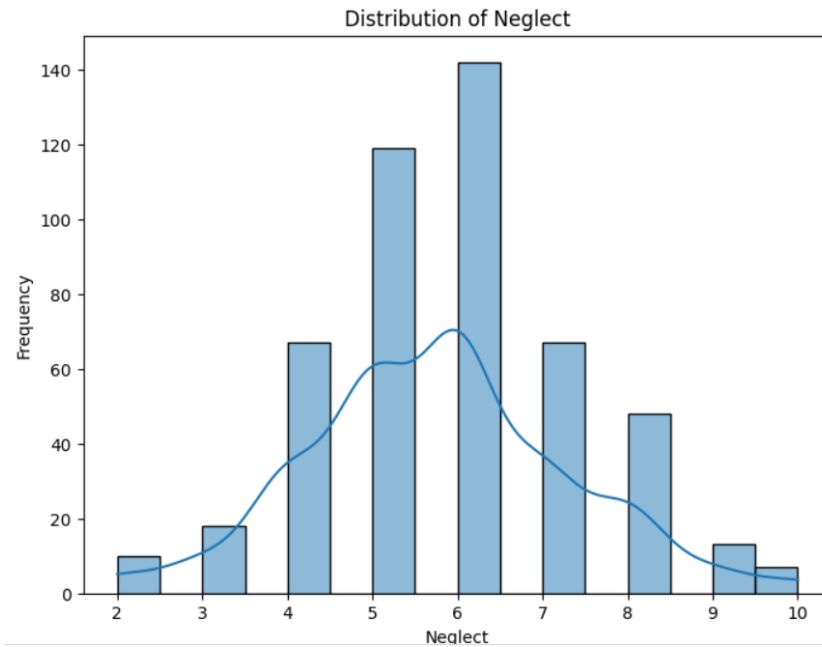


Figure 3.4.19: Bar graph of Neglect

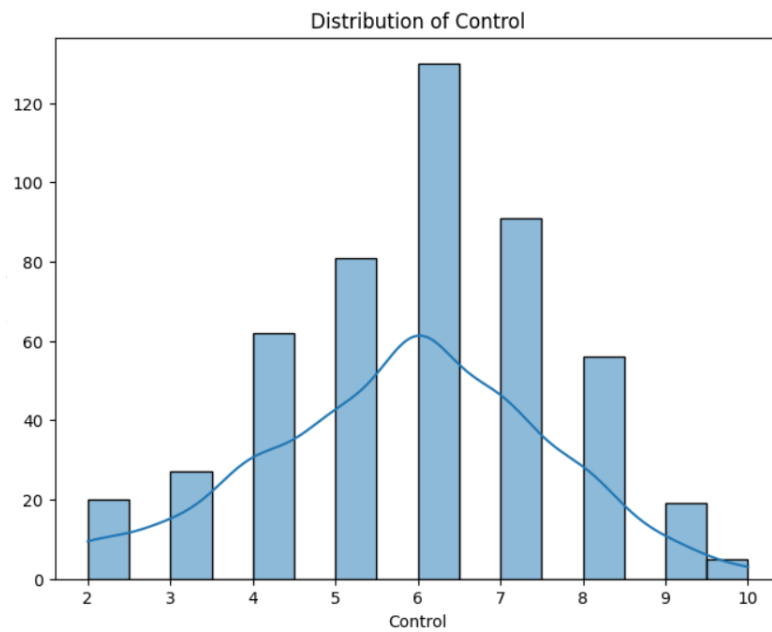


Figure3.4.20: Bar graph of Control

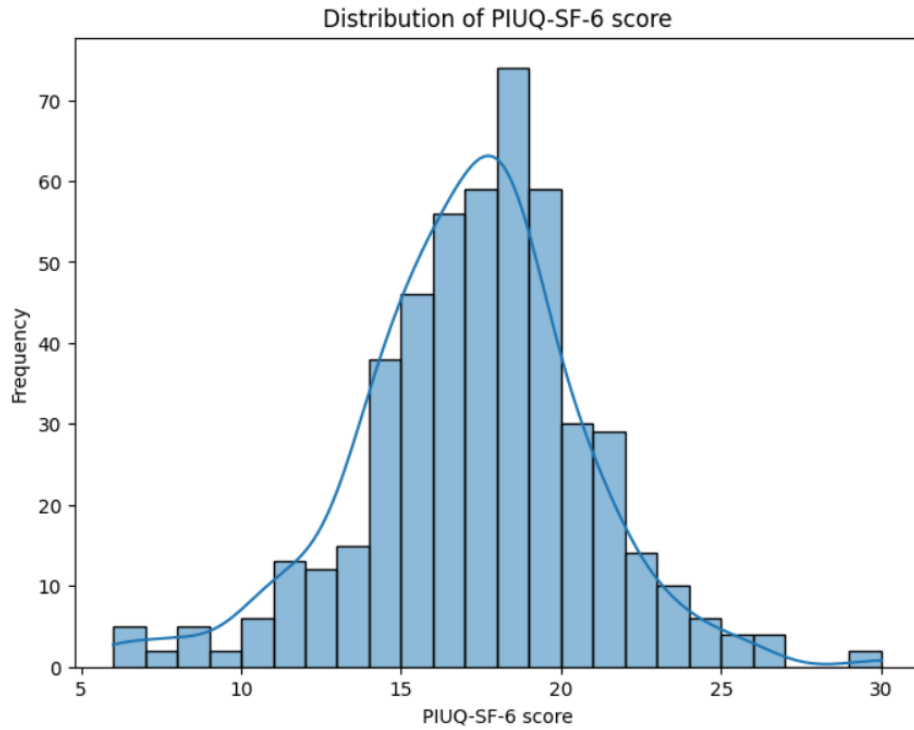


Figure 3.4.21: Bar graph of PIUG-SF-6 score

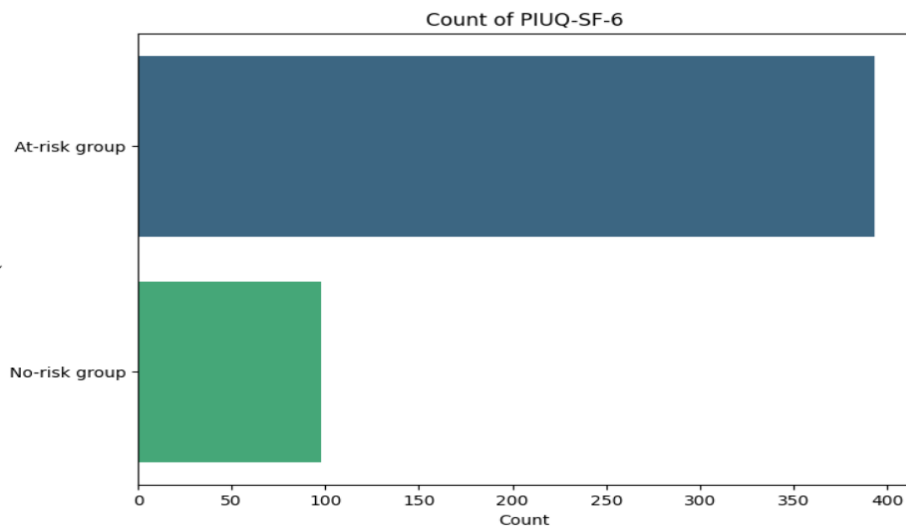


Figure 3.4.22: Bar graph of PIUQ-SF-6

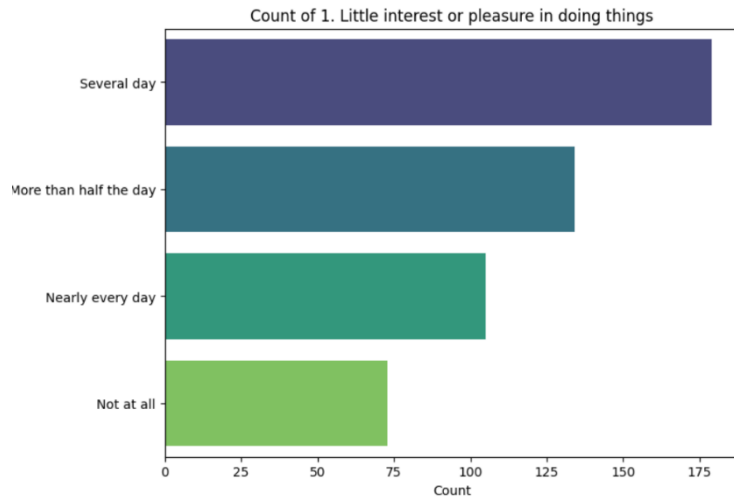


Figure 3.4.23: Bar graph of Little interest or pleasure in doing things

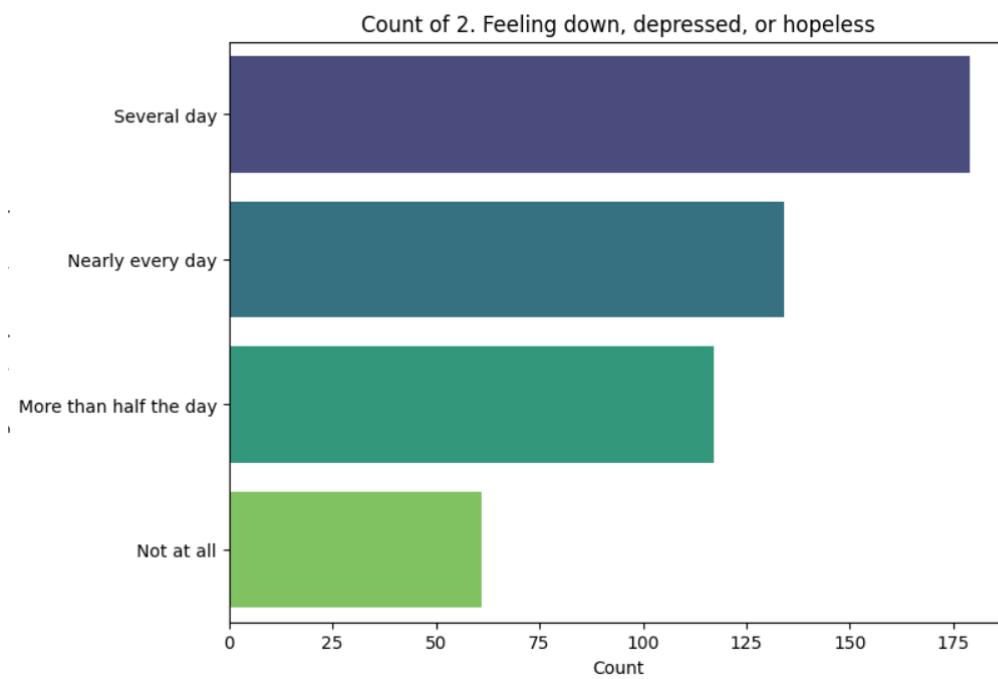


Figure: 3.4.24: Bar graph of feeling down, depress or hopeless

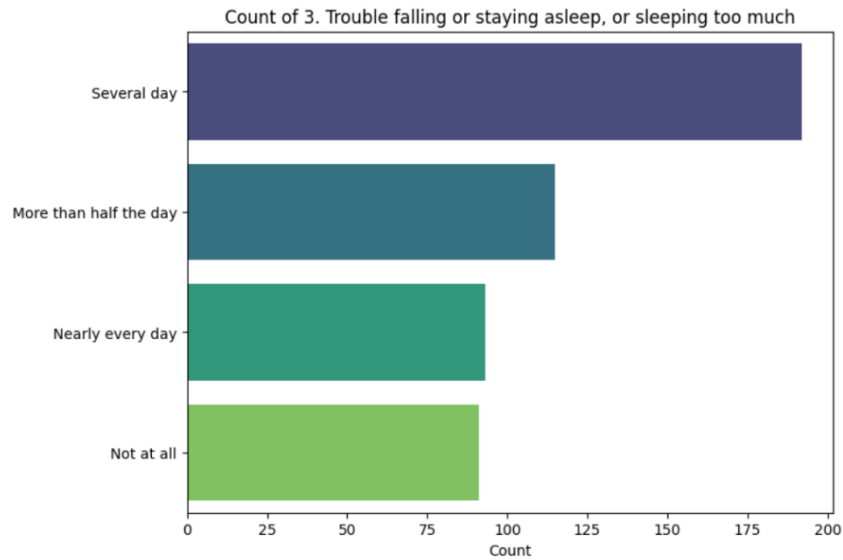


Figure 3.4.25: Bar graph of bore feeling

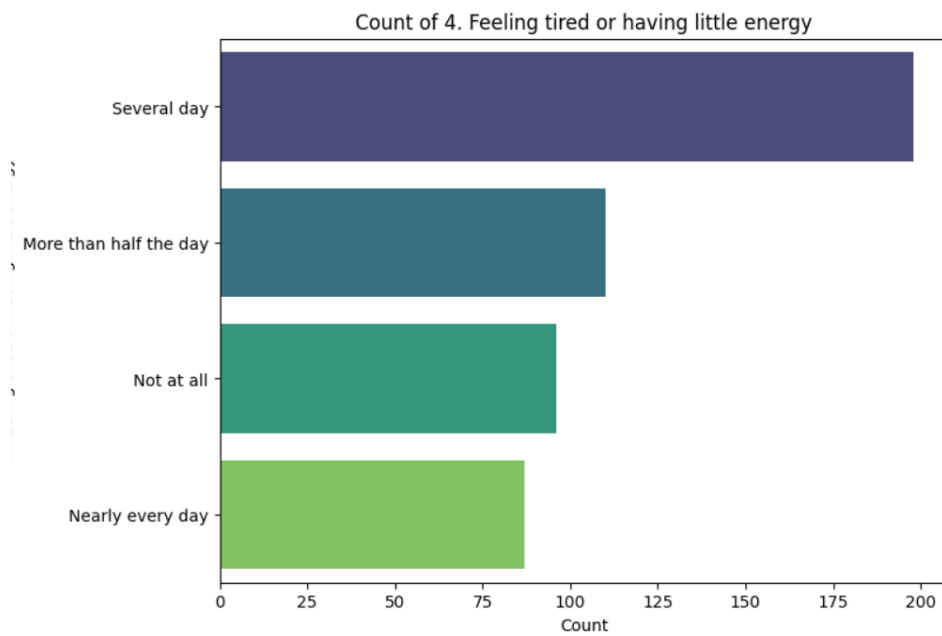


