

Additional file 1: Reproducibility and additional diagnostic figures

Runtime Anomaly Detection and Assurance Framework for AI-Driven Nurse Call Systems

Yuanyuan Liu and David R. Concepcion

Appendix A. Reproducibility

To ensure transparency and reproducibility, all source code, cleaned datasets, experiment scripts, and the interactive Streamlit application used in this study have been released as open research artifacts. These resources enable independent reproduction of the experiments, exploration of runtime anomaly detection behavior, and evaluation using custom datasets.

The materials are available through a public repository and an archived release, as detailed below:

- Source code repository: <https://github.com/maxineliu2020/ai-nursecall-runtime-anomaly-detection>
- Zenodo archival DOI: <https://doi.org/10.5281/zenodo.17767143>
- Interactive demo: <https://nursecall-demo.streamlit.app/>

These materials enable independent reproduction of the experiments, inspection of runtime behavior, and validation of the reported results.

Appendix B. Additional diagnostics

This appendix provides the supplementary diagnostic figures referenced in the main manuscript, including model confusion matrices, response-time distributions, category imbalance, operational trade-off curves, and an unsupervised extension using an autoencoder baseline.

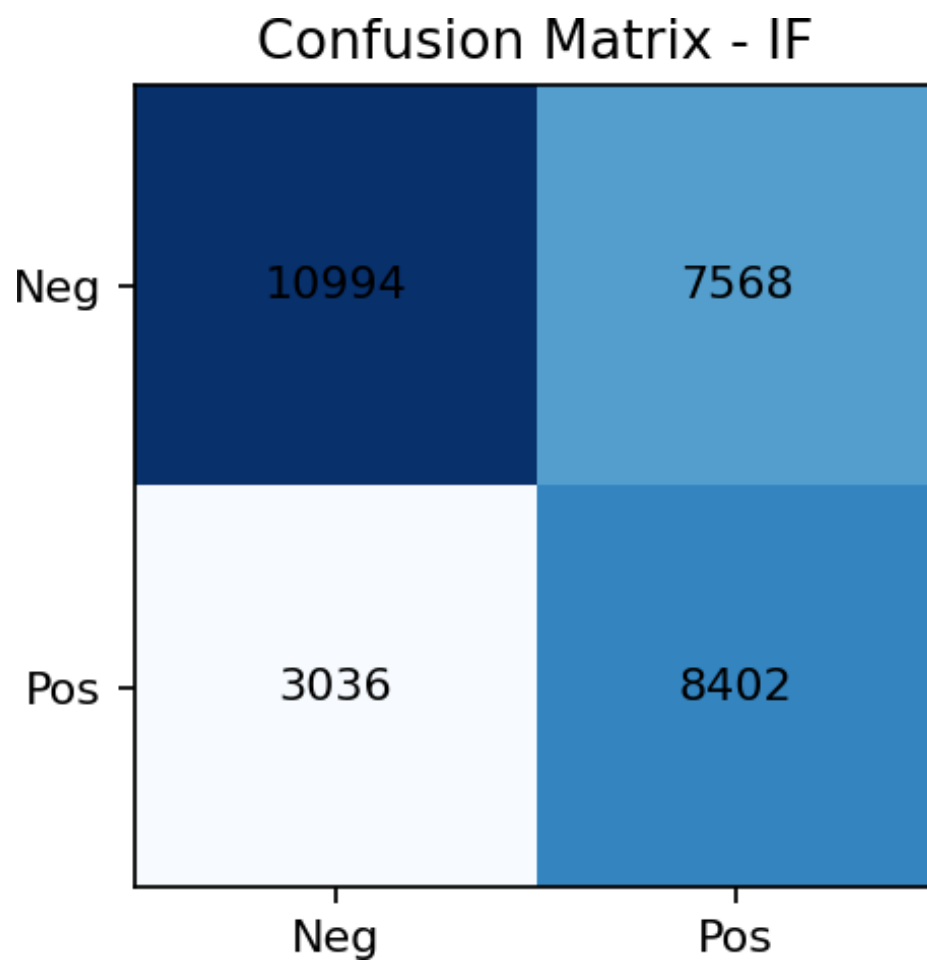


Figure S1 (original Fig. 7). Confusion matrix for Isolation Forest.

