Assessing Accuracy in Diagnosing Narcissistic Personality Disorder with Elastic Net Classifier versus Lasso Regression Classifier

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Keywords: Diagnosis, Health, Lasso Regression Classifier, Machine Learning, Narcissistic Personality Disorder, Novel Elastic Net Classifier, Ridge Regression.

Abstract: The objective of the study is to compare the Lasso Regression Classifier with an Elastic Net Classifier to identify narcissistic personality disorder. Materials and Methods: With a limit of 0.05% and datasets collected from various web sources with continuing reviews, a novel elastic net method and lasso regression technique were used with g-power value 80%. Data was obtained after 10 iterations of the confidence span 95%. Results: Elastic Net Algorithm prediction accuracy is 86%, and Lasso Regression prediction accuracy is 67%. The prediction difference is statistically significant at $p = 0.001$, ($p<0.05$). This suggests that the two algorithms differ statistically significantly from one another. Conclusion: The conclusion is Novel Elastic Net Classifier performs more accurately than the Lasso Regression Classifier.

1 INTRODUCTION

A sign of narcissistic personality disorder is a propensity to exaggerate or boast about successes in an effort to impress others. This tendency is linked to a need for a lot of praise and attention from other people (Fan et al. 2021). By providing expert diagnosis, health treatment, and guidance, the material on narcissistic personality disorder aims to help people prevent self-harm or mental health crises (Ramos-Lima et al. 2022). People may learn about self harm using these applications, which also encourage a life dedicated to preventing suicide (Howard 2013). Numerous health care professionals find it beneficial to comprehend the severe conditions in which someone is experiencing narcissism (Eken et al. 2022) (G. Ramkuamr et al. 2021).

The previous five years have seen a total of 78 articles on sciencedirect and 65 on researchgate.net written on this topic. This study's main objective is to perform a meta-analysis to discriminate between those with bipolar illness and health controls (Oliveira et al. 2019). The multimodal temporal machine learning algorithms for borderline disorder are designed to recognise the depressed state of an individual's health and interpret behavioral patterns in people (Xiong et al. 2020). Finding their non-affective psychiatric symptoms is the largest obstacle a person faces when forecasting the abnormality of their health and concentrating on those components of their memory (Sawalha et al. 2021) (James et al. 2017). Combining a natural language method with machine learning classifiers to analyze mood dynamics allows for the detection of mood swings, self-centeredness, and a tendency to ignore the opinions or feelings of others (Vrabie et al. 2013) (Sivakumar et al 2022). Effective brain connections allow for the treatment of narcissistic disorder through an accurate technique of diagnosis and offer great promise as a therapeutic tool (Garland, Jane Garland, and Duffy 2010).

There are several problems with the existing approach since each person's response will be different given that the research is about individuals' health with narcissistic personality disorder. With the use of the right questionnaire session, narcissistic personality disorder will be more accurately diagnosed, according to this study's goal. This will be accomplished by using an unique elastic net classifier in addition to a lasso regression classifier to get more accurate results.

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2 MATERIALS AND METHODS

This research evaluation was carried out in the Saveetha Institute of Medical and Technical Sciences (SIMATS), Saveetha School of Engineering of machine learning lab. In this article there are two groups that are defined. A Novel Elastic Net classifier for the first group and a lasso regression classifier for the second group are provided. Using previous evaluations from clinical.com, the test size for each component will be set using a constant g power of 80%, a boundary of 0.05, and an inevitability of 95%. The dataset information was obtained from recent research work of kaggle (Malik and Mumtaz 2019). The example size of the Novel Elastic Net model (N=10) and the Ridge regression (N=10) will both be intentionally chosen (Kane, Phar, and BCPS).

2.1 Elastic Net Classifier

The innovative elastic net classifier, a machine learning algorithm, selects a regression analysis utilizing both the lasso regression and the ridge regression classifiers. A unique elastic net classifier is used to predict the data (such as name, age, and score) and compute the scores of the data using lasso regression and ridge regression in order to identify whether a person has narcissistic personality disorder. To comprehend the ground-breaking elastic net classifier, one must have a firm knowledge of lasso regression and ridge regression techniques. By efficiently deleting any unnecessary information, lasso regression and the lasso regression classifier simplify the data. A value of 0 for lasso regression and a value of 1 for ridge regression are equivalent. The data is predicted by the help of ridge regression and lasso regression algorithm.

