International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 11 Issue: 08 | Aug 2024 www.irjet.net p-ISSN: 2395-0072

A SECURE ENERGY OPTIMIZED MODEL FOR WIRELESS NETWORK PROCESS USING MULTICHANNEL NEURAL PERCEPTRON

P Ramya[1], Dr. K Venkataramana[2], V Sridhar[3]

[1]PG Scholar, [2]Professor, [3]Assistant Professor
Dept. of Computer Science and Engineering,
VEMU Institute of Technology, P. Kothakota, Chittoor, Andhra Pradesh, India.
[1]ramyatheja2001@gmail.com, [2]venkatkathi84@gmail.com, [3]sreedharv1234@gmail.com

---

Abstract - *The rapid-fire increase of mobile data growth and the use of smartphones are creating unknown challenges for wireless service providers to overcome a global bandwidth deficit. As moment's cellular providers attempt to deliver high quality, low quiescence videotape and multimedia operations for wireless bias, they're limited to a carrier frequency diapason ranging between 700 MHz and2.6 GHz. The total allocated bandwidth for all cellular technologies globally does not surpass 780 MHz where each major wireless provider has roughly 200 MHz across all of the different cellular bands of*

Diapason available to them uses MAC protocol. The system works with considering the dynamic updating of the network with data offloading. Data save through cluster heads in case of energy loss. Estimate the shortest routing model every replication to reduce routing outflow. Alert the system when Routing problem occurs.

***Key Words*: Bandwidth, Carrier, 5G Cellular Network, MAC, MCNP.**

1. INTRODUCTION

Over the years mobile communication has kept increasing and offers continuous growth on global industries. Various companies have initiated the 5G communication based massive trials. The goal of the enhanced 5G communication systems is to provide effective outcome on content delivery to the consumers. 5G communication is slowly installed in various public places. Due to the rise in mobile devices, the 5G communication system can connect nearby devices using an available network. Often utilizing the wireless connectivety publicly available.

The major drawbacks persist with the publicly connected networks are, lack of privacy constraints and security protocols. The evolution of 5G communication network focused on delivering ultra wide band low latency communication. The systems are capable of communicating with critical applications and formulate the type of conversion held between the user and the system.

Our approach focuses on three core objectives: maximizing energy efficiency, ensuring robust security, and maintaining high-quality service levels.

2. LITERATURE SURVEY

In today's era, people are leading an unhealthy lifestyle due to bad lifestyle choices, lack of physical activity and inadequate relief of chronic stress, which further leads to the development and progression of chronic dise-ases. Thus, the need for healthcare systems and disease management is more than ever. According to the World Health Statistics 2020, the worldwide epidemic of COVID-19 will have an unknown consequence towards a healthier world [1].

WBAN consists of numerous minute, low powered and lightweight sensors having wireless communication capability. These types of sensors are located on the body, which are affixed either to the garments or at the skin or implanted under the skin (biosensors) [2],[5].

Wireless Body Area Network (WBAN) evolves as a cost efficient solution due to the miniaturization of sensor devices that revolutionized the healthcare services [3].

The majority of human deaths were caused due to Non Communicable diseases (NCDs), accounting for 71% (40.3 million) of the overall deaths. In the last 15 years, these diseases have been the key causes of deaths worldwide as symptoms are not acknowledged or experienced in earlier stages by patients. There is need of a ubiquitous and cost effective healthcare system that could diagnose the diseases in their initial stages [4].

2. PROBLEM STATEMENT

Nowadays, mobile communication has kept increasing and offers continuous growth on global industries. A robust routing model is created with 700 dynamic nodes. The optimization method utilized here is focused on extensive investigation of energy and latency. Novel design solution is provides here to develop a system that will manage

- 5G network connected devices expected the high quality of signals transmitted from source to destination.
- In case of any blockages present in the network, the presented system identifies the issues through

Multi-channel neuron perceptron network (MCNP) created at the proposed system.

3. EXISTING SYSTEM

The optimization method utilized here is focused on extensive investigation of energy and latency. Novel design solution is provides here. The study of presented system provides deep knowledge on various distributed routing models.

