Mobile Screen Addiction Using Addictive Attribute by Combination of Algorithm-In Addiction Disorder

https://doi.org/10.3991/ijim.v17i04.37745

G. Baby Saral(✉), R. Priya
Department of Computer Application, VISTAS, Chennai, India
online.babysaral@gmail.com

Abstract—Mobile Screen spent by teenage who use lot of time on screen experience psychiatric problems such as frustration, fatigue, depression, anxiety, and so on. Matplotlib pyplot with histogram figure is used to evaluate the psychiatric condition data (CSV file). For the purpose of rating the condition data, the standard deviation and mean are determined. For data analysis, there is a correlation matrix that compares every row and column. Gradient Booster, Logistic Regression, Knn algorithm is used to compare the precision of the machine learning process, which merged the characteristics of addictive and non-addictive data to find rating disorders.

Keyword—data science, gradient booster, logistic regression, pyplot

1 Introduction

Electronic device dysfunction is a symptom of neurological addiction induced by the use of devices such as the internet, sports, and social media. Anxiety and depression leads to health problem in the whole world and it affects all group all men, women and kids [5]. All the outcome of anxiety and depression disorder results in weight loss or gain and psychological disorder like tension, fear (Much more fear avoid the situation that involve certain negative judgment), anger, low [6] concentration and many. A questionnaire study of students [1, 2] forecasts the addictive diseases fatigue, depression, and anxiety [3] as a result of long-term screen use and addiction. The screen addictive disease details was interrelated from a book called Diagnostic and predictive manual of psychiatric disorders, which has been a worldwide used manual since its third edition [4]. A Python system that incorporates variation of many algorithms comes under machine learning, which are of two type called as supervised and unsupervised in machine learning. The coding, representation, symbols, characters, script, signs and figures are all available for free from http://scikit-learn,sourceforge.net, which has performance, documentation and API consistency [3].

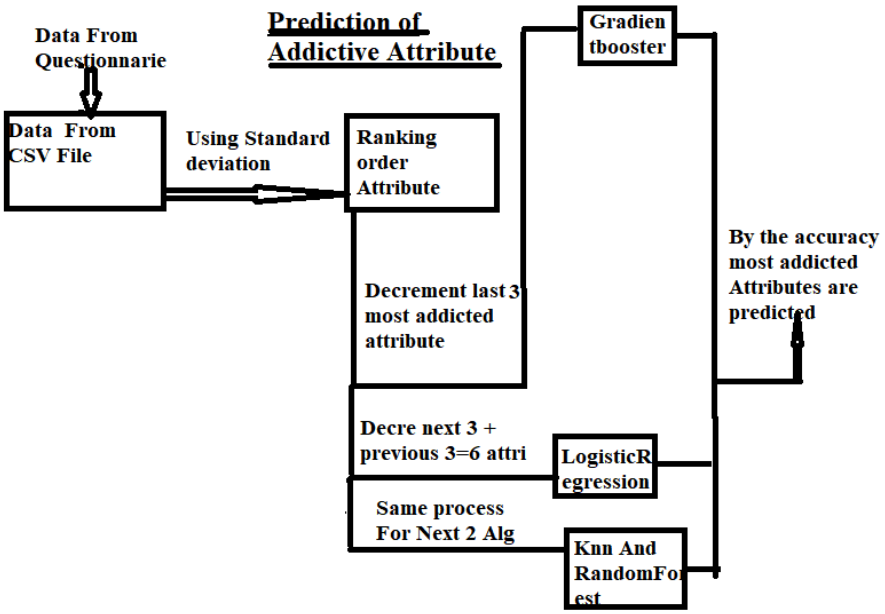

Fig. 1. Addicted attributes are filtered and algorithms are applied to get best prediction)

