EFFICIENT INNOVATIVE OF MENTAL HEALTH DISORDER OF COMPUTER USERS USING NOVEL SUPPORT VECTOR MACHINE AND LINEAR REGRESSION

Bhuvanesh Kumar. S[1], J. Velmurugan[2*]

Article History: Received: 12.12.2022 **Revised:** 29.01.2023 **Accepted:** 15.03.2023

Abstract

Aim:To implement a best efficient innovation of mental health disorder of computer users using novel Svm and linear regression.
Materials and Methods: Recognition is performed by Support Vector Machine (N=10) over Linear Regression Algorithm (N=10). Sample size is calculated using GPower with pretest power as 0.8 and alpha 0.05.
Result: Mean performance of Novel Support Vector Machine (90%) is high compared to Linear Regression Algorithm (80%). Significance value for performance and loss is 0.013 (p>0.05)
Conclusion: the mean performance of the efficient innovation of mental health disorder of computer users using svm is better than linear regression algorithm.

Keywords: Novel Support Vector Machine, Linear Regression, Recognition System, Mental Health Disorder, Computer User, Accuracy.

[1]Research Scholar, Department of Information Technology, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai,Tamilnadu, India. Pincode: 602105.
[2*]Department of Computer Scince and Engineering, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamilnadu, India. Pincode:602105.

1. Introduction

Efficient innovation of mental health disorder of computer users by taking surveys as input to read the mental health of users (Serino et al. 2016). In this research, a survey is given as input to recognise the mental health disorder of people. In this paper, research is implemented with two different algorithms and finally the algorithms are compared to find out the best performing one (Hamey and Priest, n.d.). Thus the above process detects the mental health disorder accurately for Computer User (Segaran 2007). Efficient innovation of mental health disorder of computer user is an important application. Some of the applications of the mental health disorder of computer users help desensitize patients suffering from post-traumatic stress disorder, by recreating their personal triggers (Luxton 2015). For example, a recent community-based survey of over 1,500 people with serious mental illnesses found that over 80% of patients with bipolar disorder (BD) owned and used mobile phones regularly for calling, texting, and the internet. The application used for mental health E-mental health can be accessed via computers, smartphones, virtual reality programmes, or video conferencing software (Peng et al. 2020).

In this research, Mental health disorder of computer users, the database is collected from various articles.Mental health disorder of computer users have been carried out by researchers and 160 related research articles in IEEE Digital Xplore and 104 articles are published in google scholar. The evolution and rapid dissemination of mobile and sensor technology has created unprecedented opportunities for personalized data collection in an extremely granular, unobtrusive, and even affordable way (Comito, n.d.). Mental health is the psychological, social and emotional state of a person who is functioning at an acceptable level of behavioral and emotional adjustment in the Recognition system. Mental health can be seen as a measure to which an individual can handle stress and make decisions in every facet of their life, as it severely impacts how such individual acts, thinks and feels (Stein, Fineberg, and Chamberlain 2021). Mental health issues are hard to diagnose. Many times the affected individual does not realize the state of his well being. A lot of university students tend to undergo mental health issues at various stages of their education (Salah, Kröse, and Cook 2015).

Our institution is keen on working on latest research trends and has extensive knowledge and research experience which resulted in quality publications (Rinesh et al. 2022; Sundararaman et al. 2022; Mohanavel et al. 2022; Ram et al. 2022; Dinesh Kumar et al. 2022; Vijayalakshmi et al. 2022; Sudhan et al. 2022; Kumar et al. 2022; Sathish et al. 2022; Mahesh et al. 2022; Yaashikaa et al. 2022). The existing Drawbacks of an Mental health disorder of computer users has some obstacles to recognize the accurate mental health disorder of the peoples such as Excessive Internet use may create a heightened level of psychological arousal, resulting in little sleep, failure to eat for long periods, and limited physical activity, possibly leading to the user experiencing physical and mental health problems such as depression, OCD, low family relationships and anxiety. Though much research has been carried out in this field there exists a gap to formulate the performance when it comes to detect and recognise Mental health disorder of computer users accurately. Therefore an Mental health disorder of computer users accurately. The aim of this study is to Mental health disorders of computer users accurately using the novel Support Vector Machine, thereby improving performance and reducing false detection rate in the Recognition system.