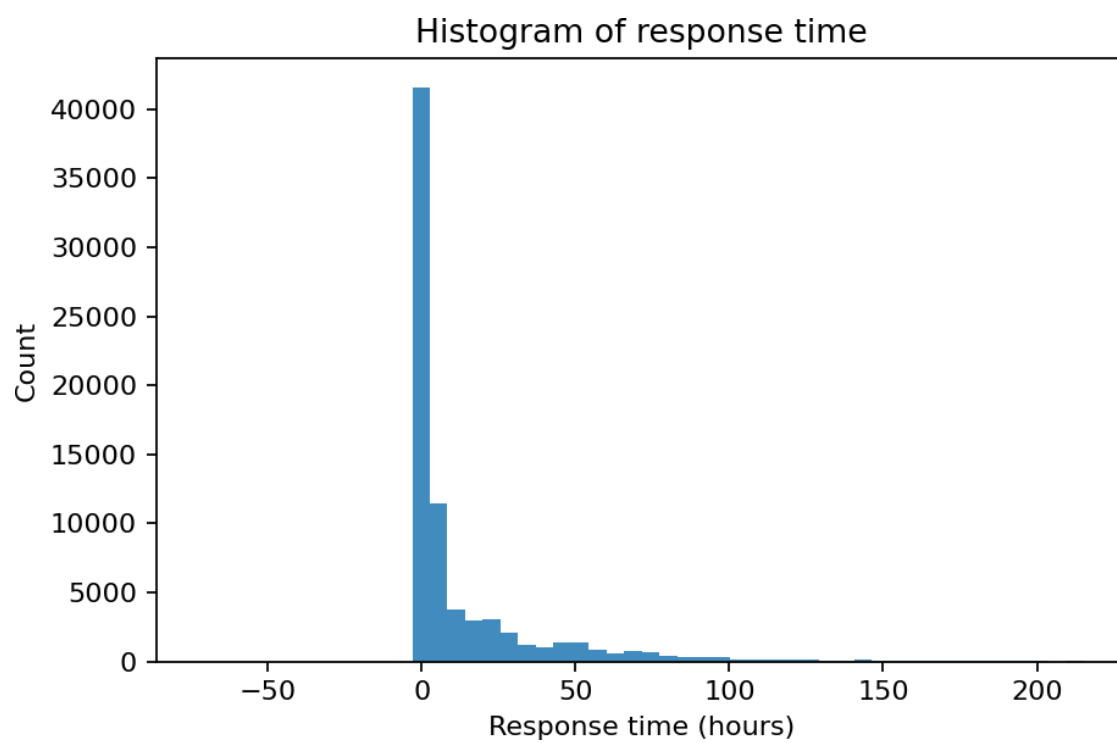


Figure S2 (original Fig. 8). Histogram of response time, providing a complementary distribution view.