Figure 3.4.26: Bar graph of weak feeling

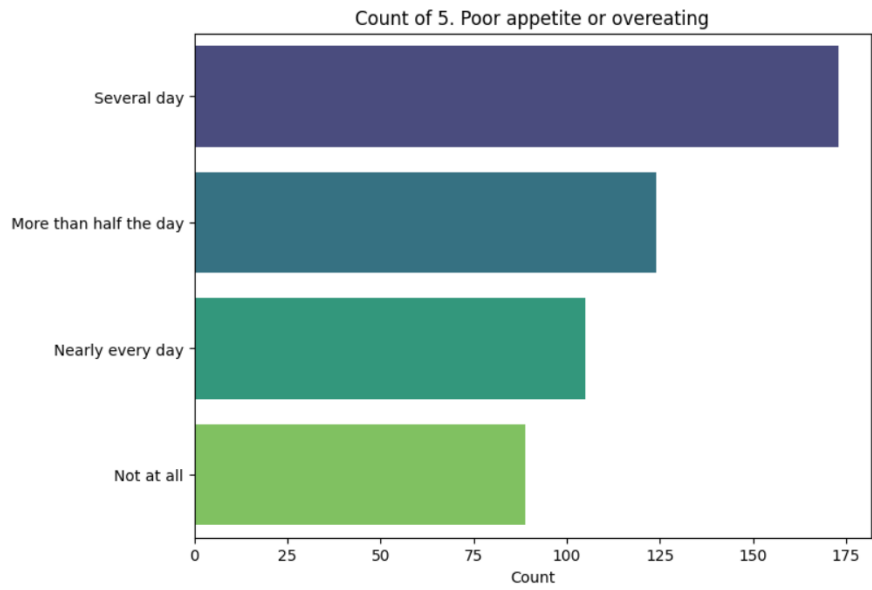


Figure 3.4.27: Bar graph of por appetite or overeating

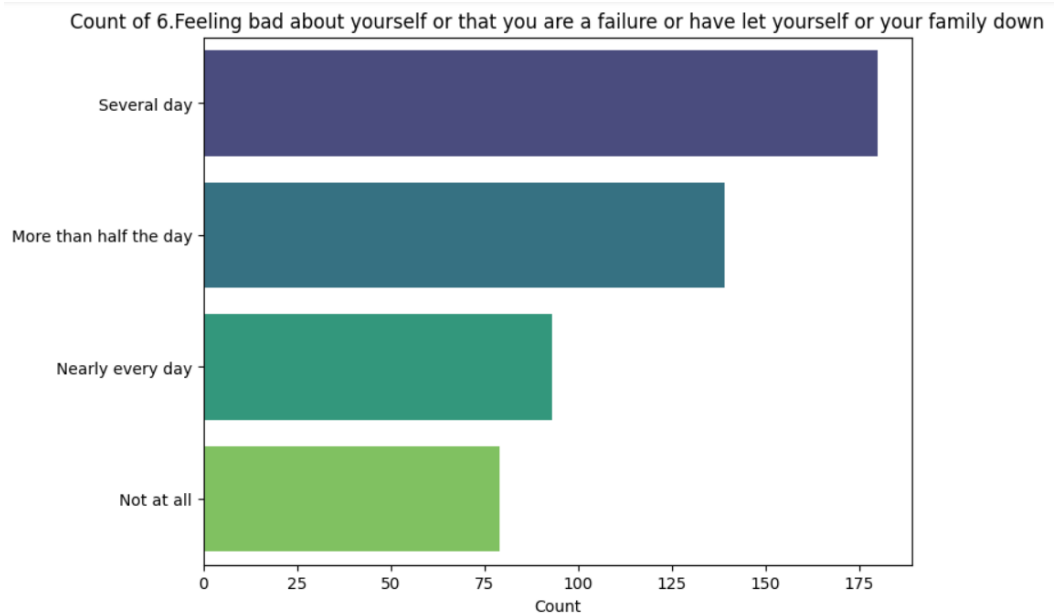


Figure 3.4.28: Bar graph of feeling suicide attemp

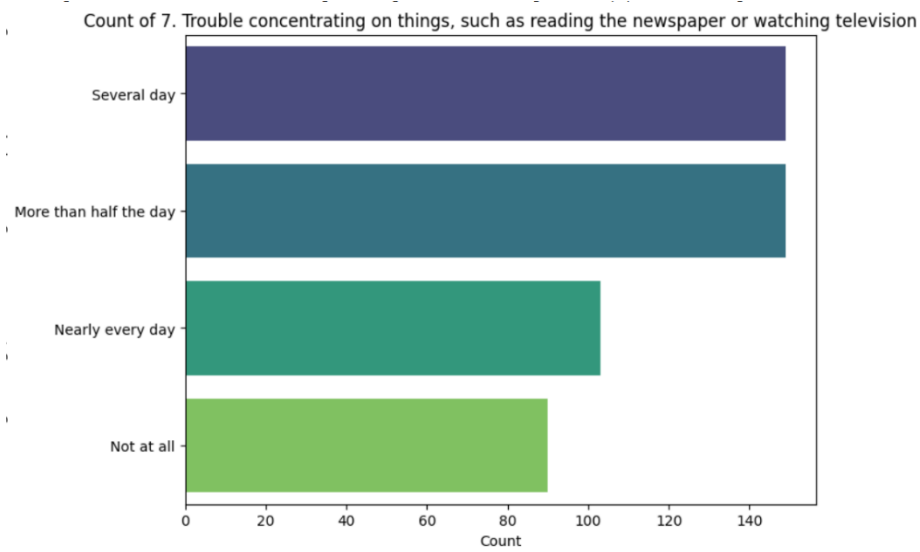


Figure 3.4.29: Bar graph of trouble on concentrating on things

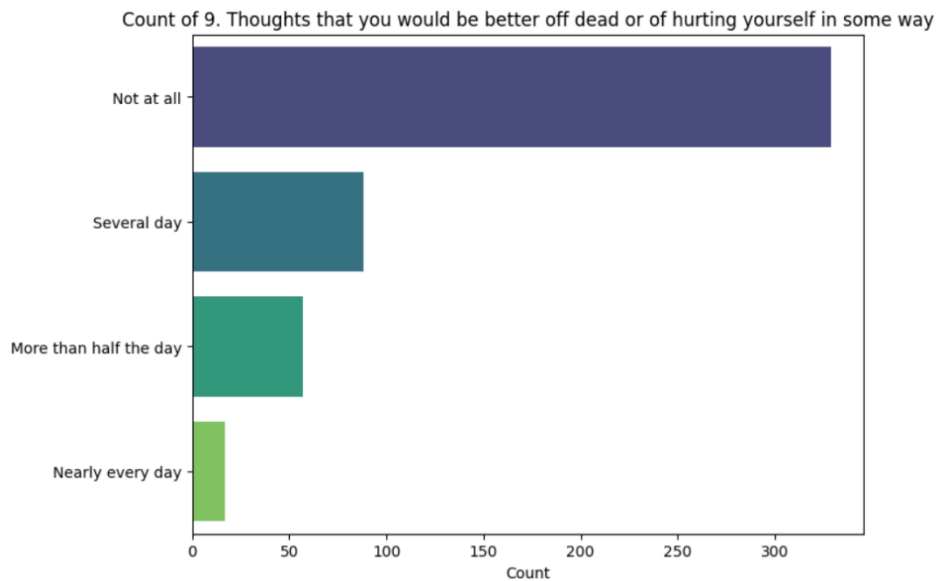


Figure 3.4.30: Bar graph of thoughts that of thoughts that you be better or dead

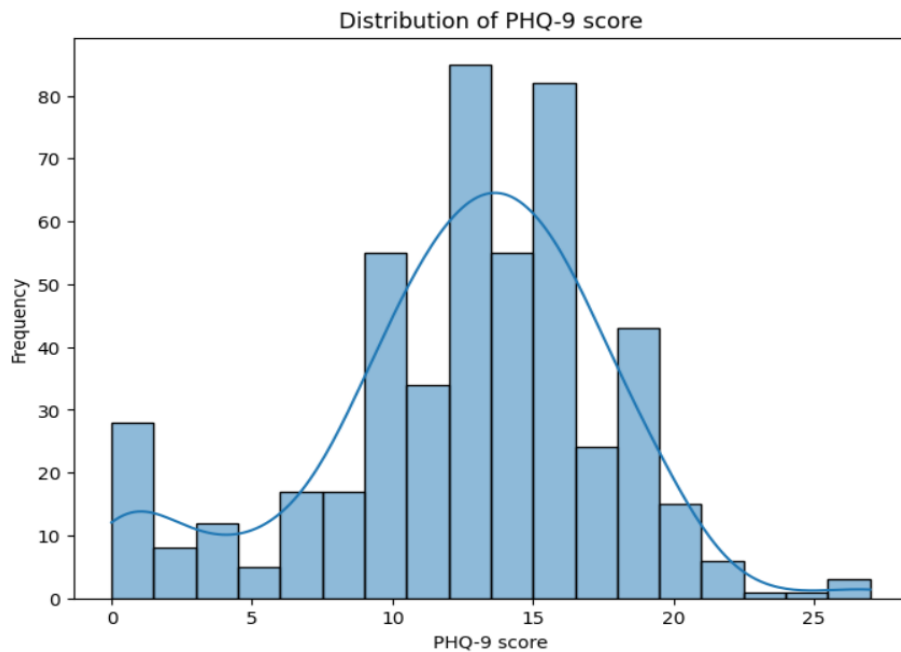


Figure 3.4.31: Bar graph of PHQ-9 score

3.4.5 Arithmetical Exploration of Target Attribute.