2. Materials and Methods

This study setting was done in the data analytics Lab,department of Information Technology,Saveetha School of engineering. Sample size for this project is 20 (Group 1=10, Group 2=10). In the Efficient innovation of mental health disorder of computer users,to modify the problem of low performance rate novel Support Vector Machine and Linear Regression algorithm is used. Novel Support Vector Machine gives the predictions from the train set that are used as features to build a new model. This model is used to make final predictions on test prediction tests. The Linear Regression algorithm measures the distance between a query scenario and a set of scenarios in the data set.Mean accuracy of novel Support Vector Machine is 90.00%. Mean accuracy of the Linear Regression algorithm is 80%. Dataset for this article is collected from (https://www.kaggle.com/lukasvonehr/my-mental-health-analysis) website with 7 attributes and 2123 rows (Raballo, Schultze-Lutter, and Armando 2022)

Support Vector Machine

The Support Vector Machine is a well-known Supervised Learning approach that may be applied to both classification and regression problems. However, it is mostly used in Machine Learning for classification problems. The Support Vector Machine algorithm's goal is to determine the best line or decision boundary for classifying n-dimensional space into classes so that subsequent

data points may be easily placed in the relevant category. The algorithm's goal is to recognise an item from its backdrop using as little training data as possible. In the object recognition problem, it displays strong generalization ability. Support Vector Machines are classification and regression analysis tools. The Support Vector Machine can handle both linear and nonlinear problems and is useful for a wide range of practical situations.

Pseudocode For Support Vector Machine

INPUT: Training Dataset

OUTPUT: Classifier accuracy

Step 1: Import the required packages.
Step 2: Convert the audio files into numerical values after the extraction feature.
Step 3: Assign the data to X_train, y_train, X_test, and y_test variables.
Step 4: Using train_test_split() function, pass the training and testing variables.
Step 5: Give test_size and the random_state as parameters for splitting the data using SVM training.
Step 6: Importing the SVClassifier from the library.
Step 7: Using SVClassifier, predict the output of the testing data.
Step 8: Calculate the accuracy of the model.

Linear Regression

Linear Regression is a machine learning algorithm based on supervised learning. It performs a regression task. Regression models a target prediction value based on independent variables. It is mostly used for finding out the relationship between variables and novel forecasting. Different regression models differ based on – the kind of relationship between dependent and independent variables they are considering and the number of independent variables being used. The task to predict a dependent variable value (y) based on a given independent variable (x). So, this regression technique finds out a linear relationship between x (input) and y(output). Hence, the name is Linear Regression.

Pseudocode for Linear Regression

INPUT: Training data D, number of epochs e, learning rate n.

OUTPUT: Classifier accuracy

Step 1:Import required packages.
Step 2:Convert data sets into numerical values after the extraction feature.
Step 3:Assign data to X train, y train, X test and y test variables.
Step 4:Read the Training data set
Step 5:Calculate the mean and standard deviation of the predictor variables in each class
Step 6:Calculate the likelihood for each class
Step 7:Get the Greatest Likelihood.

STATISTICAL ANALYSIS

The analysis was finished by IBM SPSS adaptation 21. In SPSS, datasets are prepared using 10 as sample size for both the algorithm novel Svm and linear regression algorithm. Groupid is given as 1 for novel svm and 2 for linear regression algorithm, group id is given as a grouping variable and accuracy is given as a testing variable. The attributes are survey, mental disorders, patients, workspace. Dependent variables are surveyed. Independent variables are mental disorders, patients, workspace. Independent t test is carried out in this research work.

3. Results

In statistical tools, the total sample size used is 20. This data is used for analysis of novel svm and linear regression algorithms. Statistical data analysis is done for both the prescribed algorithms namely novel svm and linear regression algorithm. The group and accuracy values are being calculated for given recognition systems. These 20 data samples used for each algorithm along with their loss are also used to calculate statistical values that can be used for comparison. Table 2, shows that group, accuracy and loss values for two algorithms novel algorithms are denoted. Group statistics Table 1 shows a number of samples that are collected. Mean and standard deviation obtained and accuracies are calculated and entered.

Table 4, shows group statistics values along with mean, standard deviation and standard error mean for the two algorithms are also specified. Independent sample T test is applied for data set fixing confidence interval as 95%. Table 3, shows independent t sample tests for algorithms. The comparative accuracy analysis, mean of loss between two algorithms are specified. Fig. 1 shows comparison of mean of accuracy and mean loss between novel svm and linear regression algorithm.

4. Discussion

The accuracy of linear regression algorithms is 80.00% whereas novel novel svm has higher accuracy of 90.00% with p = 0.013 which shows that content novel novel svm is better than linear regression algorithm. Mean, standard deviation and standard mean values for novel svm are 6.6650, 2.25909, 0.71439 respectively. Similarly for linear regression algorithms, mean, standard deviation and standard mean values are 14.6190, 2.37268, 0.75031 respectively.