Pseudo Code: Elastic Net Classifier

1. The data from training are X and Y.
2. Data is in the (0–40) range.
3. Build a website application with 40 attributes ranging from 1 to 40
4. Each attribute has the first and second phrases (1 and 2).
5. Consistently provide the attribute declarations values.
6. For each attribute value, enter a (1 or 2) statement.
7. Last but not least, insert the gender and age in the characteristics field.
8. Figuring out the scores of attributes.

Pseudo Code: Lass Regression Classifier

1. The information from training are X and Y
2. Data is in the range of 0 and 40.
3. Create a website application that has 40 qualities, ranging from 1 to 40.
4. Each characteristic includes both the first and second statements (1 and 2).
5. Regularly provide attribute declarations values.
6. For each attribute value, provide a statement of type (1 or 2).
7. Enter the gender and age in the attributes section.
8. Obtain the scores of attributes.

2.2 Lasso Regression Classifier

Table 1: Raw data table for evaluating the accuracy of Elastic Net Classifier and Lasso Regression Classifier.

S.No	Elastic Net Classifier	Ridge Regression Classifier
1	86.00	67.00
2	85.50	66.50
3	84.00	66.10
4	83.40	66.00
5	82.60	65.70
6	81.50	65.00
7	80.03	64.70
8	80.00	63.30
9	79.80	62.90
10	79.40	61.90

Table 2: Group statistics results (mean of novel elastic net classifier 82.22 is greater than the lasso regression classifier 664.91 and standard. Error Mean for ENC is 0.77319 and LRC is 0.53613).

	Groups	N	Mean	Std. Deviation	Std. Mean Error
Accuracy	NB	10	82.2230	2.44503	.77319
	KNN	10	64.9100	1.69539	.53613

Table 3: Independent Sample T-test Result is done with confidence interval as 95% and significance level as 0.001 (novel elastic net classifier appears to perform significantly better than lasso regression classifier with the value of $p<0.05$).

Independent Sample Test										
Levene's Test for Equality of Variances			T-test for Equality of Means							
	F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Differences		95% Confidence Interval of the Difference	
									Lower	Upper
Accuracy	Equal Variances assumed	2.539	.008	18.4	18	.001	17.31	0.940	15.33	19.28
	Equal Variances not assumed			18.4	16.02	.001	17.31	0.940	15.313	9.307

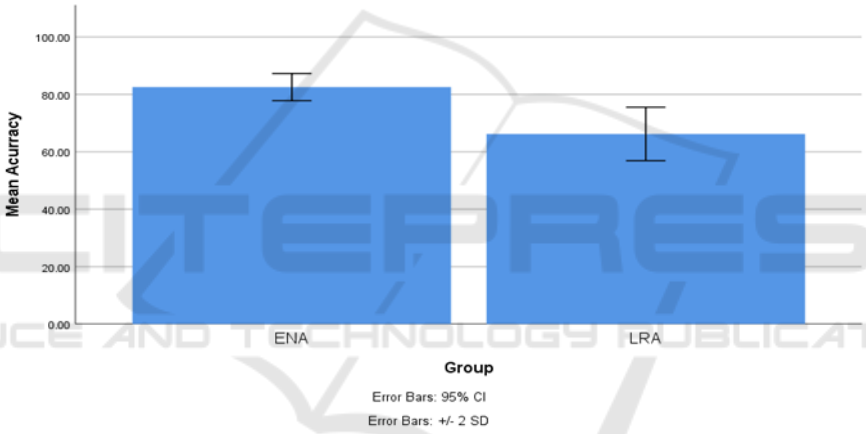

Figure 1: Novel Elastic net classifier and lasso regression classifier in terms of mean accuracy. Mean accuracy of nove elastic net algorithm (86%) is better than lasso regression classifier (67%). Standard deviation of novel elastic net algorithm is slightly better than lasso regression X Axis: ENC vs LRC. Y Axis: Mean accuracy of detection = +/- 2 SD with a Confidence Interval of 95%.

