

CHAPTER 5 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Based on the testing and analysis conducted, it can be concluded that the proposed IoT and machine learning based drinking water parameter monitoring prototype was successfully developed and functioned as intended. The monitoring process generating 26,480 measurement records together with their corresponding prediction results. Based on the evaluation results, the Random Forest Regressor was selected for implementation in the system, achieving a MAE of 0.3388, a RMSE of 0.9675 and an R^2 of 0.9990.

The testing results showed that the predicted remaining time generally decreased as the TDS value increased. TDS was the first parameter to exceed the permissible limit, whereas the pH value remained within the permissible range throughout the monitoring period. The notification system generated three types of alerts, the estimated remaining time is less than 48 hours, the estimated remaining time is less than 24 hours, and TDS measurement is outside the permissible limit. The monitoring data and prediction results were successfully displayed in the mobile application.

5.2 Recommendations

The design of the monitoring system and the remaining time prediction system before pH or TDS falls outside the permissible limits developed in this study can be further improved to enhance its functionality. The following recommendations are proposed for future research:

1. Increase the amount and diversity of the training data to improve the model's generalization and prediction accuracy.
2. Use a battery as the power source to improve the flexibility of the system's installation and deployment.

3. Future research may extend the proposed system by incorporating the remaining drinking water quality parameters specified in the Regulation of the Minister of Health of the Republic of Indonesia No. 2 of 2023.