Various companies have initiated the 5G communi-cation based massive trials. A robust routing model is created with 700 dynamic nodes. The presented system considers non-minimal routing protocol, with mitigating quality through Non-minimal model achieved up to 20%. Traffic created during the testing process and improvement during connect-ion of other network is presented.

Disadvantages:

- It is not known to what extent each independent variable is affected by the dependent variable.
- Computations are difficult and time consuming.
- The proper functioning of the model depends on the quality of the training.
- Traffic created during the testing process and impro-vement during connection of other network is presented.

4. PROPOSED SYSTEM

Creation of Wireless sensor network design allocates nodes' energy and distance costs by randomly placing them in the available space. The next task will be to locate the cluster head in a different environment.

Establishment of Communication Following the alignment and creation of the nodes, the next task is to establish a connection in the network. Dynamic off-loading the system also support Chimp algorithm that should reduce data loss, as well as dynamic off-loading of data that will be missed in the route based on energy efficiency, which effectively prevents data loss.

Advantages:

The following are the advantages among the proposed system that can be implemented from the secure energy optimized model for wireless network process using multichannel neural perceptron:

- It can be applied to complex non-linear problems and Works well with large input data.
- The same accuracy ratio can be achieved even with smaller data and Provides quick predictions after training.
- The computational accuracy of the proposed model is more when compared with the existing classifica-tion methods from the existing system.
- Furthermore, the performance is evaluated through the various performance measures and numeric metrics etc.

5. SYSTEM ARCHITECTURE

Creating system architecture for a secure, energy-optimized model for wireless network processes using a multichannel neural perceptron involves integrating various components and layers to achieve seamless operation. Below mentioned diagram is an outline of the proposed architecture:

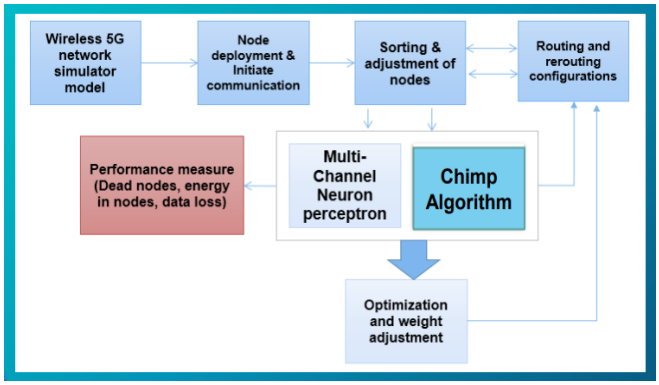

Fig -1: System Architecture

This architecture aims to balance the needs for security, energy efficiency, and performance in a modern wireless network using advanced neural network techniques.

6. MODULES

Fig -2: Module Implementation

A. Wireless 5G network simulator model:

A wireless 5G network simulator model is a tool or software that simulates the behavior and performance of 5G networks. These models are used to analyze and evaluate various aspects of 5G technology, including network design, performance, and behavior under different conditions.

Components of a 5G Network Simulator Model:

- **Network Topology:** The simulator models the network's layout, including base stations (gNodeBs), user equipment (UE), core network elements, and how they are connected.
- **Radio Frequency (RF) Simulation:** It simulates the radio environment, including signal propagation, interference, and coverage. This helps in understanding how signals travel and how they are affected by obstacles or other factors.
- **Traffic Models:** The simulator includes various traffic models to mimic real-world data usage patterns, such as streaming, browsing, or IoT communications. This helps in assessing network performance under different load conditions.
- **Protocol Models:** It incorporates the protocols used in 5G networks, such as the 5G NR (New Radio) and the 5G Core (5GC), to simulate how data is transmitted and processed.
- **Performance Metrics:** The simulator tracks and evaluates key performance indicators (KPIs) like throughput, latency, packet loss, and connection reliability to assess network performance.
- **Scenario Testing:** It allows users to create and test various scenarios, such as high user density, varying mobility patterns, and different network configurations, to see how the network performs in these situations.
- **Visualization Tools:** Many simulators come with visualization tools to display the network's performance and behavior in an understandable manner, such as heat maps or graphical reports.