This similar research increases prediction for recognition systems to find Efficient innovation

of mental health disorder of computer users in accordance with their data.This model has a slow processing rate with better accuracy (Rajvanshi and Dhaka 2016). Slow processing rate is due to usage of a large database but in case of a smaller database, both the processing and accuracy are faster and better. The opposite model is built (Srivastava 2020). Despite various fact that many researchers have discovered various recognized models, many of them are unable to accurately perform better algorithms (Rathnavel et al. 2017). Many applications can be developed to predict accurately for sensitivity from various platforms.

The novel svm algorithm has a drawback of not being user friendly and is very time consuming. Which means that the novel svm algorithm is not easy to use and takes a lot of the time processing the data in the Recognition System(Patel et al. 2013). In future scope of Efficient innovation of mental health disorder of computer users can be further improved by developing the novel svm.

5. Conclusion

From this study of Efficient innovation of mental health disorder of computer users, the mean accuracy of linear regression algorithms is 80.00% whereas novel svm have a higher mean accuracy of 90.00%. Hence it is inferred that the novel svm to be better in accuracy when compared to linear regression algorithms.

Declarations

Conflict of Interest

No conflict of interest in this manuscript.

Authors Contribution

Author BK was involved in data collection, data analysis and manuscript writing. Author was involved in conceptualization, data validation and critical reviews of manuscript.

Acknowledgements

The authors would like to express their gratitude towards Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences (formerly known as Saveetha University) for providing necessary infrastructure to carry out this work successfully.

Funding

We thank the following organizations for providing financial support that enabled us to complete this study.

1. Best Enlist,Chennai
2. Saveetha University
3. Saveetha Institute of Medical and Technical Sciences
4. Saveetha School of Engineering.

6. Reference

Comito, Carmela. n.d. Integrating Artificial Intelligence and IoT for Advanced Health Informatics: AI in the Healthcare Sector. Springer Nature.

Dinesh Kumar, M., V. Godvin Sharmila, Gopalakrishnan Kumar, Jeong-Hoon Park, Siham Yousuf Al-Qaradawi, and J. Rajesh Banu. 2022. "Surfactant Induced Microwave Disintegration for Enhanced Biohydrogen Production from Macroalgae Biomass: Thermodynamics and Energetics." Bioresource Technology 350 (April): 126904.

Hamey, L. G. C., and C. Priest. n.d. "Automatic Number Plate Recognition for Australian Conditions." Digital Image Computing: Techniques and Applications (DICTA'05). https://doi.org/10.1109/dicta.2005.17.

Kumar, J. Aravind, J. Aravind Kumar, S. Sathish, T. Krithiga, T. R. Praveenkumar, S. Lokesh, D. Prabu, A. Annam Renita, P. Prakash, and M. Rajasimman. 2022. "A Comprehensive Review on Bio-Hydrogen Production from Brewery Industrial Wastewater and Its Treatment Methodologies." Fuel. https://doi.org/10.1016/j.fuel.2022.123594.

Luxton, David D. 2015. Artificial Intelligence in Behavioral and Mental Health Care. Academic Press.

Mahesh, Narayanan, Srinivasan Balakumar, Uthaman Danya, Shanmugasundaram Shyamalagowri, Palanisamy Suresh Babu, Jeyaseelan Aravind, Murugesan Kamaraj, and Muthusamy Govarthanan. 2022. "A Review on Mitigation of Emerging Contaminants in an Aqueous Environment Using Microbial Bio-Machines as Sustainable Tools: Progress and Limitations." Journal of Water Process Engineering. https://doi.org/10.1016/j.jwpe.2022.102712.

Mohanavel, Vinayagam, K. Ravi Kumar, T. Sathish, Palanivel Velmurugan, Alagar Karthick, M. Ravichandran, Saleh Alfarraj, Hesham S. Almoallim, Shanmugam Sureshkumar, and J. Isaac JoshuaRamesh Lalvani. 2022. "Investigation on Inorganic Salts K2TiF6 and KBF4 to Develop Nanoparticles Based TiB2 Reinforcement Aluminium Composites." Bioinorganic Chemistry and Applications 2022 (January): 8559402.

Patel, Vikram, Harry Minas, Alex Cohen, and Martin Prince. 2013. Global Mental Health: Principles and Practice. Oxford University Press.

Peng, Sheng-Lung, Son Le Hoang, G. Suseendran, and D. Balaganesh. 2020. Intelligent Computing and Innovation on Data Science: Proceedings of ICTIDS 2019. Springer

Nature.

