INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 08, August 2025, pp : 1810-1812
www.ijprems.com
editor@ijprems.com
e-ISSN : 2583-1062
Impact Factor : 7.001

COUNTERFEIT NEURAL SYSTEMS: DESIGN, APPLICATIONS AND FUTURE DIRECTIONS

Soundarya S[1], Venkoba Kutagamari[2]

[1]Student Of MCA, School Of Applied Science Sapthagiri NPS University, Bengaluru, Karnataka, India.

[2]Assitant Professor, School Of Applied Science Sapthagiri NPS University, Bengaluru, Karnataka, India.

ABSTRACT

Artificial Neural Systems (ANNs) are computational models propelled by the structure and work of the human brain. They play a imperative part in fathoming complex issues where conventional calculations come up short, such as picture acknowledgement, characteristic dialect preparing, and restorative diagnostics. This paper presents an diagram of ANN structures, their learning components, and real-world applications. The consider highlights how ANNs accomplish tall precision through administered and unsupervised learning strategies .Furthermore, it is about challenges such as large scale, excessive adaptation, Computational, which received requests for information. Ultimately, this paper contains details on how Ann Research leads to proper AI and integration into other paradigms for machine learning.

Keywords: Counterfeit Neural Systems, Machine Learning, Profound Learning, Administered Learning, Applications.

1. INTRODUCTION

Artificial Neural Network in Systems (ANNs) are one of the foundational methods manufactured insights (AI) and machine learning (ML).They include artificial neural network in systems(ANN). Antennas of neurons(ANN) are powered by living neurons and act as interdependent hubs that handle data. The emergence of vast amounts of data and advancements in computational resources has made ANNs crucial in understanding high- dimensional, non-linear problems. The current investigation centers on enhancing interpretability and scalability, rather than prioritizing precision prediction.

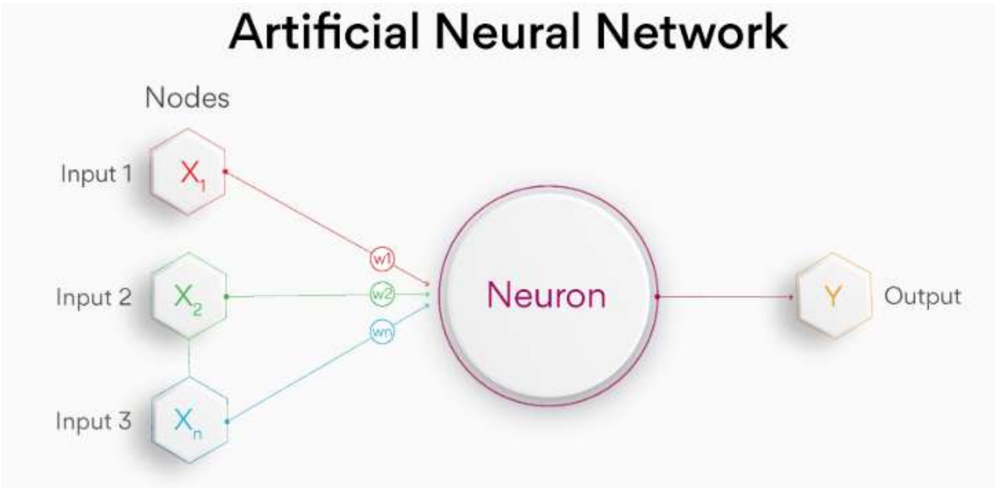

Figure 1: Artificial Neural Network

2. LITERTURE REVIEW

- A lot of research has focused on understanding and making Artificial Neural Networks better. LeCun and his team in 2015 showed how deep learning works well for tasks like recognizing images, which helped make CNNs useful in real-world situations.[4]
- In 2015, Schmidhuber had a complete overview of how deep learning evolved over time, pointing out the most important advances in both supervisor and unattended learning.[2]
- Goodfellow and others in 2016 introduced GANs, a new type of model that can create fake data, which has had a big impact on creative AI.[1]
- More recently, Zhang and yang in 2021 stressed the need for explainable AI, focusing on making neural network decisions easier to understand and more open.[6].
- Kumar and Guptha from Federate Learning in 2022. This is a way that allows you to train neural networks while data is held personally, and illustrates how distributed AI systems Work.[7]

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 08, August 2025, pp : 1810-1812
www.ijprems.com
editor@ijprems.com
e-ISSN : 2583-1062
Impact Factor : 7.001

3. METHODOLOGY

3.1 Neural Network Architecture

ANNs consists of three main layers:

1. Input Layer: Receives raw data features.
2. Hidden Layer: Extract properties via activation functions such as ReLU, Sigmoid, Tanh.
3. Output Layer: Produces classification, regression, or clustering results.