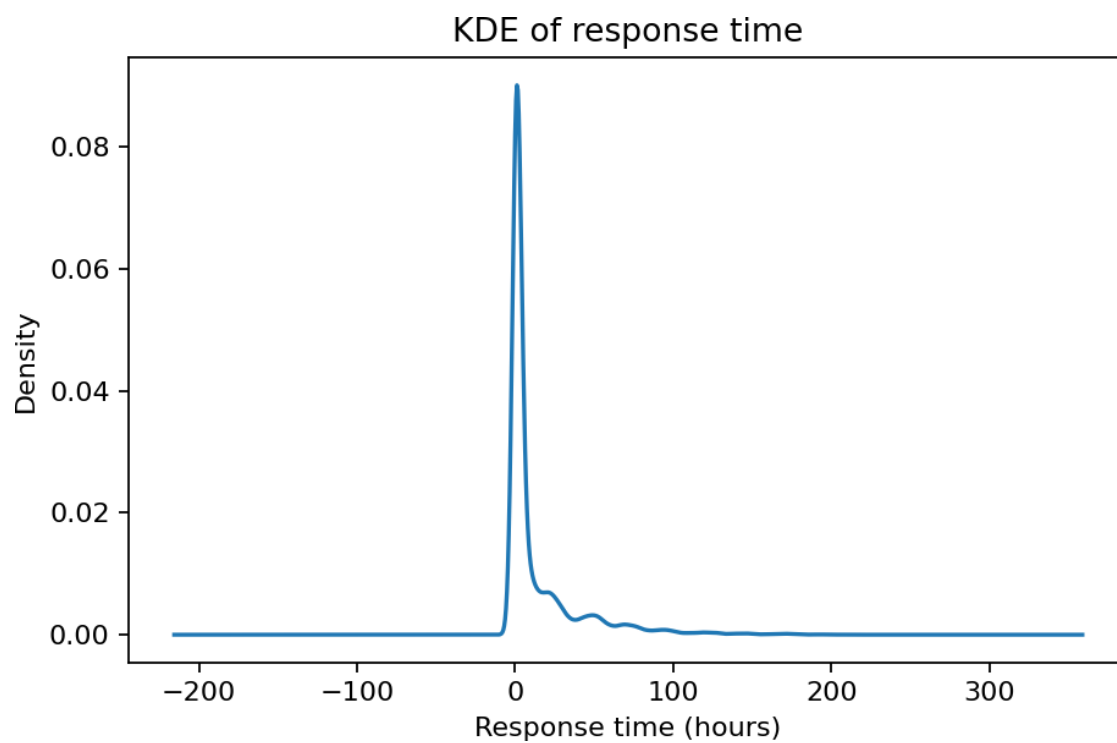


Figure S3 (original Fig. 9). Kernel density estimate of response time, providing a smoothed statistical representation.

Category distribution (top-8)

