

CHAPTER - 6

CONCLUSION

6.1 Conclusion

The 5G Networks based D2D communication protocols along with the types utilized for the communicating among the devices for reducing the burden of the base station (BS). Also, the D2D routing mechanisms and the generalized deep learning framework are outlined. Then the challenges faced by the D2D communication protocols and the application domains of D2D communication are elaborated in Chapter 1. Chapter 2 elaborates the conventional communication protocols based on Machine learning based techniques, D2D communication techniques and Cooperative communication techniques along with the research gaps. The architecture of the D2D communication protocols and the general challenges are detailed in Chapter 3.

Chapter 4 presents the joint channel selection and relay selection mechanism for efficient communication between the devices. Using the suggested EnHpo algorithm and many fitness functions, including priority, bandwidth, and transmission rate, the channel allocation is originally determined like this. The adaptive weight method is combined with the traditional hunter-prey optimization in the proposed EnHpo to increase convergence and the acquisition of the optimal global solution. Then, using deep reinforcement learning, the channel gain based on bit error rate is taken into consideration while choosing the relay.

Chapter 4 details the energy-efficient multi-hop routing system based on deep reinforcement learning. Here, a deep reinforcement learning method named double deep Q learning is suggested for the detection of multi hop path for D2D communication. In this, the DeepCNN was introduced for estimating the Q-value and reward function of the double deep Q learning for improving the path detection accuracy and solving the problem concerning the over optimization. Also, a hybrid optimization named GCO is introduced by hybridizing the hunting behavior of the Gannet with the chimp in obtaining the global best solution in choosing the optimal best path. The balanced exploration and exploitation capability of the suggested GCO algorithm with multi-objective fitness function chooses the best path for D2D communications.

6.2 Main Finding

The evaluation of first contribution EnHpo+DRL, Joint channel allocation and relay selection is performed based on the measures like Average Residual Energy, Latency, Network Life Time, Packet Delivery Ratio, and Throughput and obtained the values of 0.998, 2.709, 99.592, 0.999, and 23015, respectively.

The evaluation of second contribution GCO+DDQL, energy efficient multi-hop routing is performed based on the measures like Average Residual Energy, Latency, Network Life Time, Packet Delivery Ratio, and Throughput and obtained the values of 0.998, 2.709, 99.592, 0.999, and 23015, respectively.

6.3 Future Scope

The future scope of the research are:

- Equipment moving around the network causes the structure of the network to change in an unanticipated way, which is challenges, as the proposed research failed to consider the dynamic scenario.
- The resource reuse strategy is not considered for efficient resource allocation among the devices.
- Users of wireless communication systems have allowed roaming about; therefore managing portability becomes an important issue that has to be solved.
- It is crucial to consider privacy and security issues thoroughly while adopting and deploying communication between devices on cellular networks. Hence, during exchange, data has to be secured using an encryption method to prevent attackers.