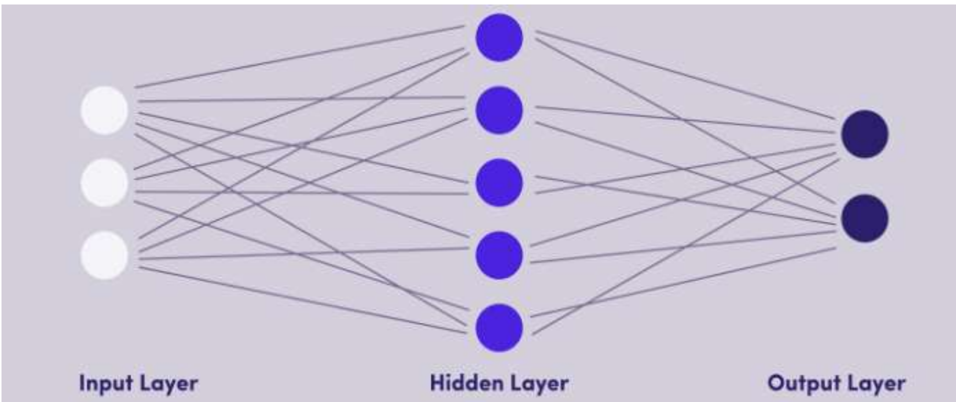

Figure 2: Neural Network Architecture

3.2 Training Process

1. Data Preprocessing (Normalization, encoding).
2. Forward Propagation for prediction.
3. Backpropagation for error minimization.
4. Optimization using algorithms such as Gradient Descent or Adam Optimizer.

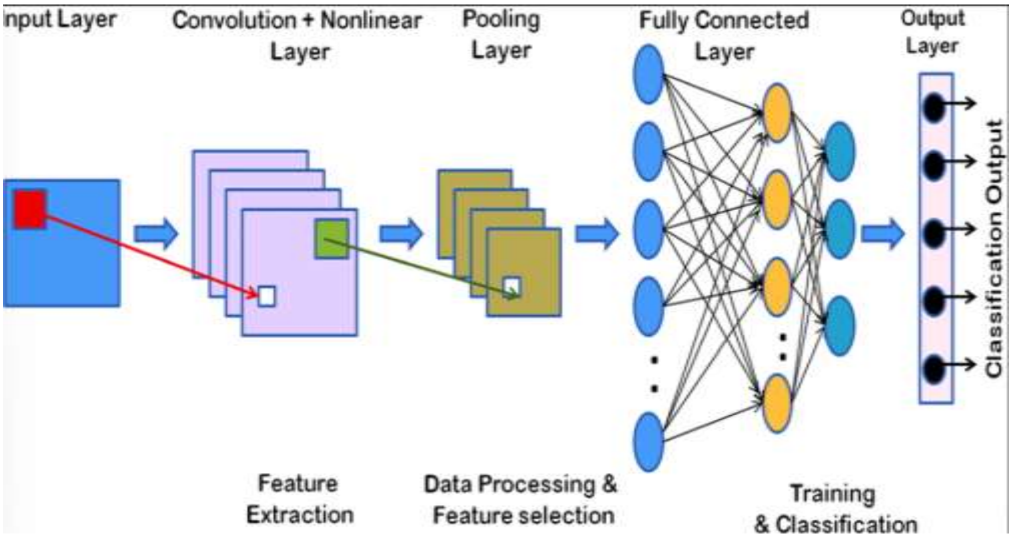

Figure 3: Training Process

4. MODELING AND ANALYSIS

In this study, a feedforward neural network with one hidden layer was simulated for a classification task.