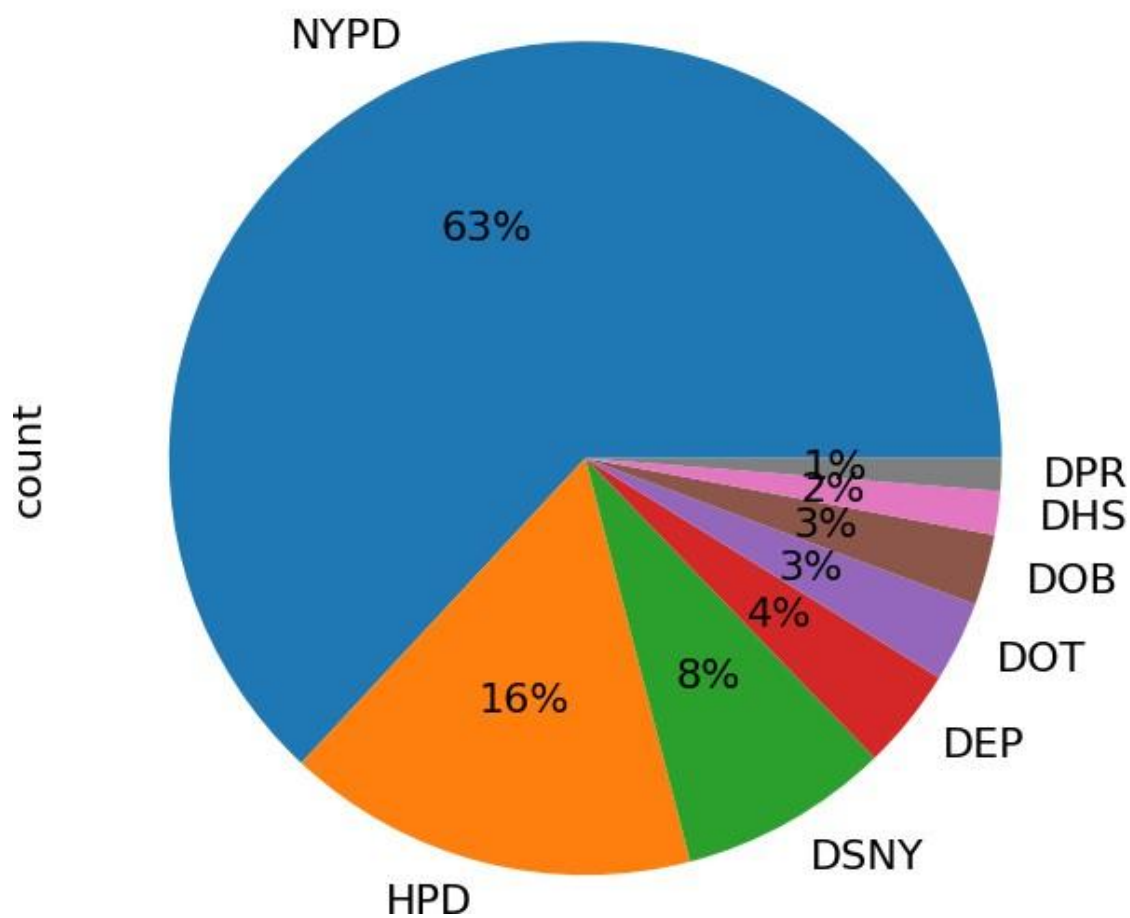


Figure S4 (original Fig. 10). Category distribution for the top eight categories, illustrating class imbalance.

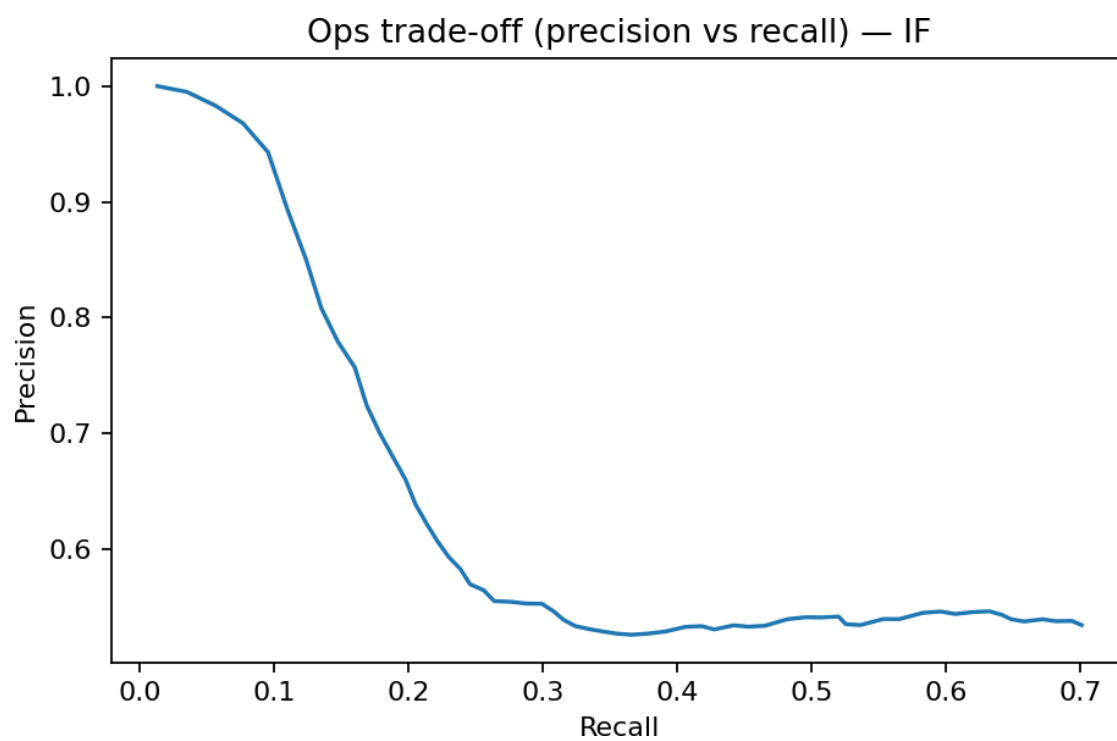


Figure S5 (original Fig. 11). Operational trade-off curve for Isolation Forest.

