Identifying the Application Areas and Utilization of Neural Networks in Quality Assessment

Mr. Rakesh Ranjan[1]* Mr. Mazhar Eqbal[2] Mr. Hasibul Hasan Mansoori[3]

[1,2,3] Assistant Professor, Department of Computer Science and Engineering, Maulana Azad College of Engineering and Technology, Neora, Patna

Abstract – This paper explores the novel technique of neural networks and their application and their use in Quality Assessment. This is a study of neural network applications in reality situation. It gives a scientific classification of artificial neural networks (ANNs) and outfit the peruser with learning of flow and rising patterns in ANN applications research and region of center for analysts. As of now, artificial intelligence (machine learning, neural network, deep learning, automated), information security, huge information, distributed computing, web, and measurable science are for the most part hotspots and energizing subjects of information and communication technology (ICT). In late time's artificial neural networks (ANNs) has turned out to be famous and accommodating model for order, clustering, pattern recognition and prediction in numerous controls. ANNs are one kind of model for machine learning (ML) and has turned out to be generally focused to customary relapse and measurable models with respect to value. Ann's full applications can be assessed regarding information examination factors, for example, accuracy, processing speed, latency, performance, fault tolerance, volume, adaptability and union.

Keywords: Neural Networks, Quality Assessment, Application, Algorithms, etc.

- X -

I. INTRODUCTION

Artificial Intelligence (AI) has been an incredible asset in the development business over the previous decade. Counting formative techniques that can improve structuring of strong models, improving pattern transparency and permitting helpful information from prepared ANNs. Efficiency is depicted as the quantitative measure between the quantity of assets utilized and the yield delivered, by and large alluded to man-hours required to create the last item in contrast with arranged man-hours. Artificial Neural Network (ANN) techniques that utilization administered learning calculations have demonstrated to be more helpful than statistical regression techniques considering variables like modeling straight forwardness and prediction accuracy. These days ANNs application have turned out to be famous in different territory of human needs. Many associations are putting resources into the neural networks to take care of issues in different fields and the financial area which customarily fall under the obligation of activities examine. What makes artificial intelligence special is that it is generally proposed for information examinations by scholastics in the fields of sociology and expressions separated from its value in science and engineering, due to its wide applications. A decent bit of leeway of ANNs application is that it can make models simple to utilize and increasingly precise from complex

normal frameworks with enormous inputs. The ANN is observed to be a novel and helpful model connected to critical thinking and machine learning. ANN is an information manager model that is like natural sensory systems capacity of the man brain. As of late, explore enthusiasm for brain usefulness has quickly expanded all inclusive.

This Research Study talks about an outline of the NN method, its role and centrality in the quality evaluation.

II. ARTIFICIAL INTELLIGENCE

Utilization of artificial intelligence (AI) in automatic characterization has been talked about by Panigrahi (2010) following the historical backdrop of Expert System. It likewise portrayed Natural Language Processing, automatic processing of content, express structure tree, automatic ordering and automatic grouping. The examination presumed that automatic arrangement system for colon grouping can be created and that it will have sway in information association and recovery in the mechanized condition. The two fundamental methodologies of Artificial Intelligence are to concentrate on machine that would carry on like humans as far as suspecting and acting and concentrating on the system assessment and imitating through computational procedures

wherein the systems are based on understanding of human behavior. The later one is the rationalistic methodology of keen systems concerning the mechanization of insightful behavior and today it's the real focal point of the exploration

Dudek and Jenkin, (2010) Artificial Intelligence (for example heuristic expert systems) relies upon knowledge while Computational Intelligence does not relies upon knowledge but rather on the numerical data provided. It has been clarified by recognizing AI systems from computational system and considering FLC, NN, and EC as its structure blocks. Real Computational Intelligence is said to have begun from IEEE World Congress on Computational Intelligence in 1994. Further, Fogel (2016) checked on the computational Intelligence thinking about adjustment as a key component of intelligence and deriving computational intelligence as a purpose for the intelligence in AI systems.

Gordon, (2011) explored on Artificial Intelligence (AI). A significant reason for creating shrewd systems is Artificial Intelligence. Artificial intelligence is viewed as the field of Science and Technology that build up the PC programs so as to reproduce the working of the biological brain. A significant case of such a simulation is the program that plays chess. In this way, the significant focal point of AI is on the simulation of human intelligence including thinking, learning and critical thinking. Turing Test is the one that is utilized to decide the degree to which the performance of the AI program in simulating the human intelligence. Robots like ZAR5 robot chip away at the idea of AI.