The target attribute of the research is PHQ-9 score3. Which is included about 491 people's information the class of class target attribute is four Such as Mild Depression, Moderate Depression, No Depression, Severe Depression. Addicted to mild Depression value is 239, Moderate Depression value is 136, No depression value 109 and severe depression is 7. This bar graph is in 3.4.32.

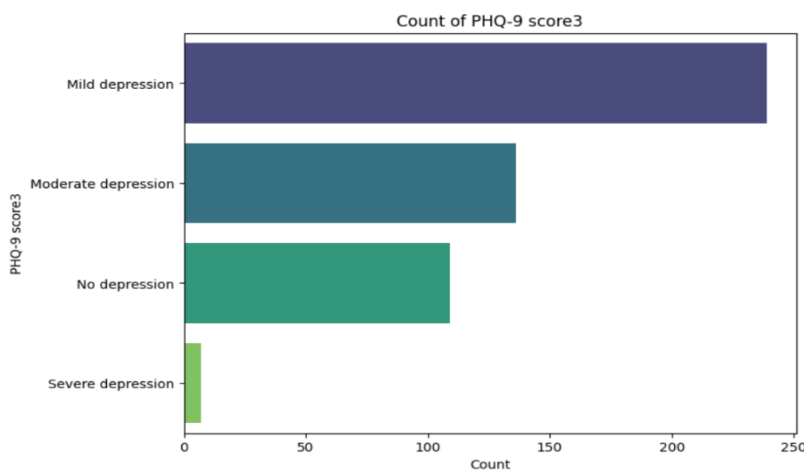


Figure 3.4.32: Bar graph of PHQ-30 score3

3.5 Implementation Requirements

I have needed data mining tool, data preprocessing tool to implement my machine learning model. Although I am using secondary dataset to built my machine learning model. I have used except sheet for my data set. Using google collab I have built whole machine learning program. Google collab is the open-source program for building any machine learning algorithm.