Declaration

Title of Manuscript:

Development of a Smart Autonomous Bilge Management System Using Synthetic Data and Machine Learning Algorithms

Author Contributions:

All authors have contributed significantly to the work reported in the manuscript. The specific contributions of each author are as follows:

Lead Author:

- **Conceptualization:** Formulated the research idea, defined the problem statement, and proposed the solution framework for SABIMS (Smart Autonomous Bilge Management System).

- **Methodology:** Developed and designed the research methodology, including the data synthesis process, selection of machine learning models, and evaluation techniques for bilge water management.

- **Data Analysis and Interpretation:** Implemented various models, analyzed the results, and interpreted the data to draw meaningful insights relevant to bilge management on merchant ships.

- **Writing - Original Draft:** Responsible for writing the original manuscript, including the introduction, literature review, methodology, results, and discussion.

Co-Author:

- **Supervision:** Provided continuous supervision, guidance, and feedback throughout the research process, helping refine the methodology and objectives.

- **Review & Editing:** Assisted in reviewing and revising the manuscript critically for important intellectual content, ensuring clarity, coherence, and alignment with academic standards.

- **Resources and Consultation:** Advised on the necessary tools, software, and academic resources to support the research work.

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Conflicts of Interest

The authors declare that they have no known conflicts of interest associated with this publication.

Ethics Approval

All ethical guidelines for conducting research were adhered to.

Data Availability

All data supporting the findings of this study are available on request.

Consent to Publish

All authors provide consent for the publication of this manuscript.