Oke, (2018) Artificial Intelligence (AI) is worried about formation of savvy operators and for the most part the systems require the learning ability to investigate the intelligence in them. Such systems need the machine learning techniques that manages structure and advancement of calculations so as to instigate the learning ability. Thus, Machine learning is viewed as a territory inside AI. Further, Data Mining is utilized to remove the nuggets of knowledge or obscure intriguing patterns from a dataset, database or data distribution center. It has taken motivation from Machine learning, artificial intelligence and Statistics. The three fields may flourish for something very similar yet the methodologies are unique. Different Applications of AI lie in Robotics, Strategic arranging and Scheduling, Manufacturing and Maintenance and so forth. Research laborers from every one of the fields attempt to share the knowledge that have been picked up so far trying to give new advances and ways to deal with all the more understanding and separating of concealed knowledge in the particular fields. One of the successful and significant techniques for removing knowledge from the operational or value-based data is the Data Mining (DM) procedure which is viewed as the mix of Artificial Intelligence, Machine Learning and Statistics.

III. NEURAL NETWORKS

Ruhui Ma et al. (2008) utilized a novel hybrid algorithm based radial premise work (RBF) neural network which is proposed for network anomaly detection in this paper. The quantum-acted molecule swarm optimization, which outflanks other optimization algorithm impressively on its basic architecture and quick union, has recently been connected to take care of optimum issue. In any case, the QPSO likewise has its very own deficiencies. In this way, a hybrid algorithm in training RBF neural network was proposed by them. This new transformative algorithm, which depends on a hybrid of quantum-carried on molecule swarm optimization (QPSO) and inclination drop algorithm (GD), is utilized to prepare RBFNN. Exploratory outcome on KDD99 intrusion detection datasets demonstrates that this RBFNN utilizing the novel hybrid algorithm has high DR while keeping up a low false positive rate.

Lee and Heinbuch (2011) expressed that Last two decades Neural Networks have been connected to take care of the anomaly detection issue. ANNs have the capacity of learning-by-model and summing up from constrained, boisterous, and inadequate data; they have been effectively utilized in a wide range of data serious applications. Anomaly detection utilizing ANN is effectively actualized by many scientists. In this ANN there are two sorts of learning. One is supervised learning and the other one is unsupervised learning. Under the supervised learning two sorts are utilized for anomaly detection. One is feed forward Neural Network (NN) and the other one is intermittent NN. They proposed a chain of importance of Back Propagation neural networks for identifying intrusions. Neural networks in low levels are planned and prepared with explicit affirmations about the network traffic. No network traffic data is utilized for training the neural networks. Neural networks in top-levels are utilized to join the detection given by low-level neural networks so as to expand the detection accuracy. Investigations are finished with reproduced data.

Abuadlla Yousef (2012) actualized a flow based anomaly intrusion detection utilizing MLP neural network for distinguishing anomaly attack detection. The aftereffects of tests with our IDS demonstrated that the utilization of Net Flow dataset by extricating just highlights that fundamentally add to intrusion detection gives promising outcomes. Flow-based intrusion detection systems are one of these methodologies that depend on totaled traffic measurements. Their principle points of interest are have autonomy and ease of use on rapid networks. Neural Network anomaly intrusion detection system dependent on flow data is proposed for recognizing attacks in the network traffic. The trial results exhibit that the structured models are promising as far as accuracy

Mr. Rakesh Ranjan[1]* Mr. Mazhar Eqbal[2] Mr. Hasibul Hasan Mansoori[3]

and computational time, and low rates of false positive alerts.

Liberios Vokorokos et al. (2016) introduced intrusion detections systems and plan architecture of intrusion detection dependent on neural network self-arranging map. They depicted base dangerous of neural network and intrusion detection system. The article further arrangements with explicit structure of intrusion detection architecture dependent on client anomaly behavior. A center of the planned architecture speaks to neural network SOM, which orders observed client behavior and decides conceivable intrusion of checked PC system. Consequence of the planned architecture is simulations in genuine conditions. Procured aftereffects of simulation dole out expediencies of utilizing neural network SOM in the intrusion detection systems that are exhibited in this paper.

Junyuan Shen et al. (2012) built up an AIS based network intrusion detection plot. An upgraded highlight determination utilizing Rough Set (RS) hypothesis is characterized. The multifaceted nature issue is additionally tended to in the plan of the algorithms. They referenced a few AI techniques, for example, neural networks and fluffy rationale have been connected in ID. The outcomes are shifted. The intrusion detection accuracy is the fundamental concentration for IDS. Most re-search exercises in the zone are expecting to improve the ID accuracy. The plan is tried on the generally utilized KDD CUP 99 dataset. Their outcome demonstrates that the proposed plan beats different plans in detection accuracy.