[20][21][22]

3.5.1 Methods and Algorithms Description

Logistic is regression is a common classifier that can use for identification [23].

K-NN is a supervised machine learning algorithm which can be very good for identification.[24]

I have used decision tree algorithm. which is verry prominent algorithm DT Decision Tree algorithm have leaf notes and I works like a Tree [25].

XG boosting another machine learning technique which can be used for higher dataset.[25]

Extra tress classifier is also a machine learning technique that can be use for higher machine learning approaches. The full name of this method is called Extremely Randomized tress classifier.[25]

Cat boosting is another hybrid classifier which can be used for higher purposed. This a classifier is only use when the data set is extremely high.[25]

GB or gradient boosting is another popular machine learning methods. That can be use in various purposes.[25]

MLP refers to Multilayer Perceptron which works in different layer and work like an Artificial Neural Network.[25]

Another machine learning technique called SVM or Support Vector Machine is also very popular for machine learning technique.[25]

Chapter 4

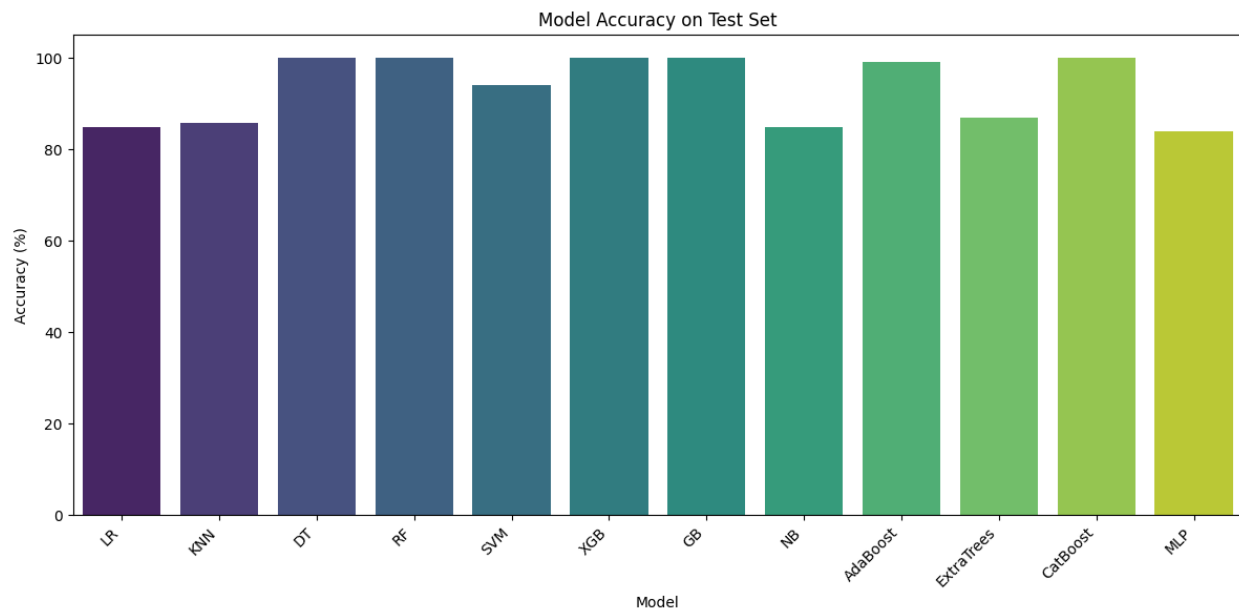
Implementation and Results and Discussion

