Original Article

Efficient Prediction of Sales during Festival Times in an Electronic Showroom Using Novel Deep Belief Network Compared Over Alexnet with Improved Accuracy

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Abstract

Aim: The aim of this paper is the efficient prediction of sales during festival times in an electronic showroom using a Deep Belief Network compared to AlexNet with improved accuracy. **Materials and Methods**: Deep Belief Network (N=10) and AlexNet algorithm (N=10) is the iteration for different times in predicting the accuracy percentage for accidents that happened. Two sample groups are considered and tested, G-power is a calculation that contains two different groups, alpha (0.05), and power (80%). **Results**: It was observed that the Deep Belief Network algorithm obtains an accuracy of 83.63% and the Novel Deep Belief Network has 74.12%. This NDBN appears to have a better significance of p=0.035 than the ResNet, that is p<0.05 using independent T-test analysis. **Conclusion**: The result proves that the Novel Deep Belief Network approaches to predicting the best retail sales store prediction have higher accuracy than the AlexNet algorithm.

Keywords: Sales Prediction, Electronic, Neural Network, Income Forecasting, Novel DBN, AlexNet.

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INTRODUCTION

This work investigates a person's online surfing and shopping behaviors and predicts shopping movements throughout a huge purchasing competition all over the world. creates possibilities for higher interface designs and enriches the personal experience (Debjit et al. 2022). To enhance online purchasing revel for consumers, boom income for traders, and gain effective warehousing and delivery (Xu et al. 2022), the first examine numerous online purchasing behaviors primarily based totally on the 31 million logs generated followed by online purchasing throughout a rushed sale occasion on 11th November 2016 (Zeng et al. 2019). The researchers have presumed that a sales Income forecasting prediction framework is needed for business associations to deal with large volumes of information. Business choices depend on the speed and exactness of information preparation procedures. It was a significant test for looking at during the examination (Dwivedi et al. 2022).

In IEEE Xplore, 44 relevant publications were published, while in Google Scholar, 55 related articles were published. (Cheriyan et al. 2018). They researched and trained the model using four distinct classifiers before deciding on the optimal model for execution. They took (Novel DBN, and AlexNet) for predicting the retail sales store prediction search. For static systems, the DBN algorithm is best for sales prediction (Ahmad et al. 2020). In comparison to individual learners, we proposed an ensemble learner strategy and evaluated the performance of four real-world datasets (de Andrade et al. 2022). Experimental evaluation yields the best performance using Deep Belief Network as a classifier, with an accuracy of 80%. According to my study, most the researchers take accuracy into consideration, In many cases, a model with a high accuracy value is the best model, but in our case, because of the way the model is trained, an article predicted as true but actually false can have negative consequences, whereas if an article was predicted as false but contained verifiable information, trust issues can arise (Blessington 2015).

Our institution is passionate about high quality evidence based research and has excelled in various fields (Parakh et al. 2020; Pham et al. 2021; Perumal, Antony, and Muthuramalingam 2021; Sathiyamoorthi et al. 2021; Devarajan et al. 2021; Dhanraj and Rajeshkumar 2021; Uganya, Radhika, and Vijayaraj 2021; Tesfaye Jule et al. 2021; Nandhini, Ezhilarasan, and Rajeshkumar 2020; Kamath et al. 2020).The existing system has issues and major parts (Zhu et al. 2021).Based on the received person behaviors and the observed collaborative filtering primarily based totally on techniques to advocate gadgets for unique consumers, and are expecting whether buy will happenAccurate sales prediction performs a vital role in lowering charges and enhancing customer support levels, specifically for e-commerce. This paper tries to forecast destiny income at Amazon.com, Inc. primarily based totally on historic income facts. Firstly, it proposes 3 viable Income forecasting techniques consistent with the historic facts pattern, this is Holt-Winters exponential smoothing, neural network community vehicle mobile regression version, and ARIMA (Singh et al. 2020). Secondly, it specifies positive accuracy measures the use of which properly decides the suitability of the forecast techniques at the available income facts. In addition, the recognition of an object may be detected. Second, primarily based totally on the observations.

MATERIALS AND METHODS

The study was carried out in the Open Source lab, Department of Computer Science and Engineering, Saveetha School of Engineering, Saveetha Institute of Medical and Technical Sciences, Chennai. Basically, it is considered that two groups of classifiers are used, namely Deep Belief Network and AlexNet algorithms, which are used to recommend the diet selection for diabetic patients. Group 1 is the Novel Deep Belief Network algorithm with a sample size of 10 and the AlexNet algorithm is group 2 with a sample size of 10 are compared which have more accuracy score and precision score values for choosing the best algorithm. Clinical.com was used to create the pre-test analysis, which included a G power of 80%, a threshold of 0.05%, a 95% confidence interval, and a standard deviation of 0.05%. The nutrition dataset was used in the study. This dataset was taken from the kaggle open-source website. The Novel Deep Belief Network algorithm was chosen for implementation in this study, and it was compared to the AlexNet algorithm.