IV. APPLICATIONS OF NEURAL NETWORKS

Schmidhuber, (2015) expressed that ANN are effectively connected to take care of issues like affiliation rules, pattern order, regression, feature selection, missing data prediction, succession mining, data decrease, probabilistic prediction, Naive Bayesian and deep learning, feature detection, discourse and picture recognition, synchronization, control of nonlinear systems, exchanging networks, discourse recognition, picture investigation, versatile control and so on. Applying Neural Network on enormous measure of instructive datasets can support scientists and experts to reveal patterns and patterns which wasn't possible manually. Various uses of neural network in training incorporate, advancement of new models or improvement in the current models that can be utilized in the instructive area for controlling understudy maintenance and whittling down, anticipating dropout understudies, determining the connection between the college placement test results and their rate of achievement, foreseeing and characterizing understudies based on their scholastic performance, evaluating the nature of training given by the establishments and so on.

Neural networks are grouped into various sorts as per their architecture, associations, flow of control and activation functions. Selection of the neural network type relies on the idea of the issue to be settled.

Neural network controller trained the neural network disconnected with known elements of the system as per Selinsky and Guez (2009). Through the training algorithm alteration, utilizing from the earlier knowledge, constrained the loads of the neural network through a parallel control way. From the earlier knowledge was consolidated. Neural network structure to the land weight guide was created. Practical connections are utilized to supplant the straight inputs. He built up a method for upgrading the underlying portrayal of the data to the neural network

For nonlinear plants versatile control plans are started by Narendra and Parthasarathy (2010). ID and control of neural networks applications are managed by Many of Narendra's papers. There was work done on self-learning control systems by Nguyen and Widrow. Utilizing neural networks ID issues and control issues a Long history was given by Windrow's papers. Windrow's work was on open-circle control and with no priori knowledge. Shut circle feedback was excluded in Windrow's work. To accomplish the predefined performance, he settled a precarious system with feedback and then utilized neural network. Utilization of neural network is the recommendation given by Windrow's work. In the field of control dependent on neural network, foundation is finished by Narendra and Widrow. Work done by them on neural network was checked on in a large portion of the papers in charge applications. Neural networks subjects are given in the accompanying segments. About any system restricted sum information going to be known. Any knowledge about the priori system leaving is certainly not a decent plan.

Psaltis et al (2018) nonlinear plant control neural networks utilize three autonomous neural networks. Pre-channel, a feedforward controller and a feedback controller are the three neural networks. Neural networks are trained by various learning techniques. To instruct feedforward controller, the pre-channel general learning architectures and roundabout learning are utilized. Feedback controller is shown utilizing particular learning architecture. Neural network is trained utilizing another algorithm created by them with the nonlinearities of the plant knowledge. The new algorithm thinks about the plant as another layer to the neural network, and the incomplete subordinates of the plant at its working point are utilized to prepare through the plant. This technique requires knowledge of the nonlinearities of the plant.

Mr. Rakesh Ranjan[1]* Mr. Mazhar Eqbal[2] Mr. Hasibul Hasan Mansoori[3]

Narendra and Parthasarathy utilized same thought and it is utilized by many different analysts. Model of the neural network was made by the expected access to the real system. Neural network controller is trained by the model of the neural network. Training, utilizing the genuine system, functions admirably utilizing a neural network. Making a decent model of the system is the principal issue. Discovering connection between's the yields and the inputs is depended on the neural network. Relationship is the subsequent issue to impact the working of the controller with neural network. Priori information was not utilized by the over two techniques. Utilizing from the earlier knowledge to the constrained loads of the neural network was utilized by Joerding and Meador (2011). The issue of priori knowledge joining about a yield ideal capacity into explicit constraints is tended to by them. Weight Constraint strategy and an Architecture Constraint technique are the two general methodologies. Monotonic and concavity which are the types of the ideal yield capacity was accepted by both the strategies. Slant does not change sign in monotonic capacity while slant that increments (or diminishes) as the capacity contentions increment the neural network wanted yield is constrained to these capacity types. With a hyperbolic tangent squashing capacity for feed-forward neural network to abuse the mathematical nature, two strategies are utilized.