Lasso regression classifier may be used as a statistical method to find factors that are predictive of narcissistic personality disorder and to comprehend the connection between these factors and the result. For instance, lasso regression classifier may be used in a study to pinpoint clinical and societal variables linked to the emergence of narcissistic personality disorder and to ascertain how these variables affect the condition's trajectory. Researchers may be better able to comprehend the underlying causes of the condition and create more specific and practical remedies with the use of lasso regression classifier in this situation. The use of a single statistical technique, such as the lasso regression classifier is not recommended since narcissistic personality disorder is a complex condition with various origins.

Apply the generated approach and the elastic net technique to the training dataset. By combining all the data, the errors and incorrect inputs were eliminated. At this moment, the preprocessing was done. After that, the data set is split into two groups: one for training and one for testing. 25% more system training is included in this dataset, which comprises 75% testing. In order to improve and reach high accuracy, test sets are produced after analyzing the computations carried out throughout two interaction trains. The data set concerns the identification of narcissistic personality disorder. 11,000 details make up the dataset. The information set is split into 25%

for training and 75% for testing. Python-based machine learning falls under the category of narcissistic personality disorder. The dataset requirements to run this. Python and the flask library's web frame are used in the software specification for narcissistic personality disorder. The use of machine learning technologies by the Windows operating system and the Jupyter notebook's IDE.

The examination was conducted using IBM SPSS version 21. It is a tool for the quantitative creation of software that analyzes data. Ten recursions were completed with the help of a limit of 10–20 models and two current and recommended cunnings. To evaluate the accuracy for each recursion was gathered, the information was gleaned from recent Kaggle research. A processor with a base clock of 3.8 GHz or greater, 4 GB of RAM, and a minimum of 800 MB of disc space are the minimum hardware.

3 STATISTICAL ANALYSIS

The independent variables for this test are the test name, step and language type which remain consistent even when the dataset size is increased and the limits and components are changed in accordance with the data sources and the components are moved to account for any changes in the data. For the purpose of diagnosing narcissistic personality disorder, the autonomous T-test is utilized to contrast the lasso regression approach to the elastic net approach. In contrast to age and score are independent variables and accuracy is a dependent variable.

4 RESULTS & DISCUSSION

Elastic Net Classifier and Lasso Regression Classifier accuracy was compared in Table 1 using raw data. The error of the innovative elastic net classifier and the lasso regression classifier based on the diagnosis of narcissistic personality disorder are shown in Table 2 respectively. It demonstrates that the lasso regression classifier calculation will have an exactness mean of 64.91%, Standard Deviation 1.69, while the revolutionary elastic net classifier technique will have a mean of 82.22%, Standard Deviation 2.44.

The mean and standard deviation of the lasso regression classifier and the novel elastic net classifier of narcissistic personality disorder are tabulated in Table 3, which highlights the substantial difference between the two groups with $p=0.000(p<0.05)$.

The mean accuracy of a novel elastic net classifier and lasso regression classifiers based on the diagnosis of narcissistic personality disorder are contrasted in Fig. 1.

The experiments revealed that the novel elastic net classifier outperformed the lasso regression strategy. The accuracy of the lasso regression classifier and the novel elastic net classifier is calculated using the SPSS tool. The lasso regression technique with 86% and the original, creative elastic net classifier with 67% has the accuracy to diagnosis of narcissistic personality disorder in the dataset. The statistical analysis calculated in narcissistic personality disorder difference $p=0.001$ ($p<0.05$) tested by using t-test states values of results are significant.

The prediction, reduce treatment costs, and prevent life-threatening illnesses, supporting research is conducted on narcissistic personality disorder. (Sonkurt et al. 2021). The identification of the condition includes a few recognition computations required to comprehend narcissistic personality disorder (Paris 2017). To counteract this research, using machine learning techniques to raise the accuracy by expanding the features of the medical dataset(Paris 2017; Colombo et al. 2022). The result and precision of the information in the example given form the basis for this capability to recognize items (Ravan et al. 2023). Introduce a straightforward classifier to evaluate and better understand personality disorders (Parker et al. 2022).With the use of vast datasets and high accuracy classifiers like new elastic, this classifier successfully identifies the disease (Walsh-Messinger et al. 2019). This project will use machine learning methods to investigate narcissistic disease. (Mumtaz et al. 2015).

