Neural Networks Error Recovery using Cloud Operations

Prof. Shweta. M. Nirmanik[2], Anupama. B .Salimath[2]

[1,2] *Dept of CSE, Rural Engineering College Hulkoti.*

Abstract - *Neural networks can meet the needs of error recovery and system and security in cloud production systems. Through constant monitoring of the network applied as a restore and redistribution model. In fact, if a system fails to operate the supporting neuron nodes can rebuild the system while establishing new connections. Neural networks are a useful method for forming manage policies in difficult decision problems. Building a neural network with a layered approach to an organization cloud productions network allows the use of cooperative co evolutionary algorithms and canonical evolutionary algorithms to support and automate system, as a self-remediation tool.*

Keywords: Neural Networks, Cloud, Disaster recovery, Cooperative co evolutionary algorithms, canonical evolutionary algorithms, Distributed problem solving.

1. INTRODUCTION

Neural computing originates from biological processes, it will be useful to review the properties of a biological neural network at a summery level, before introducing artificial intelligence remediating disaster recovery neural network system. Our human brain deals with pattern matching and pattern handling with no difficulty and effectiveness that no computer system can match it performs these tasks not in a consecutive fashion but in a parallel fashion using a large network of neurons. The brain is organized in a hierarchy with successively higher layers performing more complex and summary operations on the input data. Each layer performs its processing of the input data before passing the result up to the next layer. The neurons for the "processing elements" of the mind. The human neocortex contains over 10 billion neurons with each neuron connected to thousands of other neurons.

The mind contains a vast number of different neurons each with a marginally differing structure and properties. Much like the designs of neurons in the AI neural network DRCO systems structures and properties vary.

In the current Artificial Intelligence (AI) neural models they remain simplistic when compare to the brain and use a simple summation and threshold devoice as the basic processing element in a layered network. Artificial neurons are the fundamental building blocks of neural networks. A neuron takes a set of inputs X; which are the same to the excitation or the inhabitation signal levels of a neuron.

A typical artificial neuron has a single output and several inputs, usually one from each neuron in the preceding layer. These inputs are then acted upon by a set of associated weights W; which correspond to the synaptic strengths of a neuron. These weighted inputs are then compared with a threshold value and the output is delivered depending on the result of thresholding. The weighting factors are analogous to the synaptic strengths within a brain. The artificial neurons are usually connected in a simple layered structure. Most neural network model consist of either two or three layers of neurons since it has been shown that any continuous mappings can be achieve by a three-layered system a multilayer network where each input X;to a neuron Nj, in a layer has an associated weight W;j. The inputs from each layer are then broadcasted as inputs.

1.1 AI Self – Error recovery monitoring system for cloud operations.

This AI self – remediating error recovery monitoring system for cloud operations is planned holistically much like the human brain. The core response server is built to manage the activities of the network neuron collective. And supporting servers, Forward safety attack pattern recognition servers,(FSAPR)the FSAPR supplies the pattern identification to the core alert server. Parietal Network Logic End server(PNLE) network plan changes and detection and FSAPR stimulation. Temporal Log Pattern Preceptor(TLPP)server supporting FSAPR server and parietal network logic server. The brain neocortex equivalent is the network neuron collective.

1.2 Perimeter Network distributed problem solving (DSP)agents.

Guarding the perimeter of a network using a distributed problem solving (DSP)agents; DSP is the supportive solutions of a problem by a grouping of loosely coupled agents resulting in a decentralized computational model. There are no centralized data stores, and no agents has enough information to make complete decision; an agent requires assistance from other agents in the decision – making process. DSP agents DSP revolves around the distribution and coordination of computation among its society of agents so that structural demands of the task are matched. The DSP node resolves to a manager node which announces a task for which multiple eligible perimeter nodes respond with an offer. An offer/task is presented by a level of need and correction to the network nodes view/state. Each perimeter node will receive instructions after a negotiation process, and in case a perimeter node requires assistance with its current problem that to solve as part of the original request.

In this quest for answers, the perimeter node will assume the role of manager node the node and send a sub – request the part of the problem it needs help to solve. The methodology for resolution for a task is specified in the programming of the perimeter node.

The change operator uses a back-propagation algorithm and is performer a few iterations with a low value of the learning coefficient n. Parametric mutation is carried out after the structural mutation. Structural mutation displays the complexity in the modification of the structure of the network. While retaining the behavioral link between parents and their offspring this link avoids generational gaps that can produce inconsistency in the evolution algorithm. There are four different structural mutations that will be applied to the network neuron collective.