1. Dataset: Standard MNIST (handwritten digits).
2. Hidden layer: 128 Neurons with ReLU Activation.
3. Training: 20 epochs using Adam Optimizer.

Table 1: Sample Accuracy Comparison

Model	Accuracy	Training Time(s)
Logistic Regression	91.2	12
ANN (1 Hidden Layer)	96.8	25
ANN (Deep-3 Layers)	98.3	67

The analysis showed that deeper architecture provide better accuracy but at the cost of increased computation time.

INTERNATIONAL JOURNAL OF PROGRESSIVE RESEARCH IN ENGINEERING MANAGEMENT AND SCIENCE (IJPREMS)
(Int Peer Reviewed Journal)
Vol. 05, Issue 08, August 2025, pp : 1810-1812
e-ISSN : 2583-1062
Impact Factor : 7.001

5. RESULTS AND DISCUSSION

The results show that artificial neural networks are better than traditional machine learning models when it comes to handling complex data. As networks get deeper, their performance usually gets better, but they also face problems like overfitting, difficulty in training, and using a lot of energy. Methods such as dropout, batch normalization, and adjusting the learning rate can help solve these problems. IN real-world use, ANNs are very useful: in healthcare, they help find diseases early, like cancer and diabetes; in finance; they are used for detecting fraud and predicting stock prices; in self-driving cars, they help identify objects and make decisions. However, there are still important issues to address, such as bias in data and the lack of clear explanations, which are crucial when using ANNs in a responsible way.

6. CONCLUSION

This paper gives detailed look at counterfeit neural systems, which are also called Artificial Neural Networks(ANNs). It covers their structure, how they are trained, how they model data, and how they are used in the real world. ANNs have Shown to be very effective at solving difficult problems that involve a lot of different factor, and they are changing how things work in industries. The results show that ANNs often do better than older models, but there are still some issues like high costs to run them, models learning too much from training data, and concerns about how ethical their use is. The review of existing research shows that studies on ANNs are always changing, with new ideas in deep learning, explainable AI, and learning across networks helping shape the future of smart systems. As we move forward, developments in computing that mimics the brain, networks that use quantum principles, and AI that uses less energy will play a big role in how this field grows. In the end, the success of ANNs depends not just on technical improvements, but also on making sure AI is fair, clear, and trusted by People

ACKNOWLEDGEMENTS

I extend my sincere gratitude to **(Venkoba Kutagamri), Assistant Professor,** School of Applied Science, Sapthagiri NPS University Bengaluru, for his constant guidance, encouragement, and valuable feedback throughout the course of this research work. His expertise and insightful suggestions were instrumental in shaping the direction and quality of this study. I would also like to thank the **School of Applied Science, Sapthagiri NPS University,** for providing a conductive academic environment and necessary resources to carry out this work successfully.

7. REFERENCES

[1] Goodfellow I., Bengio Y., Courville A., Deep Learning, MIT Press, 2016.
[2] Schmidhuber J., “Deep learning in Neural Networks: An Overview, “Neural Network, vol. 61, pp. 85-117, 2015.
[3] Ganesh Kumar and P. Vasnth Sena, “Novel Artificial Neural Networks and Logisitic Approach for Detecting Credit Card Deceit,” IJCSNS, Vol. 15, Issue 9, pp. 222-234, 2015.
[4] LeCun Y., Bengio Y., Hinton G., “Deep Learning,” Nature, Vol. 521, pp. 436-444, 2015.
[5] Hitesh D Bambhava jayeshkumar Pitroda, Jayadev J.Bhavasar, “A Comparative Study on Bamboo Scaffolding And Metal Scaffolding in Construction industry,” IJETT, Vol. 4, Issues 6, pp. 2330-2337, 2013.
[6] Zhang Q., Yang L., ‘Advances in Explainable Artificial Intelligence: Interpretable Models and Methods.’ IEEE Transactions on Neural Networks, 2021.
[7] Kumar S., Gupta R., ‘Federated Learning for privacy=Preserving Neural Networks.’ ACM computing Surveys, 2022.