Novel Deep Belief Network

As the first step in training a Novel Deep Belief Network, the Contrastive Divergence method is employed to learn a layer of features from visible units. After that, it's time to deal with the active method from the Neural Network. The hit rate of the object guidelines is evaluated mostly based on 5-fold pass validation using the suggested collaborative filtering primarily based on the technique. When the learning for the final hidden layer is completed, the entire Novel DBN is trained.

Algorithm

1. Importing the dataset from Kaggle
2. Explore the data and analyze the dataset and how it looks.
3. Pre-processing the datasets
4. Split data into the attributes and labels
5. Training and testing set divided into datasets
6. Work with Novel Deep Belief Network
7. Make some suggestions

ALEXNET

In AlexNet's first layer, the convolution window form is 11×11. Since maximum images in ImageNet are extra than ten instances better and wider than the MNIST snapshots, items in ImageNet information generally tend to occupy extra pixels. Consequently, a bigger convolution window is wanted to seize the object. AlexNet is a whole lot deeper than the relatively small LeNet5. AlexNet includes 8 layers: 5 convolutional layers, fully-linked hidden layers, and one fully-linked output layer. Second, AlexNet used the ReLU in place of the sigmoid as its activation function.

Algorithm

1. Dataset is imported
2. Pre-process the data and analyze
3. Explore the data of the dataset and how it performs
4. Separate the information into attributes and labels
5. Split the data into training and testing sets
6. Have to work AlexNet

7. Make corrections if any available

Statistical Analysis

IBM SPSS model 21 is used to complete the analysis. It's a type of statistical software that's used to examine data. 10 iterations with a maximum of 20 samples were completed for each proposed and present approach, and the expected accuracy was utilized to analyze accuracy for each generation. The variables for dependent are sales for Income forecasting, retail, prediction, and activity, and independent variables are Electronic Sales Prediction. The value obtained from the iterations of the Independent Sample T-test was performed.

RESULTS

As a result of these transformations, it obtains the best boundary between the viable outcomes. Because of the relevance of equality of variance, the probability value states that the results of research efforts are significant and correlated with each other, the table demonstrates the difference in the accuracy of both Novel Deep Belief Network and AlexNet. The AlexNet and compared to the Novel Deep Belief Network is taken as accuracy for sample size N=10 per group. Because of its efficient classification feature based on the Novel Deep Belief Network, the algorithm outperforms theAlexNet.

Table 1 shows the results of the independent sample T-test, the frequency of 0.927 at the time of 15 the significance received as 0.035 for the alpha 0.05, and the confidence interval is 95%.

Table 2 shows the comparison of groups namely Novel Deep belief Network and AlexNet for the sample 10, it achieved 83.63% and 74.12% accuracies respectively.

Figure 1 shows the Mean accuracy of Novel DBN and AlexNet, where the X-axis scales the accuracy and Y-axis scales the algorithms used in Novel DBN vs AN. The Error bar is classified for the CI as 95% and SD +/- 1.

DISCUSSION

Actually on the Independent sample t-test the significance was obtained at 0.035, which was less than 0.05. This proof shows the existence of significance among the groups for this experimental analysis. The group's analysis derives the mean accuracy of 83.63% for the Novel Deep belief network and 74.14% for AlexNet, from the analysis Novel Deep Belief Network performs better than the AlexNet Algorithm.

They used computational approaches to do income predictions on freshly published books in a piece of writing about corporate control environments. In the field of Income forecasting, Artificial Neural Networks are also employed (Chang and Wang 2006). Neural Networks have been introduced to improve overall prediction performance (Majhi, Panda, and Sahoo 2009). Identified paintings withinside the area of the sale for Income forecasting are executed (Castillo et al. 2017). Consumers in 2015 had been from cellular gadgets in place of computer systems and cellular buy are anticipated to develop hastily (Cheriyan et al. 2018). Despite the high-quality capacity of cellular purchasing in neural networks, which allows for purchases at any time and from any location, little is considered about cellular purchasing habits due to the exclusive nature of data. since every year's major purchase carnival (Arunraj and Ahrens 2015). However, the higher the revenue, the more difficult it is for traders to put together the proper inventory, to ensure that the e-commerce platform will no longer go out of business with heavy burst traffic, and for specific businesses, it's miles more difficult to precisely extract customer's choice on objects and the temporal traits in their on-line purchasing behaviors that are primarily based entirely on the evaluation of the logs generated for Income Forecasting while customers shopped online.

The literature on this subject indicates that now no longer a lot of paintings have been executed in the swarm intelligence approach in effectively schooling the prediction models (Majhi et al. 2008). The Genetic Algorithm is a capability candidate for schooling the ANN models. There are loads of works that limit this subject which has helped the agency to expect the destiny income that they could make via means of making an investment in the right vicinity at the proper time (Majhi et al. 2009). The current examinations can be sped up by utilizing Big Data as an instrument for the prescient investigation of deals determined in future works.