2 Addictive feature selection

In Machine learning Feature selection is the main step in the whole framework and reduces the inappropriate and redundant features from primitive predictor variables. There are 20 predictors mentioned in Figure 2 (Screen Time-Result(boring), Opening Social-Media is first task, Hobbies lost-Excessive Screen Time, Spending time with family, friends reduced, Lost Carrier-Excessive Screen Time, Parents Restriction-Excessive Screen Time, Hours-Spend, Content Restriction in Screen-time, Within or After hr, Unhappy-No notification, Stress-No.of notification reduced, Upset-Misuse of Photo, video, Fear-Online gossip, Reduced Memory Power, Fear by horror film, video, Anger byshooting, fight game, Stress-No Screen Usage, Low concentration, headache, Online App tempts, Do not Notice Around you,) which are in ratio form and 2 features (Addicted and not Addicted) and remaining features are in the ranking order. All the features are tested and trained and preprocessing by scalar and transpose matrix. Pairplot the whole data and three types of classifier are applied to get accuracy value with confusion matrix [8][9]. The best group of features are interpret connection between two variables to form an independent clusters. Pairplot also help-out to form classification models [10] or linear separation in addictive dataset.

```
features =['stress-no.of notification reduced', 'Fear-
Online gossip', 'Anger by shooting, fighte game',
'Unhappy-No notification',
```

```
            'Content Restriction In Screentime','Upset-
Misuse of Photo, video', 'Do not notice Around you',
'Hours-Spend',
            ]

  # split train and test data
  X = df[features]

  # Normalize Data
  X = preprocessing.StandardScaler().fit_transform(X)

  y = df['Addicted/Not Addicted']

  #Histogram
  df.hist(figsize=(50, 20))

  plt.show()
```

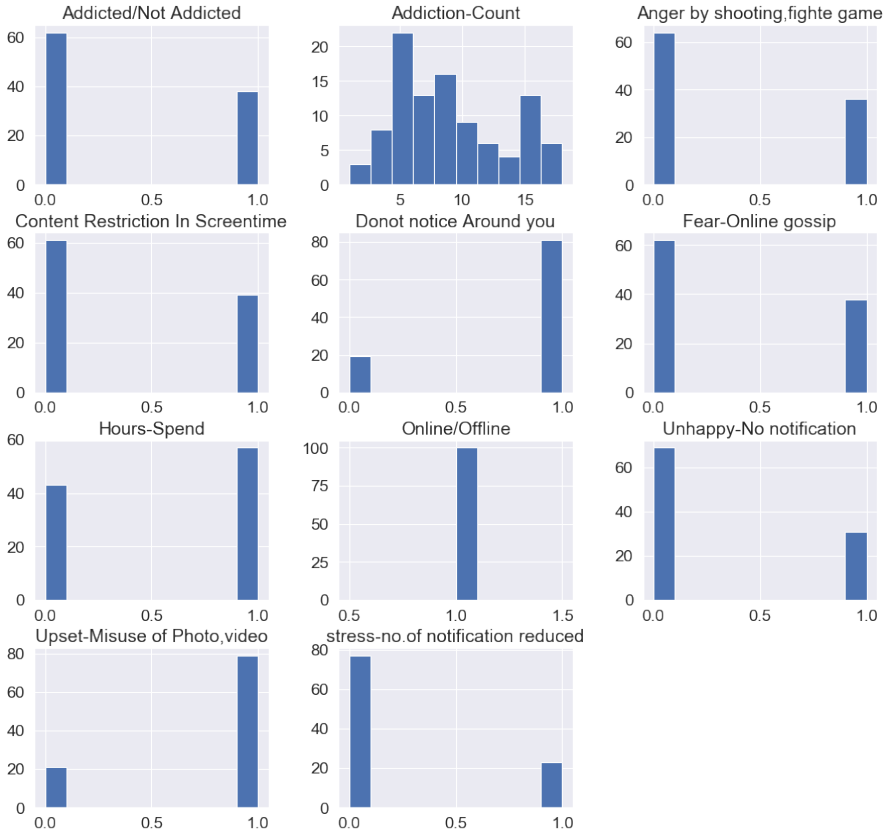

Fig. 2. Feature selection

3 Supervised learning

The data are trained with machine with lot of features that is split the data in two ways test and train data. The preprocessing with scalar and transpose matrix [6][7]. SVM algorithm applied and predicted with the model [14][15] and accuracy is found. The Addicted, Non-Addicted plot with 0 and 1, The True Positive, Negative, False positve, Negative are 32,48,0,0.

3.1 Attribute ranking

The standard deviation formula is used to find most addicted percentage for each attribute and ranking is applied for each attribute, Python is front end for analysing. The data mining, data science tool are supported by JupyterNotebook [13] is used to estimate the addicted student For Each attribute count and standard division are calculated and overall performance are predicted from the standard deviation and addicted rank is the final value which has ranking order addictive attributes as given in the below Table 1.