Accuracy will be established by constraints like certain scores and the volume of data. The accuracy percentages will be determined by using the term "narcissistic personality disorder" as well as a collection of data that includes the size and score of each condition. If the average mistake could be greatly decreased, that would be desirable. It is required to optimize the data related to this recognition. As a consequence, the work performance offered by the innovative elastic net classifier has more accuracy and a smaller mean error when compared to the lasso regression technique. To maximize data, this method will be used in the future to improve the diagnostic and classification accuracy of narcissistic personality disorder. future algorithms for high-quality selection. In future, quality choice algorithms may be utilized to decrease the calculation time and develop the diagnosing accuracy of classifiers.

5 CONCLUSIONS

When combined with a lasso regression classifier which offers (67%) accuracy, the innovative elastic net classifier delivers greater accuracy (86%) in light of collected results. This recognition associated data needs to be optimized. Samples of the data should be gathered from continuous sites like Kaggle. The narcissistic personality disorder diagnosis will be used to determine the accuracy values and it also counts the size and score of each narcissistic personality disorder in a set of data. It would be preferable if the average error could be significantly reduced.

REFERENCES

Colombo, Federica, Federico Calesella, Mario Gennaro Mazza, Elisa Maria Teresa Melloni, Marco J. Morelli, Giulia Maria Scotti, Francesco Benedetti, Irene Bollettini, and Benedetta Vai. 2022. “Machine Learning Approaches for Prediction of Bipolar Disorder Based on Biological, Clinical and Neuropsychological Markers: A Systematic Review and Meta-Analysis.” Neuroscience & Biobehavioral Reviews. https://doi.org/10.1016/j.neubiorev.2022.104552.

Eken, Aykut, Damla Sayar Akaslan, Bora Baskak, and Kerim Münir. 2022. “Diagnostic Classification of Schizophrenia and Bipolar Disorder by Using Dynamic Functional Connectivity: An fNIRS Study.” Journal of Neuroscience Methods. https://doi.org/10.1016/j.jneumeth.2022.109596.

Fan, Ru, Tiantian Hua, Tian Shen, Zhigang Jiao, Qingqing Yue, Bingwei Chen, and Zhi Xu. 2021. “Identifying Patients with Major Depres sive Disorder Based on Tryptophan Hydroxylase-2 Methylation Using Machine Learning Algorithms.” Psychiatry Research. https://doi.org/10.1016/j.psychres.2021.114258.

Garland, E. Jane, E. Jane Garland, and Anne Duffy. 2010. “Treating Bipolar Disorder in the Early Stages of Illness.” Practical Management of Bipolar Disorder. https://doi.org/10.1017/cbo9780511776922.008.

G. Ramkumar, R. Thandaiah Prabu, Ngangbam Phalguni Singh, U. Maheswaran, Experimental analysis of brain tumor detection system using Machine learning approach, Materials Today: Proceedings, 2021, ISSN 2214-7853, https://doi.org/10.1016/j.matpr.2021.01.246

Howard, Newton. 2013. “Approach Towards a Natural Language Analysis for Diagnosing Mood Disorders and Comorbid Conditions.” 2013 12th Mexican International Conference on Artificial Intelligence. https://doi.org/10.1109/micai.2013.50.

James, J., Lakshmi, S. V., & Pandian, P. K. (2017). A preliminary investigation on the geotechnical properties of blended solid wastes as synthetic fill material. International Journal of Technology, 8(3), 466-476.

Kane, Sean P., Phar, and BCPS. n.d. “Sample Size Calculator.” Accessed April 19, 2023. https://clincalc.com/stats/samplesize.aspx.

Malik, Aamir Saeed, and Wajid Mumtaz. 2019. “Introduction: Depression and Challenges.” EEG-Based Experiment Design for Major Depressive Disorder. https://doi.org/10.1016/b978-0-12-817420-3.00001-1.

Mumtaz, Wajid, Aamir Saeed Malik, Syed Saad Azhar Ali, and Mohd Azhar Mohd Yasin. 2015. “P300 Intensities and Latencies for Major Depressive Disorder Detection.” 2015 IEEE International Conference on Signal and Image Processing Applications (ICSIPA). https://doi.org/10.1109/icsipa.2015.7412250.