4.2 Preliminaries

I have used is about included about 492 peoples have participated in that survey. The target attribute that is about “PHQ-35 score3” which is included 4 classes such Mild depression, Moderate depression, No depression, Severe Depression. About 239 people are identified as Mild depressed and moderate depressed peoples are 139, No depression 109, severe depression 7.

4.2 Experimental results and analysis

Ten better machine learning algorithms are used in this model. Such as Logistic Regression, K-NN, Decision Tree, Random Forest, SVM, XG Boost, Gradient Boosting, Naïve Bayes, AdaBoost,



Extra Tress classifier, CatBoost, MLP. All machine learning classifiers model are given below in Figure 4.1

Figure 4.1: Ten machine learning classifiers model with accuracy

Here 4 models have the highest accuracy. Those machine learning algorithms are Decision tree, Tuned_CatBoost, Gradient Boosting, XG Boosting etc. These machine learning algorithms have highest accuracy. The figure of these algorithms are given below in Figure No 4.2 to 4.4.

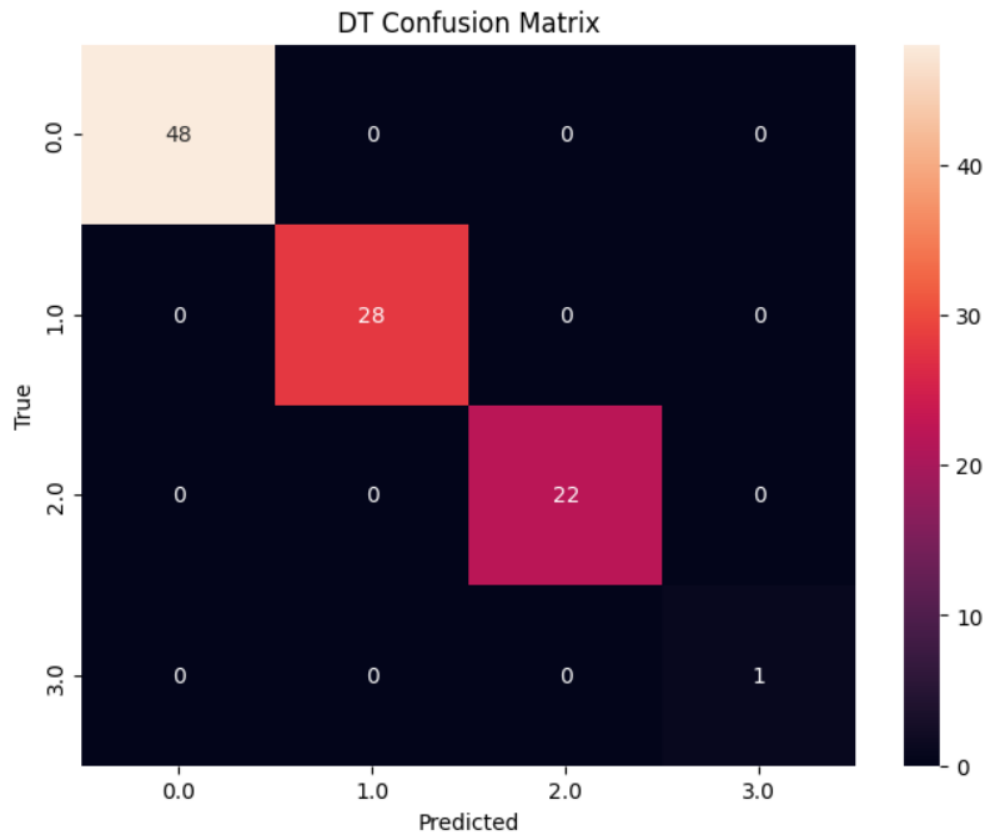


Figure 4.2: Decision tree confusion matrix

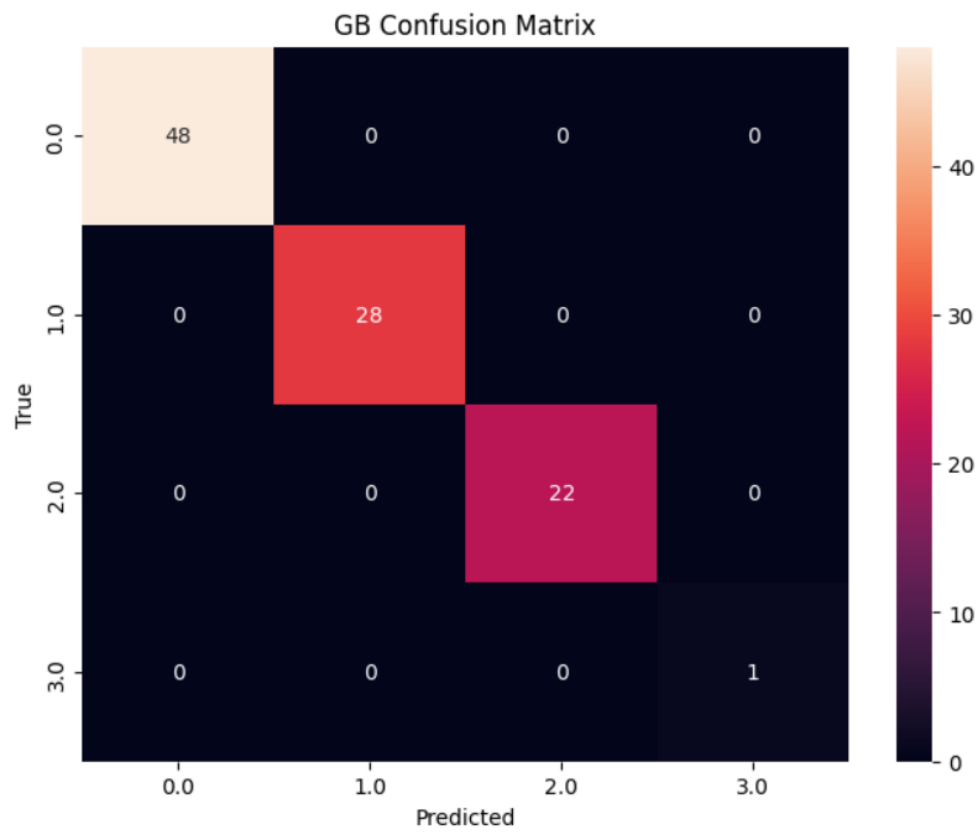


Figure 4.3: Gradient Boosting confusion matrix

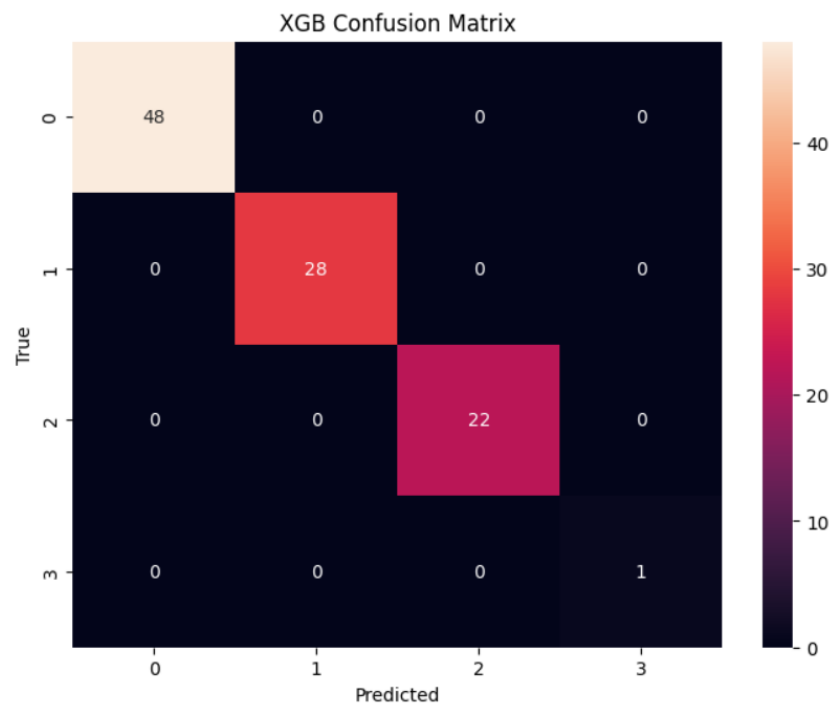


Figure 4.4: XG Boosting confusion matrix