- **Addition of node**: The node is added with no links to implement the behavioral link with its parent.
- **Deletion of node**: A node is randomly selected and deleted together with its links.
- **Addition of connection**: A link is added, with weight 0 to a randomly selected a node. There are three types of links: from an input node, from an extra hidden node to the output node. Each link of each type may end up biased.
- **Deletion of connection**: a link is selected, following the same condition of the addition of links, and removes.

Table :1 Parameters of network structural mutations.

Mutation	Δm	ΔM
Add node	0	1
Delete node	0	2
Add connection	1	4
Delete connection	0	3

2.3 Configuration of the network neuron collective environment

The configuration of the network neuron collective consists of several logical modular clusters of network nodes and a behavior neuron recording node. Nodes in a logical cluster correspond to a class of functionally equivalent entities and are distributed over a network. Nodes in a logical cluster correspond to a class of functionally equivalent entities and in general, are distributed over a network. In this environment, three logical clusters of the network are developed.

- **DPS nodes:** Each node sits on the perimeter of the networks; each neuron node corresponds to firewalls and load balancers and endpoints.
- **System update neuron nodes**: Each system node sits on the perimeter of the networks; each neuron node corresponds to the perimeter distribution neuron, providing update searches.
- **Behavior neuron nodes**: behavior neuron node sits on the perimeter of the networks; each neuron node corresponds to the perimeter distribution neuron; the behavior neuron node is part of the subpopulation.

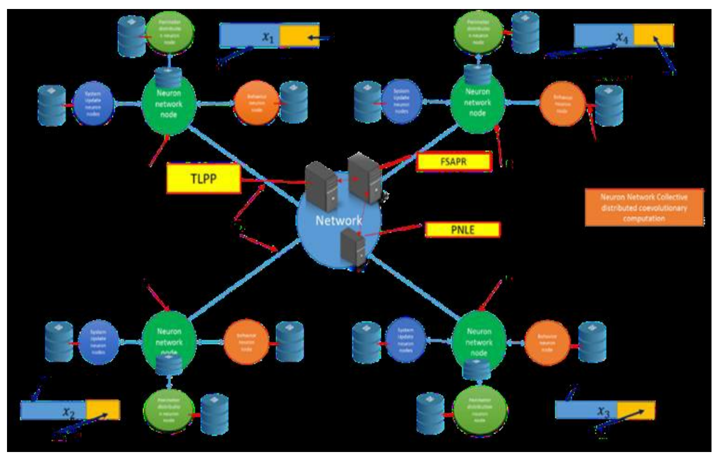

Figure:2 The network neuron collective environment.

3. Agents design neural networks.

The DPS agents start the evolutionary search by searching each of the perimeter nodes for available decision resources and encoding references to the discrete choices in the appropriate one or two or more alternative forms of mutations are changes found at the same place on the nodes. Sets ofits representation data structure. A certain mutation of the network will set corresponding to a certain part of node type stores an encoded list of equivalent parts available for spin up. All perimeter nodes act in similar fashion to mutations in the network. xiIn this model of computation, the evolutionary algorithm at any node I performs an evolutionary search based on its primary variable block xi using locally accessible information, it is assumed that accessing the interconnection network for purposes of communication between the nodes is delay prone, and so each node performs large number of local computations between communication cycles. Given space x and a variable distribution, each node I performs a local evolutionary search in its primary subspace xiwhile the variables corresponding to the second subspaces at a node are secured. An intercommunication operation updates the respective secondary variables at all nodes. Following this, the local search proceeds using updated information, and the local and global operations of the distributed search alternate, resulting in a cooperative search. The search space x in this computation is the product space of the p subspaces and is given by $x = \pi_i^p = 1$.

4. NEURAL NETWORK

The aim of this work was to create a prototype application which enables efficient provisioning of cloud storage resources with the use of A Neural Networks to achieve better compliance with SLAs. The most common type of NNs used for forecasting is the feedforward multilayer perceptron (ffmlp), as seen in Figure 1.