Table 1. Ranking order of attribute using standard deviation formula with the help of Scalar matrix

S.No	Attribute	Count	Standard-deviation	Addicted-Rank
1.	Screen Time-Result(boring)	222.000000	0.235327	20
2.	Opening Social-Media is first task	222.000000	0.484924	9
3.	Hobbies lost-Excessive Screen Time	222.000000	0.477042	11
4.	Spending time with family, friends reduced	222.000000	0.462000	13
5.	Lost Carrier-Excessive Screen Time	222.000000	0.482480	10
6.	Parents Restriction-Excessive Screen Time.	222.000000	0.399543	17
7.	Hours-Spend	222.000000	0.491189	8
8.	Content Restriction in Screen-time.	222.000000	0.482480	5
9.	Within or After hr	222.000000	0.399542	18
10.	Unhappy-No notification.	222.000000	0.49489	4
11.	Stress-No.of notification reduced.	222.000000	0.463871	12
12.	Upset-Misuse of Photo, video	222.000000	0.493734	6
13.	Fear-Online gossip.	222.000000	0.500397	2
14.	Reduced Memory Power.	222.000000	0.388918	19
15.	Fear by horror film, video	222.000000	0.427276	15
16.	Anger byshooting, fight game.	222.000000	0.499092	3
17.	Stress-No Screen Usage.	222.000000	0.501049	1
18.	Low concentration, headache.	222.000000	0.451852	14
19.	Online App tempts	222.000000	0.399643	16
20.	Do not Notice Around you.	222.000000	0.492928	7

Last six highest rank attribute are removed from CSV file then Gradient Booster algorithm are applied. Next highest rank attribute are removed including the previous attribute from CSV file. The same process is applied for Logistic Regression, Random Forest and Knn algorithm. Finally Last seven attribute are addicted.

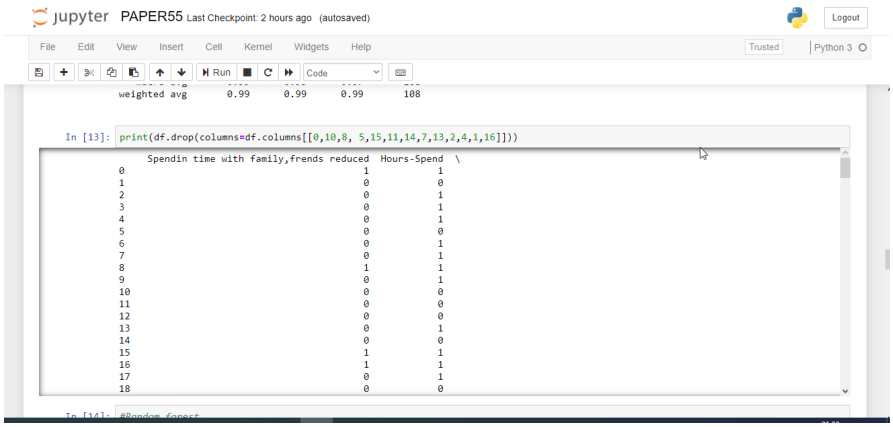

Fig. 3. Most addicted attributes are deleted using drop column command

3.2 Gradient boosting

Gradient boosting algorithm which altogether make weak learning algorithm to a strong predictive [16][17] model. It creates addictive disorder model in a step by step manner which allows predict and fit the model to get the accuracy value with confusion matrix. True positive, negative, False positive, negative=45,9,323. From sklearn the ensemble import the gradient-boosting classifier and metrics the confusion matrix and the apt gradient booster classifier are applied with training and test variable to predict the accuracy.