Raballo, Andrea, Frauke Schultze-Lutter, and Marco Armando. 2022. Children, Adolescents and Families with Severe Mental Illness: Towards a Comprehensive Early Identification of Risk. Frontiers Media SA.

Rajvanshi, Priti, and Vijaypal Singh Dhaka. 2016. "Automatic Number Plate Goyal Recognition-Image Processing Technique." IMS Manthan (The Journal of Innovations). https://doi.org/10.18701/imsmanthan.v10i2.11119.

Ram, G. Dinesh, G. Dinesh Ram, S. Praveen Kumar, T. Yuvaraj, Thanikanti Sudhakar Babu, and Karthik Balasubramanian. 2022. "Simulation and Investigation of MEMS Bilayer Solar Energy Harvester for Smart Wireless Sensor Applications." Sustainable Energy Technologies and Assessments. https://doi.org/10.1016/j.seta.2022.102102.

Rathnavel, Jayanti, Student MTech, Department of Computer Engineering, K J Somaiya College of Engineering, and Mumbai. 2017. "Personalized Book Recommendation System." International Journal Of Engineering And Computer Science. https://doi.org/10.18535/ijecs/v6i4.61.

Rinesh, S., K. Maheswari, B. Arthi, P. Sherubha, A. Vijay, S. Sridhar, T. Rajendran, and Yosef Asrat Waji. 2022. "Investigations on Brain Tumor Classification Using Hybrid Machine Learning Algorithms." Journal of Healthcare Engineering 2022 (February): 2761847.

Salah, Albert Ali, Ben J. A. Kröse, and Diane J. Cook. 2015. Human Behavior Understanding: 6th International Workshop, HBU 2015, Osaka, Japan, September 8, 2015, Proceedings. Springer.

Sathish, T., V. Mohanavel, M. Arunkumar, K. Rajan, Manzoore Elahi M. Soudagar, M. A. Mujtaba, Saleh H. Salmen, Sami Al Obaid, H. Fayaz, and S. Sivakumar. 2022. "Utilization of Azadirachta Indica Biodiesel, Ethanol and Diesel Blends for Diesel Engine Applications with Engine Emission Profile." Fuel. https://doi.org/10.1016/j.fuel.2022.123798.

Segaran, Toby. 2007. Programming Collective Intelligence: Building Smart Web 2.0 Applications. "O'Reilly Media, Inc."

Serino, Silvia, Aleksandar Matic, Dimitris Giakoumis, Guillaume Lopez, and Pietro Cipresso. 2016. Pervasive Computing Paradigms for Mental Health: 5th International Conference, MindCare 2015, Milan, Italy, September 24-25, 2015, Revised Selected Papers. Springer.

Srivastava, Gaurav. 2020. "Automatic Number Plate Recognition." International Journal for Research in Applied Science and Engineering Technology. https://doi.org/10.22214/ijraset.2020.6178.

Stein, Dan J., Naomi A. Fineberg, and Samuel R. Chamberlain. 2021. Mental Health in a Digital World. Academic Press.

Sudhan, M. B., M. Sinthuja, S. Pravinth Raja, J. Amutharaj, G. Charlyn Pushpa Latha, S. Sheeba Rachel, T. Anitha, T. Rajendran, and Yosef Asrat Waji. 2022. "Segmentation and Classification of Glaucoma Using U-Net with Deep Learning Model." Journal of Healthcare Engineering 2022 (February): 1601354.

Sundararaman, Sathish, J. Aravind Kumar, Prabu Deivasigamani, and Yuvarajan Devarajan. 2022. "Emerging Pharma Residue Contaminants: Occurrence, Monitoring, Risk and Fate Assessment – A Challenge to Water Resource Management." Science of The Total Environment. https://doi.org/10.1016/j.scitotenv.2022.153897.

Vijayalakshmi, V. J., Prakash Arumugam, A. Ananthi Christy, and R. Brindha. 2022. "Simultaneous Allocation of EV Charging Stations and Renewable Energy Sources: An Elite RERNN-m2MPA Approach." International Journal of Energy Research. https://doi.org/10.1002/er.7780.

Yaashikaa, P. R., P. Senthil Kumar, S. Jeevanantham, and R. Saravanan. 2022. "A Review on Bioremediation Approach for Heavy Metal Detoxification and Accumulation in Plants." Environmental Pollution 301 (May): 119035.

TABLES AND FIGURES

Table 1. Group, Accuracy and Loss value uses 8 columns with 8 width data for automatic number plate recognition system.