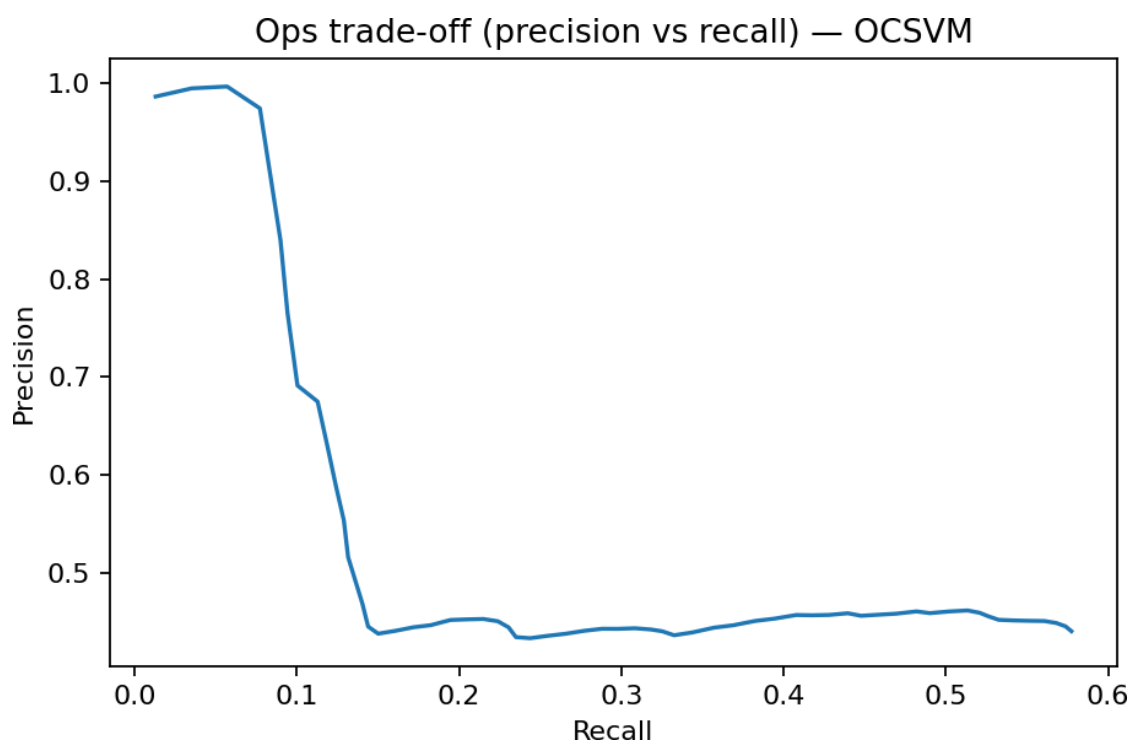


Figure S6 (original Fig. 12). Operational trade-off curve for One-Class SVM.