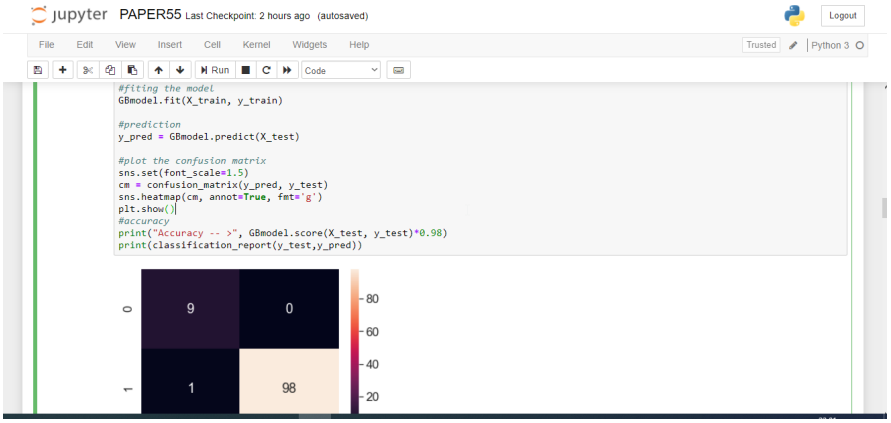

Fig. 4. Addicted attributes predicted applying Confusion matrix

3.3 Knn and logistic regression

The k-nn algorithm is a multivariate function that does not require any data to be addictive or not addiction attribute. The boolean value k in knn algorithm which can be used as a function for classification. In the k-nn algorithm, regression, and estimation of psychiatric illness (screen-time habitue) in addiction attribute, which repeatedly substitutes unrealistic linear sepals [15][19]. Cross validation with grid search is used to conduct preparation, analyzing, and presenting data using knn and logistic regression. It adds all of the trainee data foremost points together to locate the nearest new data foremost point. Importing Standard Scalar from sklearn is used to pre-process the results. For finding the best nearest k value, a preprocessing optimized algorithm is used [20][16].

Table 2. Accuracy of all the four algorithms

S.No	Algorithm	Accuracy
1.	GradientBooster	0.9709
2.	LogisticRegression	0.9907
3.	RandomForest	0.9977
4.	Knn	0.9074

4 Conclusion

The mobile Screen usage lead to Psychological problems contribute to the use of mobile devices. Fear, frustration, stress, depression, and anxiety are all expected, and predictive analysis is conducted. In machine learning, mathematical study of psychiatric problems is visualized using the seaborn principle used in machine learning. In Sklearn, the disorderliness data-set is divided for training and evaluating, and all four algorithms are calculated in particulars of expected and efficiency to decide the fulfillment in random forest algorithm. More tools may be applied to measure more precision and estimation.

5 References

[1] G. Baby Saral, R.Priya. (2019). Electronic screen addiction in digital world. *IJICS, 6*(6), June 2019. http://ijics.com

[2] G. Baby Saral, R.Priya. (2019). "Screen Time Addiction and psychological metric analysis among teens using machine learning techniques", *JARDCS, 11*(10-Special Issue). https://doi.org/10.5373/JARDCS/V11SP10/20192782

[3] Khawaja Moyeez Ullah Ghori, Muhammad Imran, Asad Nawaz. (2020). "Performance Analysis of machine learning classifier for non-technical loss detection", *Springer.* https://doi.org/10.1007/s12652-019-01649-9

[4] Yaling, Fan Wul, Lei Du. (2019). "EEEG-Based Identification of Latent Emotional Disorder Using the Machine Learning Approach". IEEE 2019, 978-1-5386-6243-4/19.