SI.NO	Name	Type	Width	Decimal	Columns	Measure	Role
1	Group	Numeric	8	2	8	Nominal	Input
2	Accuracy	Numeric	8	2	8	Scale	Input
3	Loss	Numeric	8	2	8	Scale	Input

Table 2. Accuracy and Loss Analysis of SVM and Linear Regression

S.No	GROUPS	ACCURACY	LOSS
1	**SVM**	**80.11**	**10.30**
		89.60	**10.40**
		89.33	**10.67**
		89.66	**10.34**
		89.55	**10.45**
		88.96	**11.04**
		88.00	**12.00**
		89.55	**10.45**
		89.56	**10.44**
		89.22	**10.78**

2	**Linear Regression**	**90.21**	**11.50**
		88.30	**11.70**
		87.77	**12.23**
		87.55	**12.45**
		85.66	**14.34**
		86.32	**13.68**
		86.00	**14.00**
		87.00	**13.00**
		88.11	**11.89**
		87.99	**12.01**

Table 3. Group Statistical Analysis of SVM and Linear Regression. Mean, Standard Deviation and Standard Error Mean are obtained for 10 samples. SVM has higher mean accuracy and lower mean loss when compared to Linear Regression.

	GROUP	**N**	**Mean**	**Std.Deviation**	**Std.Error Mean**
ACCURACY	**SVM**	**10**	**93.9350**	**2.79109**	**0.88262**
	Linear Regression.	**10**	**87.3200**	**1.01552**	**.32114**
LOSS	**SVM**	**10**	**85.3810**	**2.37268**	**0.75031**
	Linear Regression.	**10**	**6.6650**	**2.25909**	**0.71439**

Table 4. Independent Sample T-test: is insignificantly SVM better than Linear Regression with p value 0.013 (Two tailed, p>0.05).

		F	Sig.	t	df	Sig (2-tailed)	Mean Diffencene	Std.Error differenc e	Lower	Upper
ACCURACY	Equal variances assumed	7.668	0.013	5.536	18	.000	1.99300	.36002	1.23664	2.74936
	Equal Variances not assumed	-	-	5.536	13.336	.000	1.99300	.36002	1.21722	2.76878
LOSS	Equal variances assumed	7.668	0.013	–5.536	18	.000	-1.99300	.36002	-2.74936	-1.23664
	Equal Variances not assumed	-	-	-5.536	13.336	.000	-1.99300	.36002	-2.76878	-1.21722

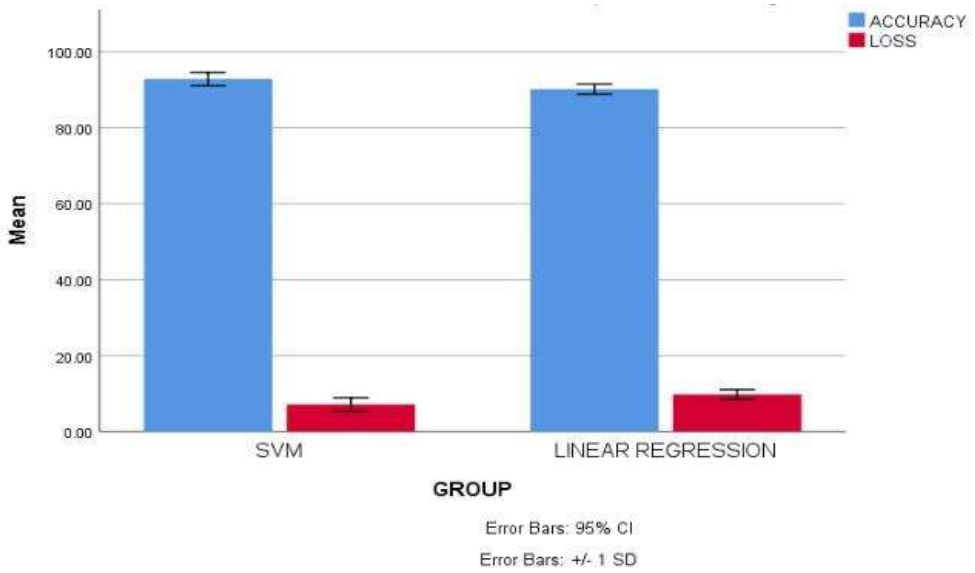

Fig. 1. Comparison of SVM and Linear Regression in terms of accuracy. The mean accuracy of SVM is greater than Linear Regression and standard deviation is also slightly higher than Linear Regression. X-axis: SVM vs Linear Regression. Y-axis: Mean accuracy of detection + 1 SD.