CONCLUSION

AI approaches featured in this examination paper will actually want to give a compelling system in information tuning and dynamic. The experimentation using Novel Deep Belief Network and AlexNet for sales prediction in Electronic Showroom was performed. The results are compared using various statistical analyses. Finally, it is concluded that Novel DBN's (83.63%) accuracy is more than AlexNet's (74.12%) and has better performance.

DECLARATION

Conflicts of Interest

No conflict of interest in this manuscript.

Authors' Contributions

Author BR was involved in data collection, data analysis, and manuscript writing. Author SPC was involved in the conceptualization, guidance, and critical review of the manuscript.

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TABLES & FIGURES

Table 1. For determining mean significance and standard Error, use an independent sample test. p-value=0.035 and p<0.05. It is considered to be significant and 95% confidence intervals of the Difference.

Leven's Test for Equality of Variances				**t-test for Equality of Mean**					**95% Confidence Interval of the Difference**	
		F	Sig	t	df	Sig (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Accuracy	Equal Variance assumed	0.927	.035	15	38	000	7.58200	.26747	7.02008	8.14392
	Equal Variance not assumed			15	37.437	000	7.58200	.26747	7..01737	8.14663

Table 2. Statistical analysis of AlexNet and Novel DBN. Mean data transmission speed value, Standard deviation, and Standard Error Mean for AlexNet and Novel DBN algorithms. It is observed that the Novel DBN algorithm has a better data transmission speed than the AlexNet algorithm

	Algorithm	N	Mean	Std. Deviation	Std.Error Mean

Accuracy	DBN	10	83.6310	.75250	.23796
	AlexNet	10	74.1240	.51490	.16283

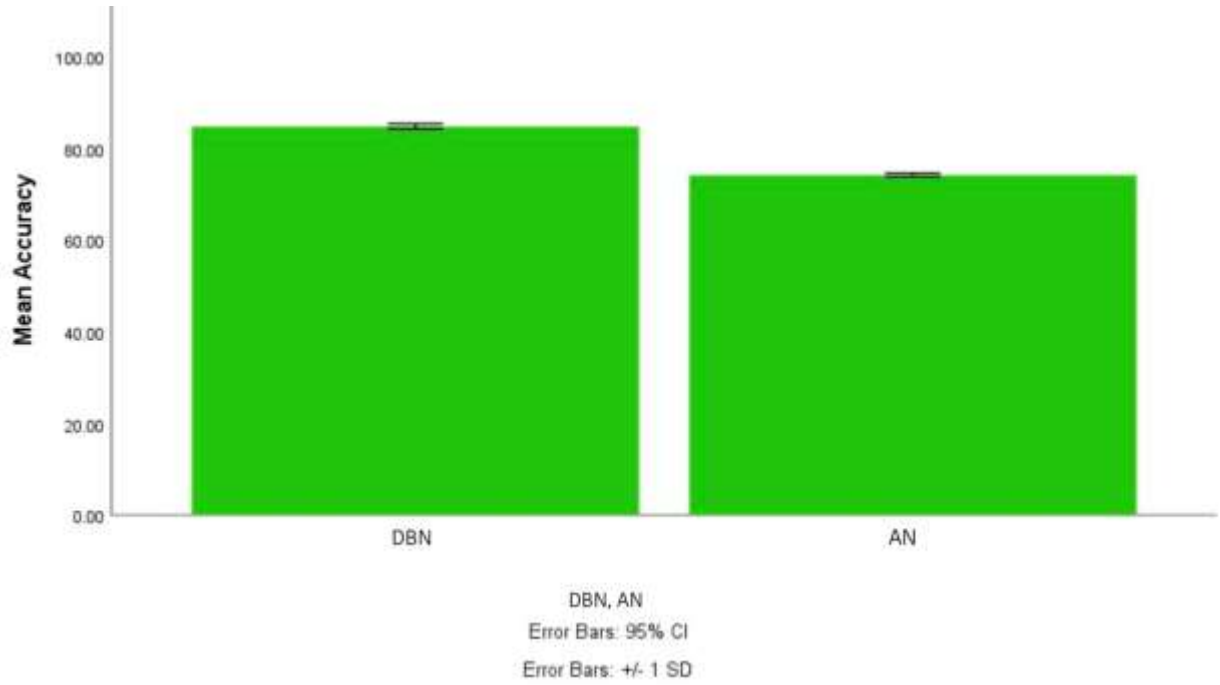

Fig. 1. Comparison of Novel DBN algorithm and AlexNet in terms of mean data transmission speed. The mean data transmission speed of the Novel Deep Belief Network is performing better than AlexNet. The X-axis is AN vs Novel DBN Y-axis mean accuracy. Error bars: +/- 1 SD