Uses of 5G Network Simulators:

- **Design and Planning:** Helps network engineers design and plan 5G networks by providing insights into how different configurations will perform.
- **Optimization:** Aids in optimizing network parameters and configurations to achieve desired performance and efficiency.
- **Testing and Validation:** Allows for testing new features, protocols, or technologies in a controlled environment before deployment.
- **Research and Development:** Supports research into new technologies and methodologies by providing a platform to test theoretical concepts in practice.

B. Node Deployment and Initiate Communication

In a 5G network, both node deployment and initiating communication involve additional complexities due to the advanced technology and features of 5G:

- **Node Deployment:** 5G networks use various types of nodes, including macro cells, small cells, and massive MIMO (Multiple Input Multiple Output) antennas. Deployment strategies often involve optimizing the placement of these nodes to ensure optimal coverage and capacity.
- **Initiate Communication:** 5G introduces new protocols and techniques for establishing connections, such as beam forming and advanced handover procedures. This helps in achieving ultra-low latency and high-speed data transfer.

C. Sorting and Adjustment of Nodes

Sorting and adjustment of nodes in 5G networks are vital for managing and optimizing network performance, coverage, and resource allocation. These processes help ensure that the network can handle high data rates, support a large number of devices, and provide reliable and efficient service to users.

D. Routing & rerouting configurations

Routing and rerouting configurations in 5G networks are integral to managing the complexity and performance of advanced network architectures. They ensure efficient data transmission, network reliability, and the ability to adapt to dynamic conditions and service requirements.

E. Multi-Channel Neuron Perceptron

A multi-channel neuron perceptron extends the basic perceptron model to handle multiple input channels, allowing it to process more complex data structures, such as RGB images or multi-sensor data. This approach enhances the perceptron's ability to learn and make predictions based on multi-dimensional or multi-modal data.This extension involves:

- Handling multiple sets of inputs (channels).
- Applying channel-specific weights and biases.
- Combining the results from different channels for final predictions.

F. Chimp Algorithm

The Chimp Algorithm is a meta heuristic optimization technique inspired by the social and problem-solving behaviors of chimpanzees. The algorithm is designed to solve complex optimization problems by balancing the search for new solutions with the refinement of existing ones,

leveraging insights from chimpanzee behavior to guide the optimization process.

G. Optimization and Weight Adjustments

Optimization in 5G networks involves improving the performance and efficiency of the network to meet the high demands for speed, reliability, and low latency. It includes various techniques and methodologies aimed at enhancing network coverage, capacity, and overall quality of service (QoS). Weight adjustments are a crucial aspect of optimization in 5G networks, as they directly impact resource allocation, signal processing, and load balancing.