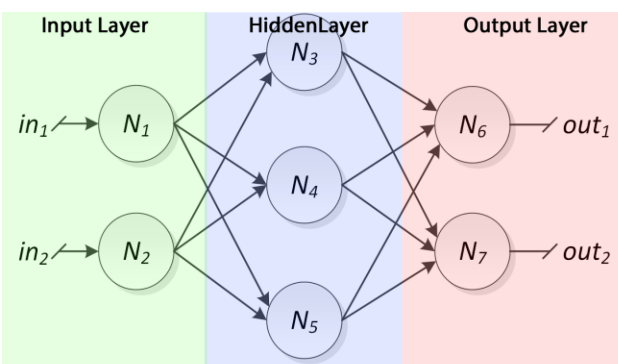

Figure 1. Simple 3-tier Feedforward Multilayer Perceptron.

These are Neural Networks, which consist of one input layer, n-hidden processing layers and one output layer. Feed forward networks are classified by each neuron in one layer having only direct connections to the neurons of the next layer, which means they have no feedback. In feed forward multi-layer perceptions, a neuron is often connected to all neurons of the next layer, which is called completely linked. So, there is no direct or indirect connection path from neuron Nx which leads back to a neuron Nx. To compute a one-step-ahead forecast, these NNs are using lagged observations inputs of time.

4.1 Need for Error Recovery (ER)

Figure:2 What happens when you don't have the right ER system

5. Error recovery on cloud operation

- Error recovery (ER) is about preparing for and recovering from an error.
- Any event that has a negative impact on a company's business continuity or finances could be termed an error. This includes hardware or software failure, a network outage, a power outage, physical damage to a building like fire or flooding, human error, or some other significant event.
- According to AWS, "Error recovery is a continual process of analysis and improvement, as business and systems evolve. For each business service, customers need to establish an acceptable recovery point and time, and then build an appropriate ER solution."
- ER on Cloud can significantly reduce costs (up to half the costs) as compared to a company maintaining its own redundant data centers. These costs include buying and maintaining servers and data centers, providing secure and stable connectivity and keeping them secure. The servers would also be underutilized.

5.1 Traditional ER Practices

- A traditional approach to ER involves different levels of off-site duplication of data and infrastructure. Critical business services are set up and maintained on this infrastructure and tested at regular intervals. The disaster recovery environment's location and the source infrastructure should be a significant physical distance apart to ensure that the disaster recovery environment is isolated from faults that could impact the source site.

- At a minimum, the infrastructure that is required to support the duplicate environment should include the following:

1. Facilities to house the infrastructure, including power and cooling.
2. Security to ensure the physical protection of assets.
3. Suitable capacity to scale the environment.
4. Support for repairing, replacing, and refreshing the infrastructure
5. Contractual agreements with an Internet service provider (ISP) to provide Internet connectivity that can sustain bandwidth utilization for the environment under a full load.
6. Network infrastructure such as firewalls, routers, switches, and load balancers.
7. Enough server capacity to run all mission-critical services, including storage appliances for the supporting data, and servers to run applications and backend services such as user authentication, Domain Name System (DNS), Dynamic Host Configuration Protocol (DHCP), monitoring, and alerting.

APPLICATIONS

- Neural Networks in Practice
- Neural networks in medicine
  - Modelling and Diagnosing the Cardiovascular System
  - Electronic noses
  - Instant Physician
- Neural Networks in business
  - Marketing
  - Credit Evaluation

ADVANTAGES

- It involves human like thinking.
- They handle noisy or missing data.
- They can work with large number of variables or parameters.
- They provide general solutions with good predictive accuracy.
- System has got property of continuous learning.
- They deal with the non-linearity in the world in which we live.

4. Conclusion

The applicability of AI - Self- Remediating Error Recovery monitoring system for a cloud operation. Can improve the error recovery many businesses that rely on cloud computing. Many times, production and security lack the personal to patch update and recovery systems due to the lack of knowledge employees. This AI- Self Remediating Error Recovery monitoring system for a cloud operation. Fills the gap between HR resources and system resources.

REFERENCES

1. C.H.M.D.O.B.NicolasGarciaPedrajess, "cooperative coevolution of artificial neural network assemble for pattern classification"IEEE transactions on evolutionary computation,vol. 9,no.3,p.32,june2005
2. J.W.Z.H. Zhou, "Ensembling Neural networks:Many could be better than all,"Artificial Intelligence,vol.37,no.1-2,pp.239-253,May 2002.
3. P.J.Werbos,The roots of Back propagation :from ordered derivatives to Neural Networks and political forcasting, New Yark;Wiley,1994.
4. X.A.Y.Liu, "a new evolutionary system for evolving artificial neural networks",IEEE Trains.
5. Neural Networks,vol.8,pp.694-713,1997.