From the earlier knowledge was joined as the yield layer of the neural network into the system by Brown, Ruchti, and Feng (2013). To plan a quick, successful controller it is critical to have priori knowledge. In neural network it is exceptionally normal practice to prepare the neural network disconnected, utilization of from the earlier knowledge are discovered I. Their thought is to prepare the neural network by making a model with more subtleties accessible. The shaded commotion is the contribution for the training set. Neural network subsequent to training is associated with the real system. The neural network may not execute true to form because of the nonlinearities is the issue with this strategy, if the model isn't absolutely right.

V. UTILIZATION OF NEURAL NETWORKS IN QUALITY ASSESSMENT

In this paper, Bouzerdoum (2015) propose a neural network way to deal with image quality assessment. Specifically, the neural network estimates the nature of an image by foreseeing the mean opinion score (MOS) of human eyewitnesses, utilizing a set of key features extricated from the first and test images. Test results, utilizing 352 JPEG/JPEG2000 packed images, demonstrate that the neural network yields associate exceedingly with the MOS scores, and in this way, the neural network can undoubtedly fill in as a connect to emotional image quality assessment. Utilizing 10-crease cross-approval, the anticipated MOS esteems have a straight relationship coefficient of 0.9744, a Spearman positioned connection of

0.9690, a mean total mistake of 3.75%, and a rms blunder of 4.77%. These outcomes contrast in all respects positively and the outcomes got with different strategies, for example, the basic likeness record.

Callet (2016) depicts a use of neural networks in the field of target estimation technique intended to automatically survey the apparent nature of advanced videos. This difficult issue means to imitate human judgment and to supplant extremely mind boggling and tedious emotional quality assessment. A few measurements have been proposed in writing to handle this issue. They depend on a general system that joins various stages, every one of them tending to complex issues. The desire of this paper isn't to exhibit a worldwide immaculate quality measurement but instead to concentrate on a unique method to utilize neural networks in such a structure with regards to reduced reference (RR) quality measurement. Particularly, we bring up the enthusiasm of such an instrument for consolidating features and pooling them so as to process quality scores. The proposed methodology takes care of certain issues characteristic to target measurements that should anticipate emotional quality score acquired utilizing the single boost persistent quality evaluation (SSCQE) strategy. This last has been embraced by video quality expert group (VQEG) in it's as of late settled reduced referenced and no reference (RRNR-TV) test plan. The innovation of such methodology contrasted with past endeavors to utilize neural networks for quality assessment, depends on the utilization of a convolutional neural network (CNN) that permits a constant time scoring of the video. Target features are removed on an edge by-outline premise on both the reference and the misshaped groupings; they are gotten from a perceptual-based portrayal and incorporated along the fleeting hub utilizing a period delay neural network (TDNN).

Kung et al (2011) Artificial Neural Network (ANN) is a strategy for the mathematical functions to reenact the human nervous cells in the processing system. The upside of ANN is utilizing the model of neural network system with always training to pick up the precise outcomes. Structure Similarity (SSIM) contain the image brightness, contrast, and structure, it communicates the nature of the images thoroughly. This examination joins the Artificial Neural Network perceptrons and Structure Similarity attributes to make various sorts of images appropriate for weight esteem, expect through the video image intensifier to improve the visual recognizable proof, and gives the automatic image processing method later on (for example examine, detection, division, and recognize). The "Image Intensifier Filter System" which could automatically reinforce the video image as indicated by various sorts of video image is created for this examination.

Mr. Rakesh Ranjan[1]* Mr. Mazhar Eqbal[2] Mr. Hasibul Hasan Mansoori[3]

Liebowitz, (2016) Educational Data Mining utilizes various techniques, for example, decision tree, rule enlistment, neural networks, k-nearest neighbor, credulous Bayesian, regression, affiliation examination and many others. These techniques, gives differing nature of knowledge. Such knowledge is productive for decision creators to improve the degree of nature of the instruction system. It has been seen from writing survey section that neural network is promising data mining strategy that has beated in various educational issues in correlation with different techniques.

VI.   CONCLUSION

Different ideal models of Artificial Intelligence have been investigated out. Development of soft computing have been sequentially point by point out to demonstrate the history pathway from basic science towards the idea of soft computing through computational techniques. Aside from this, contrasts among statistics and different machine learning algorithms have additionally been expressed. As technology propels, the image show technology and industry have been developed too. Artificial Neural Networks is a broadly talked about and re-considered themes lately. It alludes to an impersonation of biological neural network information processing system. To the biological perspective, the artificial neural network is a straightforward model of human brain. A writing study for quality assessment utilizing neural networks has been displayed in this paper.

