Universiti Teknologi Mara

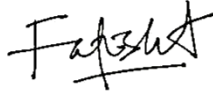# Fuzzy Inference System Approach to Quantify Water Pollution Level in Klang River

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for
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STUDENT'S DECLARATION

I certify that this report and the research to which it refers are the product of my own work and that any ideas or quotation from the work of other people, published or otherwise are fully acknowledged in accordance with the standard referring practices of the discipline.

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ABSTRACT

The Water Quality Index is an important assessment of water that sustains and preserves the aquatic ecosystem. In Malaysia, the current classification practice of the Department of Environment Water Quality Index (DOE WQI) shows a rigid value in assessing the input of parameters that are close to the boundary class. However, more rational approach is needed in the design of the water quality index, as the existing indices have a number of inconsistencies and need to be corrected. The parameters of water quality considered for obtaining WQI are different for all indices. Some important parameters have not been considered at all and the allocation of the weight age factor is completely subjective. At the same time, some parameters can dramatically change the results without justifying it. This study thus proposed a technique to use the Mamdani Fuzzy Inference Method (FIS) to determine the parameters in a holistic way. As an evaluation tool, the method describes the groups with various ranges and aggregates the parameters using membership function and Centroid function respectively. In this study, a numerical example was adapted based on data obtained from DOE on three sampling stations along the Klang River. It was adapted to show the proposed approach. The findings shown using the proposed methods indicate that the status of Klang River is ranging from Class 3 to Class 5. Overall, FIS is able to evaluate the parameters and execute them in a single index, representing the condition from Class 1 (Excellent) to Class 5 (Poor) water quality scales.

Keywords: Fuzzy Inference System, Water Quality Index, Fuzzy Membership Function

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