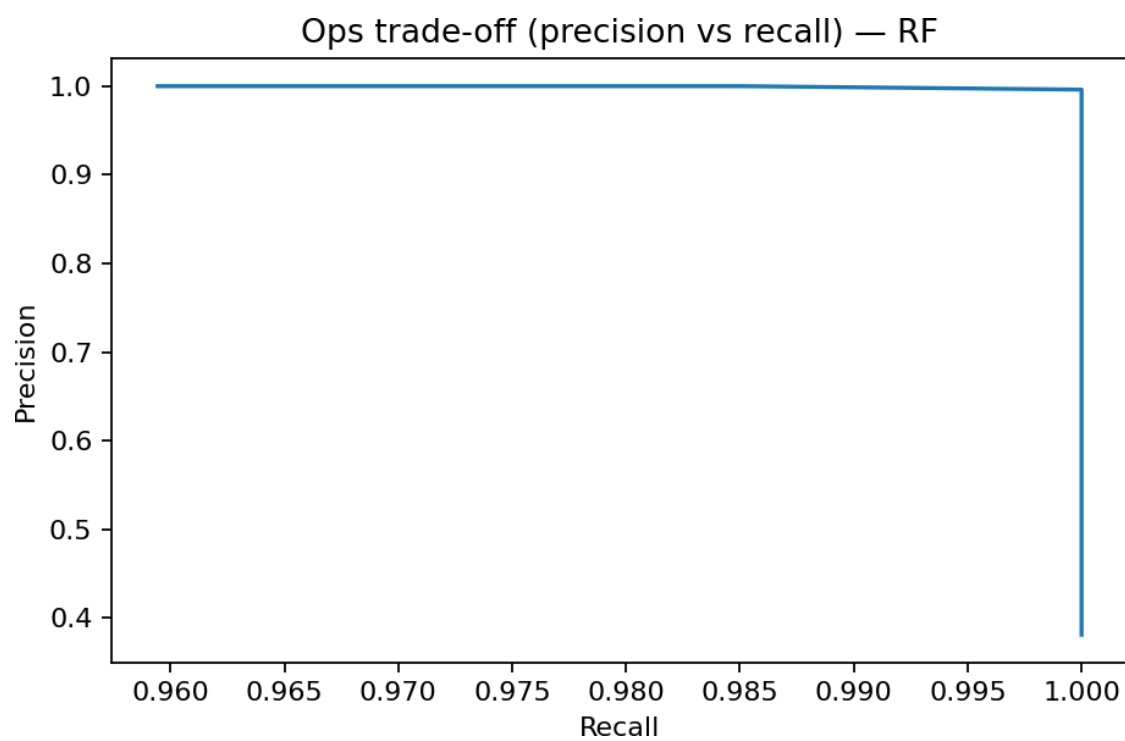


Figure S7 (original Fig. 13). Operational trade-off curve for Random Forest.

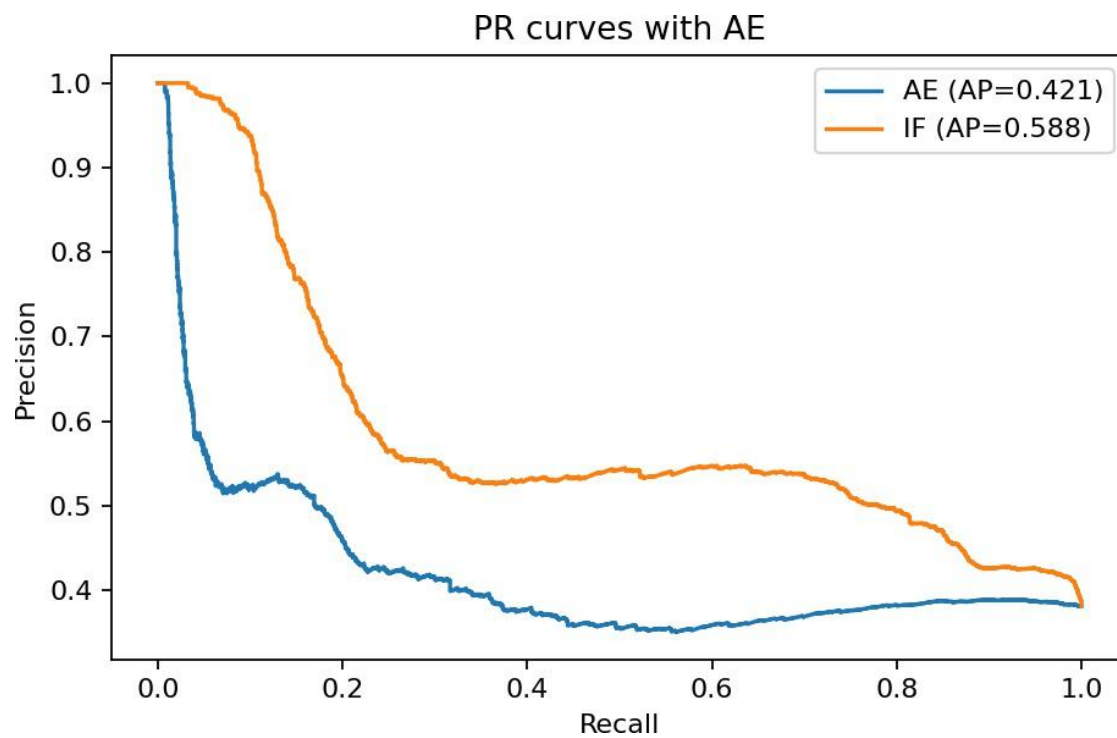


Figure S8 (original Fig. 14). Precision-recall curves with autoencoder versus Isolation Forest.