Oliveira, Leticia de, Leticia de Oliveira, Liana C. L. Portugal, Mirtes Pereira, Henry W. Chase, Michele Bertocci, Richelle Stiffler, et al. 2019. “Predicting Bipolar Disorder Risk Factors in Distressed Young Adults From Patterns of Brain Activation to Reward: A Machine Learning Approach.” Biological Psychiatry: Cognitive Neuroscience and Neuroimaging. https://doi.org/10.1016/j.bpsc.2019.04.005.

Paris, Joel. 2017. “Differential Diagnosis of Bipolar Disorder and Borderline Personality Disorder.” Bipolar Disorders. https://doi.org/10.1111/bdi.12565.

Parker, Gordon, Michael J. Spoelma, Gabriela Tavella, Martin Alda, David L. Dunner, Claire O’Donovan, Janusz K. Rybakowski, et al. 2022. “A New Machine Learning-Derived Screening Measure for Differentiating Bipolar from Unipolar Mood Disorders.” Journal of Affective Disorders. https://doi.org/10.1016/j.jad.2021.12.070.

Ramos-Lima, Luis Francisco, Vitoria Waikamp, Thauana Oliveira-Watanabe, Mariana Recamonde-Mendoza, Stefania Pigatto Teche, Marcelo Feijo Mello, Andrea Feijo Mello, and Lucia Helena Machado Freitas. 2022. “Identifying Posttraumatic Stress Disorder Staging from Clinical and Sociodemographic Features: A Proof-of-Concept Study Using a Machine Learning Approach.” Psychiatry Research. https://doi.org/10.1016/j.psychres.2022.114489.

Ravan, M., A. Noroozi, M. Margarette Sanchez, L. Borden, N. Alam, P. Flor-Henry, and G. Hasey. 2023. “Discriminating between Bipolar and Major Depressive Disorder Using a Machine Learning Approach and Resting-State EEG Data.” Clinical Neurophysiology. https://doi.org/10.1016/j.clinph.2022.11.014.

Sawalha, Jeffrey, Liping Cao, Jianshan Chen, Alessandro Selvitella, Yang Liu, Chanjuan Yang, Xuan Li, et al. 2021. “Individualized Identification of First-Episode Bipolar Disorder Using Machine Learning and Cognitive Tests.” Journal of Affective Disorders. https://doi.org/10.1016/j.jad.2020.12.046.

Sivakumar, V. L., Nallanathel, M., Ramalakshmi, M., & Golla, V. (2022). Optimal route selection for the transmission of natural gas through pipelines in Tiruchengode Taluk using GIS–a preliminary study. Materials Today: Proceedings, 50, 576-581.

Sonkurt, Harun Olcay, Ali Ercan Altınöz, Emre Çimen, Ferdi Köşger, and Gürkan Öztürk. 2021. “The Role of Cognitive Functions in the Diagnosis of Bipolar Disorder: A Machine Learning Model.” International Journal of Medical Informatics. https://doi.org/10.1016/j.ijmedinf.2020.104311.

Vrabie, M. I., I. Miclutia, V. Marinescu, and C. Popescu. 2013. “1983 – Identifying Specific Domains of Cognitive Dysfunction for Manic Episodes in Bipolar Affective Disorder.” European Psychiatry. https://doi.org/10.1016/s0924-9338(13)76920-7.

Walsh-Messinger, Julie, Haoran Jiang, Hyejoo Lee, Karen Rothman, Hongshik Ahn, and Dolores Malaspina. 2019. “Relative Importance of Symptoms, Cognition, and Other Multilevel Variables for Psychiatric Disease Classifications by Machine Learning.” Psychiatry Research. https://doi.org/10.1016/j.psychres.2019.03.048.

Xiong, Zihan, Xuanhua Zhang, Mengxuan Zhang, and Bosen Cao. 2020. “Predicting Features of Human Mental Disorders through Methylation Profile and Machine Learning Models.” 2020 2nd International Conference on Machine Learning, Big Data and Business Intelligence (MLBDBI). https://doi.org/10.1109/mlbdbi51377.2020.00019.