[5] Muhammad Aamir, Syed Mustafa Ali Zaidi. (2019). "Clustering based semi-supervised machine learning for DDoS attack classification", *Elsevier.* https://doi.org/10.1016/j.jksu–ci.2019.02.003
[6] Imtiaz PARVEZ, Maryamossadat AGHILI, Arif I. SARWAT. (2019). "Online power quality disturbance detection by support vector machine in smart meter". *Springer.* https://doi.org/10.1007/s40565-018-0488-z
[7] B.B.Brodey, R.R.Girgis, O.V.Favorov, C.E.Bearden, S.W.Woods. (2019). "The Early Psychosis Screener for Internet (EPSI)-SR: Predicting 12 monthpsychotic conversion using machine learning". *Springer.* https://doi.org/10.1016/j.schres.2019.01.015
[8] Jianyuan Guo, Zhen Xie, Yong Qin, Limin Jia and Yaguan Wang. (2019). "Short-Term Abnormal Passenger Flow Prediction Based on the Fusion of SVR and LSTM". IEEE. http://www.ieee.org/publications_standards/publications/rights/index
[9] Randal S. Olson and Jason H. Moore. (2019). "TPOT: A Tree-Based Pipeline Optimization Tool for Automatinh Machine Learning", *Springer.* https://doi.org/10.1007/978-3-030-05318-5_8
[10] Bo Wu, Jianxin Zhou, Xiaoyuan Ji, Yajun Yin, Xu Shen. (2019). "Research on Approaches for Computer Aided Detection of Casting Defects in X-ray images with Feature Engineering and Machine Learning". Elsevier. https://doi.org/10.1016/j.promfg.2019.12.065
[11] Anna Koroleva Sanjav, Kamath Patrick Paroube. (2019). "Measuring semantic similarity of clinical trial outcomes using deep pre-trained language representations". *Elesevier.* https://doi.org/10.1016/j.yjbinx.2019.100058
[12] Naklada Slap, Jastrebarsko, Croatia. (2013). "Diagnostic and statistical manual of mental disorders (DSM-5)", American Psychiatric Association. ISBN:978-953-191-787-2(book published year 18 may 2013).
[13] Facts on mental health. World health organization (WHO). Geneva. [Internet]. 2017 April 7 [cited 2017 April 11]. Available from. http://www.who.int/features/factfiles/mental_health/mental_health_facts/en/index1.html. Van AM. Comorbid anxiety and depression epidemiology, clinical manifestations, and diagnosis. 2016.
[14] Figueroa G, Chen Y, Avila N, Chu C. (2017). "Improved practices in machine learning algorithms for NTL detection with imbalanced data". IEEE. https://doi.org/10.1109/PES–GM.2017.8273852
[15] Valletta, John Joseph, et al., (2017). "Applications of machine learning in animal behaviour studies". *Animal Behaviour 124*(2017): 203-220. https://doi.org/10.1016/j.anbehav.2016.12.005
[16] Shermila, A. Mary, Amrith Basil Bellarmine, and Nirmala Santiago. "Crime Data Analysis and Prediction of Perpetrator Identity Using Machine Learning Approach." 2018 2nd International Conference on Trends in Electronics and Informatics (ICOEI). IEEE, 2018.
[17] B, Carmona J, Gavalda R, Alcoverro S, Martin V. (2016). "Fraud detection in energy consumption: a supervised approach". oma-Puig IEEE.
[18] N. Giangreco, G. Lebreton, S. Restaino, M. Farr. (2019). "Exosome Proteomics and Machine Learning Identify Novel Biomarkers of Primary Graft Dysfunction", *Elesevier, 38*(4), Supplement April 2019, https://doi.org/10.1016/j.healun.2019.01.325
[19] Bo Wu, jianxin Zhou, Xiaoyuan ji, Yajun Yin. (2019). "Research on Approches for Computer Aided Detection of Casting Defects in X-ray Images with Feature Engineering and Machine Learning", *Elsevier, 37*. https://doi.org/10.1016/j.promfg.2019.12.065
[20] Yin, Chunyong, et al., (2019). "Local privacy protection classification based on human-centric computing." *Human-centric Computing and Information Sciences, 9.1*(2019): 33. https://doi.org/10.1186/s13673-019-0195-4

[21] Tomita, Katsuyuki, et al., (2019). “Deep learning facilitates the diagnosis of adult asthma." *Allergology International, 68.4*(2019): 456-461. https://doi.org/10.1016/j.alit.2019.04.010

6 Authors

G. Baby Saral, M.C.A, M.Phil., Ph.D, is currently a Ph.D. Research Scholar in the Department of Computer Application, VISTAS, Chennai, India (email: online.babysaral@gmail.com).

Dr. R. Priya, M.C.A, M.Phil., Ph.D., is a professor and research supervisor in the department of computer applications, VISITAS (Vels University), Chennai, India. She is a University rank holder in both UG and PG programs (B.Sc – Computer Science and M.C.A) at Bharathidasan University, Thiruchirapalli. She holds 20 years of teaching experience and 8 years of research and National journals. She has presented many technical papers in National and International Conferences and won many best papers. She is reviewer for various International journals. She is at present board of management member at VISITAS, Chennai. She is currently guiding Ph.D., and M.Phil Research scholars. Her area of interest in research includes data mining, data science & Analytics, Machine learning and information security (email: priyaa.research@gmail.com).

Article submitted 2022-10-30. Resubmitted 2022-12-19. Final acceptance 2022-12-27. Final version published as submitted by the authors.