And even Tuned_ Catboost have the height accuracy. These algorithms have 100% accuracies. Comparing others these algorithms have extremely high accuracies. So, these are certainly over fitted. For the Decision Tree (DT), the overfitting issue occur because this algorithm can grow deep and complex, creating specific splits that memorize training data. With only 491 samples, a deep tree can capture noise especially in high-cardinality features like “10. Location in Division”. XG Boost is a gradient Boosting algorithm sequentially used on hard to classify samples. Which can lead to overfitting. For Gradient Boosting algorithms it works like XGB. Which is basically used for higher dataset. Tuned_CatBoosting is used for categorical data and performs well in features like age, sex and internet habits. So, it can cause overfitting issue.

4.3 Analyze of Cross validation accuracy

If I consider cross validation balanced accuracy, we can see that the accuracy is very low for the algorithms such as Logistic Regression, Random Forest, KNN and SVM but If I consider that cross validation accuracy acquired very sophisticated accuracy rate. The figure of cross validation are given below in figure 4.5 .

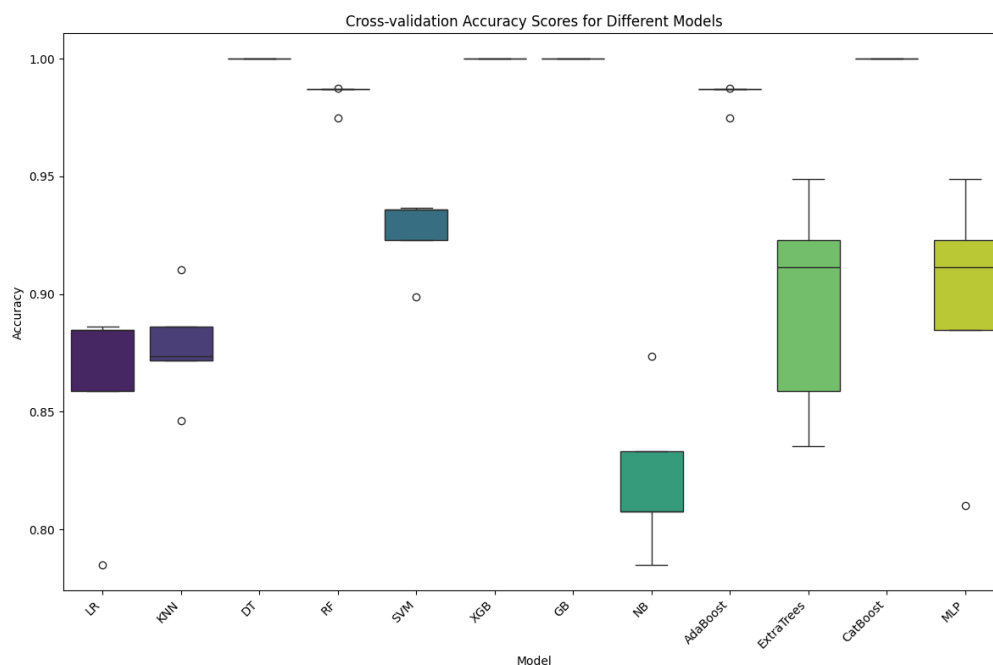


Figure 4.5: Cross validation accuracies of different models

4.4 Comparative Analysis

Here is the table that I have shown that the comparison of my work and other research work.