7. RESULTS

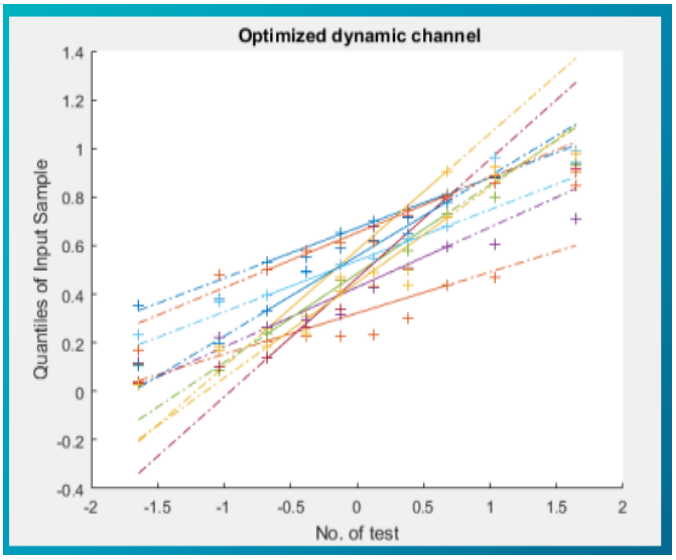

Fig -3: Optimized dynamic channel nodes

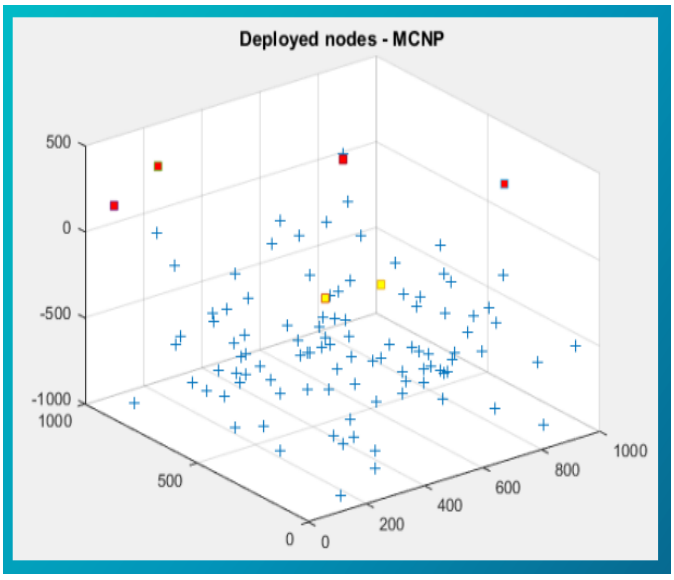

Fig -4: Deployed nodes using MCNP model

8. CONCLUSIONS

In order to provide users with the best possible experience, wireless communication systems are continually expanding. The launch of 5G communication has sparked a meteoric rise in mobile communication. In terms of connectivity failure, reconnecting issues, delivery latency, packet loss, and self-organizing networks, wireless networks encounter a variety of issues. To evaluate the wireless sensor network's performance toward achieving an energy-efficient model, customized packet transfer, and mostly self organize network that handles the task scheduler process in the edge networks, we developed an energy-optimized multi-channel neural perceptron. Disconnection is handled by a multichannel neural perceptron, which also activates self-healing systems.

9. FUTURE ENHANCEMENT

In our project the following things can be implemented in future.

- To implement Federated Learning for Decentralized Security and Energy Efficiency.
- To integrate Adaptive Power Control with AI.
- To employ Lightweight Cryptographic Algorithms for secure communications.

10. REFERENCES

[1] World Health Statistics. Accessed: Mar. 20, 2021. [Online].Available:https://www.who.int/data/gho/whs-2020-visual-summary

[2] S. Ullah, H. Higgins, B. Braem, B. Latre, C. Blondia, I. Moerman, S. Saleem, Z. Rahman, and K. S. Kwak, "A comprehensive survey of wireless body area networks," J. Med. Syst., vol. 36, no. 3, pp. 1065–1094,Aug. 2010.

[3] IEEE Standard for Local and Metropolitan Area Networks—Part 15.6:Wireless Body Area Networks, Standard 802.15.6-2012, 2012.

[4] MJ Deen,"Information and communications technologies for elderly ubiquitous healthcare in a smart home," Pers. Ubiquitous Comput., vol. 19, nos. 3–4, pp. 573–599, 2015.

[5] R. Punj and R. Kumar, "Technological aspects of WBANs for health monitoring: A comprehensive review," Wireless Netw., vol. 25, no. 3,pp. 1125–1157, Apr. 2019.

[6] M. S. Pramod , Shiva Shankar and M. Khurram, "Random node deployment and route establishment in receiver based routing protocol for WSNs," 2016 IEEE International Conference on Recent Trends in Electronics, Information & Communication Technology

(RTEICT),Bangalore,India,2016,pp.74-78, doi:10.1109/RTEICT.2016.7807786.

[7] Y. -J. Jiang and S. -Y. Fang, "COALA: Concurrently Assigning Wire Segments to Layers for 2-D Global Routing," in IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems, vol. 42, no. 2, pp.569-582,Feb.2023,doi:10.1109/TCAD.2022.3178353.

BIOGRAPHIES

P Ramya,
234M1D5812,
Dept. of CSE,VEMU IT College,
P Kothakota, Andhra Pradesh.
ramyatheja2001@gmail.com.

Dr.K Venkataramana,
Professor,
Dept. of CSE,VEMU IT College,
P Kothakota, Andhra Pradesh.
Venkatkathi84@gmail.com.

V Sridhar,
Assistant Professor,
Dept. of CSE,VEMU IT College,
P Kothakota, Andhra Pradesh.
Sreedharv1234@gmail.com.