REFERENCES

1.   Panigrahi, P. K. (2010). An artificial intelligence approach towards automatic classification (Part-2). IASLIC Bulletin, 44(3), pp. 105-118.

2.   Fogel, Lawrence J., Alvin J. Owens, and Michael J. Walsh (2016). "Artificial intelligence through simulated evolution.".

3.   Dudek, Gregory, and Michael Jenkin (2010). Computational principles of mobile robotics. Cambridge University press.

4.   John L.Gordon (2011) . "Artificial Intelligence – From Logic to Fuzzy Logic", Applied Knowledge & Innovation, AKRI.

5.   Oke, S. A. (2018). "A literature review on artificial intelligence." International Journal of Information and Management Sciences 19.4: pp. 535-570.

6.   Ruhui Ma, Jiangnan Univ., Wuxi, Yuan Liu, Xing Lin and Zhang Wang (2008). "Network Anomaly Detection Using RBF Neural Network with Hybrid QPSO, Networking,

Sensing and Control', ICNSC 2008, IEEE International Conference on pp. 1284–1287.

7.   Lee S.C. and Heinbuch D.V. (2011), 'Training a neural-network based intrusion detector to recognize novel attacks', IEEE Transactions on Systems, Man and Cybernetics, Part A, Vol. 31, Issue 4, pp. 294 –299.

8.   Abuadlla Yousef (2012). "Flow-Based Anomaly Intrusion Detection System using Neural Network', Proceedings of the International Conference on Internet Computing , Informatics in E-Business and applied Computing (ICIEACS 2012), Bur Dubai, UAE.

9.   Liberios VOKOROKOS, Anton BALÁŽ, Martin CHOVANEC (2016). "Intrusion Detection System Using Self Organising Map', Acta Electrotechnica et Informatica No. 1, Vol. 6, , pp. 1-6.

10.   Junyuan Shen, Jidong Wang and Hao Ai (2012). "An Improved Artificial Immune System based Network Intrusion Detection by Using Rough Set', Communications and Network, Vol. (4), pp. 41-47.

11.   Schmidhuber, J. (2015) "Deep learning in neural networks: An overview. Neural Networks, 61, pp. 85–117. doi:10.1016/j.neunet.2014.09.003

12.   Selinsky, J. W. and A. Guez (2009). "The Role of A Priori Knowledge of Plant Dynamics in Neurocontroller Design," Proceedings of the 28th Conference on Decision and Control, Vol. 2, pp. 1754-1758

13.   Narendra, K. S. and K. Parthasarathy (2010). "Identification and Control of Dynamical Systems using Neural Networks," IEEE Transactions on Neural Networks, Vol. 1, No. 1, pp. 4-27

14.   Psaltis, D., A. Sideris, and A. A. Yamamura (April 2018). "A Multilayered Neural Network Controller," IEEE Control Systems Magazine, Vol. 8, No. 2, pp. 17-21

15.   Joerding, W. H. and J. L. Meador (2011). "Encoding A Priori Information in FeedForward Networks," Neural Networks, Vol. 4, pp. 847-856 Proceedings of the IEEE International Joint Conference on Neural Networks, Vol. 3, pp. 21-26

16.   Brown, R. H., T. L. Ruchti, and X. Feng (2013). "Artificial Neural Network

Identification of Partially Known +Dynamic Nonlinear Systems," Proceedings of the 32nd Conference on Decision and Control, vol. 4, pp. 3694-3699

17. Liebowitz, J. (2016). Thoughts on recent trends and future research perspectives in big data and Analytics in higher education. Big Data and Learning Analytics in Higher Education, Springer, pp. 7–17. doi:10.1007/978-3-319- 06520-5_

18. A. Bouzerdoum A. Havstad and A. Beghdadi (2015). "Image quality assessment using a neural network approach" 10.1109/ISSPIT.2004.1433751

19. P. Le Callet, C. Viard-Gaudin and D. Barba (2016). "A Convolutional Neural Network Approach for Objective Video Quality Assessment" Volume: 17, Issue: 5.

20. Chih-Hsien Kung, Wei-Sheng Yang and Chih-Ming Kung (2011). "A Study on Image Quality Assessment using Neural Networks and Structure Similarity" JOURNAL OF COMPUTERS, VOL. 6, NO. 10, OCTOBER 2011

Corresponding Author

Mr. Rakesh Ranjan*

Assistant Professor, Department of Computer Science and Engineering, Maulana Azad College of Engineering and Technology, Neora, Patna

Mr. Rakesh Ranjan[1]* Mr. Mazhar Eqbal[2] Mr. Hasibul Hasan Mansoori[3]