

## Chapter 5: Conclusion and Future scope

A novel BESMRM-OAD model for secure data transfer and diagnostic procedures has been created in this Thesis. The concept that is being described consists of many stages of activities, including SPECK block cipher-based encryption, NOA-based optimum key generation, secure data management using the Hyperledger blockchain, and ML or DL-based diagnosis with optimization algorithm. The health record transmission procedure has increased security due to the inclusion of NOA in the key generation process. The Hyperledger blockchain, meanwhile, offers secure health record management, allowing patients to grant or revoke access to any doctor or healthcare facility. Finally, the ML or DL-based diagnostic procedure is used to identify any disorders that may occur. The performance of the BESMRM-OAD model was tested on two benchmark medical datasets and compared against other methods. On the first medical dataset, we see that the normal ML model (KNN) with optimization technique was performed better than others model even the dataset is quite large. Here the DL model also didn't work better. So, we can say that the Model optimization impact on the performance. If we observe the second dataset analysis, there was less amount of data but with the help the model optimization we got better results on DL based model (SVAE). So, include the metaheuristic optimization-based hyperparameter tuning help to give us the better performance. The experimental results showed that the proposed methodology outperformed the state-of-the-art methods and we achieved our objective.

In the future, we will try to work on textual data using Natural Language Processing that is important in real life to describe the patient history. We work on normal numerical records are our SPECK-NOA Encryption performs better but the normal SPECK cipher is not able to encrypt the textual data. SPECK cipher only take input as an integer. If We can convert a text into a single integer value or binary representation value then it can work properly but a text convert to a number is not an easy task. In future research, we aim to incorporate various deep learning and semi-supervised techniques. Despite our efforts to deploy our custom models for classifying illness severity in the health care system, we were unable to do so due to time constraints. We plan to deploy these models in a API based server where we will give a input dataset and this will store in the database as encrypted form and tell us the best ML or DL model for analysing the data. Additionally, the current datasets were obtained from a private hospital and lacks diversity. To increase the impact of this research, we suggest collecting data from different countries and types of clinics, including government, private, and military clinics. This would result in a more diverse dataset, representing patients from various socio-economic backgrounds, leading to more realistic research outcomes.