Table 4.1 Comparison of my work and other's research work

SL	Author	Objectives	Issue of the Domain	Dataset	Methods	Accuracy
1	Leong et al.(2019)	Social Media addiction	Analyze	665	Hybrid Structure equation model, ANN	86.6%
2	Mim et al. (2024)	Media addiction	Detection	1417	K-NN, SVM, RF	82%
3	Illahi, M at el. (2022)	Stress Detection on using social media	Detection	190000	NLP, several deep learning algorithms	85%
4	Authors (2021)	Afghanistan student's social media addiction	Analyze	330	Statistical Analysis such probability sampling	N/A
5	Author (2021)	Media addiction of Turkish people	Analyze	5000	Logistic regression	N/A
6	Anonymous (2021)	Social media addiction among nurses	Analyze	207	Regression, Pearson model	N/A

7	Sabbir et al. (202)	Analysis of Bangladeshi people's emotion	Prediction	1121	CNN	96.7%
8	Authors (2020)	Instagram addiction among young people	Prediction	443(total) Type D	Logistic Regression classifier technique	66.6%
9	Authors (2020)	Addiction for chewing belet nut	Prediction	1100	Random forest	96%
10	Authors (2020)	Social media addictin	prediction	1016	SVM	89%
11	This work	Social media addiction	Analysis	492	Logistic regression , K-NN, SVM , XGB, GB, Random Forest etc.	98%

4.5 Discussion

In my research work I have used ten machine learning algorithms most of them work very perfectly with sophisticated results or accuracies. Such as Logistic Regression 85% accuracies, SVM have 92% accuracies, KNN 87% accuracies, Random Forest 98%, Naïve Bayed 82%, Multilayer-Perceptron (MLP) 89% accuracies have shown in the model. Apart from this there are many algorithms got 100% accuracies, such as DT (Decision Tree), XGB, GB, Tuned_CatBoosting. So, for this algorithm the model became overfitted. Logistic Regression has shown remarkable performance on the model and KNN (K Nearest Neighbors), Random Forest, have also sophisticated accuracies. In depth analysis of different method performed well and demonstrated better accuracies for the model.

Chapter 5

Social and Environmental Impact and Sustainability

5.1 Social Impact

This model that I build to predict social media addiction among all Bangladeshi student has a great impact on society. Any ages people of any religion can use this model very easily. Because there are complexities of using this machine learning model to predict the addiction level. My intention was to build this kind of project that can really help people and that is really useful for everybody who is really enthusiastic to measure their children on social media addiction. In various way people can get addicted to social media. But they need aware about that the advantages or disadvantages of social media addiction. But eventually this uncontrollable use of social media become very dangerous for their mental health or it became psychological issue. Parents should be ware about their children for their on social media.

5.2 Impact on Environment

My model is very friendly for any social environment. Because there was no use of any chemical and any other un social instrument. So, this is social friendly and impactful critical and very affecting approach to identify social media addiction and to take steps to recover their addiction. As a result, we can live a peaceful life because there might be decrease of criminal activities in a peaceful society.

5.3 Ethical Aspects

My project on machine learning approach is not any bad impact or it doesn't have any unethical impact on society. The will be no privacy issue because, the dataset that I have collected doesn't use any personal data of any user's such as name, location, identification etc.

5.4 Sustainability plan

The sustainability plan are only concern that can predict the project future aspect of impact and even it can give us the proper view of what is the future plan of my work. This model can be used for psychiatrist or psychologist to speed up their work

Chapter 6

Summary, Conclusion and Future work

6.1 Summery of the work

In the summary of the work, I can say that young people cannot do proper use of social media. At a result they got very unexpected outcome in their early life they don't get good result on their exam. I have used machine learning approached to identify addiction of social media for the Bangladeshi students at any age.

6.2 Conclusion

I have used a secondary dataset for my machine learning project so that I had to integrate many different features which will be really necessary for the project. Even there was many unnecessary features which is not required for my project so that I had to drop those for better accuracies. And even we had a very little dataset. Some of the machine learning algorithm give high accuracies which. Which is overfitted.

6.3 Future work or Further studies

In further work of the study I will make primary data of my own which will be included a large amount of information of different types of people. That will make better accuracies and even there will not be overfitted of any model. And apart form I will make a software or web app or mobile app so that anyone can measure their addiction level.

APPENDIX

ABBREVIATION

LR = Logistic Regression

DT = Decision Tree

K-NN = K Nearest Neighbors

RF = Random Forest

SVM = Support Vector Machine

XGB = eXtreme Gradient Boosting

GB = Gradient Boosting

NB = Naïve Bayes

AdaBoost = Adaptive Boosting

Extra Tress = Extremely Randomized Trees Classifier

MLP = Multilayer Perceptron

Appendix: Research Reflection

I know a little bit knowledge know of machine learning algorithm. Our supervisor is a verry kind person. He helped me a lot to finish my project. When doing this project, I was facing many issues to collect perfect dataset of the machine learning model. Helped me found out the dataset. I build model using “Google collab” which is an open source program of Google. After finishing this project or research I feel verry confident and enthusiastic. And I will make more sophisticated machine learning research then this.

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