

CHAPTER V

CONCLUSION

5.1 Conclusion

Based on the research conducted by implementing the Particle Swarm Optimization (PSO) algorithm on the MLPClassifier model, the following conclusions can be drawn.

- a. Particle Swarm Optimization (PSO) algorithm was successfully implemented to tune hyperparameters in the Artificial Neural Network model using the MLPClassifier. The optimized hyperparameters included hidden layer size, alpha, initial learning rate, and maximum iterations.
- b. The JST-PSO model was successfully applied to breast cancer classification using the Breast Cancer Wisconsin (Diagnostic) Dataset. The optimization process was carried out using various configurations of particle count and number of iterations to obtain the optimal hyperparameter combination.
- c. Test results show that hyperparameter optimization using PSO was able to improve the ANN model's performance from an accuracy of 93.1% in the baseline model to 95.6% in the optimized model. Thus, PSO proved effective in improving classification performance in this research scenario.

5.2 Recommendations

The following are several suggestions for future research, based on the findings of this study.

- a. Future research could use other hyperparameter optimization methods, such as Genetic Algorithms or Bayesian Optimization, to compare them with PSO.
- b. Future research could use other hyperparameter optimization methods, such as Genetic Algorithms or Bayesian Optimization, to compare them with PSO.
- c. Future research could use other datasets of different types to test the consistency of the proposed method's performance.
- d. Future research could optimize more hyperparameters or explore a broader search space.

- e. Future research could utilise additional evaluation metrics besides accuracy to obtain a more broad illustration of the model's performance.